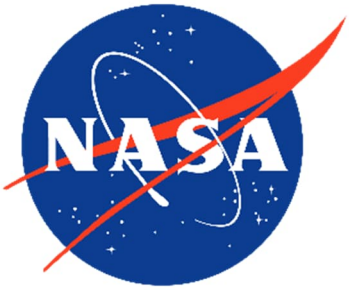
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Prepared for:



Environmental Assurance Branch
National Aeronautics and Space Administration
Kennedy Space Center, Florida 32899

A-E Contract 80KSC019D0010
Task Order 80KSC019F0075

January 2024
Revision 0

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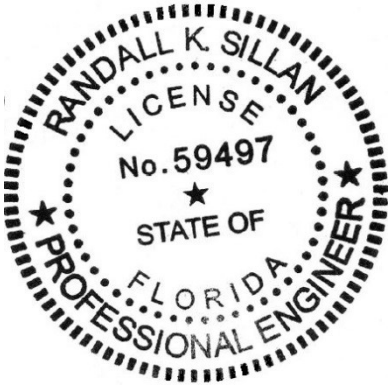
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In accordance with the provisions of Florida Statutes, Chapter 471, this Corrective Measures Implementation and Interim Measures Annual Status Report for the Kennedy Space Center Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area located in Merritt Island, Florida, has been prepared under the direct supervision of a Professional Engineer registered in the State of Florida. This document and the work described herein comply with standard professional practices and the requirements of Chapter 62-780, Florida Administrative Code (F.A.C.) and other rules of the Florida Department of Environmental Protection according to Rule 62-780.400(1), F.A.C. This work was performed in accordance with generally accepted professional engineering practices pursuant to Chapter 471 of the Florida Statutes. The data, findings, recommendations, specifications, or professional opinions were prepared solely for the use of the National Aeronautics and Space Administration and the Florida Department of Environmental Protection. AECOM makes no other warranty, either expressed or implied, and is not responsible for the interpretation by others of these data.



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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

%	percent
10xNADC	10 times the Natural Attenuation Default Concentration
ADP	Advance Data Package
AECOM	AECOM Technical Services, Inc.
bls	below land surface
CAO	Corrective Action Objective
CCR	Construction Completion Report
cDCE	cis-1,2-dichloroethene
CMD	Corrective Measures Design
CMI	Corrective Measures Implementation
CVOC	chlorinated volatile organic compound
DO	dissolved oxygen
DPT	direct push technology
EE	Engineering Evaluation
Eurofins	Eurofins Testing LLC
ERD	enhanced reductive dechlorination
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
Geosyntec	Geosyntec Consultants, Inc.
HCP	High Concentration Plume
IGM	interim groundwater monitoring
IM	Interim Measures
IMWP	Interim Measures Work Plan
ISCR	in situ chemical reduction
KSC	Kennedy Space Center
KSCRT	KSC Remediation Team
LCP	low concentration plume
LNAPL	light non-aqueous phase liquid
LTM	long-term monitoring

LUCIP	Land Use Control Implementation Plan
mg/L	milligrams per liter
M	million
MLP	Mobile Launch Platform
NADC	Natural Attenuation Default Concentration
NASA	National Aeronautics and Space Administration
NFA	No Further Action
OFW	Outstanding Florida Water
OM&M	operation, maintenance, and monitoring
PAH	polycyclic aromatic hydrocarbon
PCE	tetrachloroethene
PRB	permeable reactive barrier
RAE	Remedial Alternatives Evaluation
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RIS	Remediation Information System
SOP	standard operating procedure
STS	Space Transportation System
SWMU	solid waste management unit
TCE	trichloroethene
tDCE	trans-1,2-dichloroethene
TOC	total organic carbon
USEPA	U.S. Environmental Protection Agency
VAB	Vehicle Assembly Building
VABRA	Vehicle Assembly Building Reassessment Area
VC	vinyl chloride
WCPS	West Crawler Park Site
ZVI	zero-valent iron
µg/L	micrograms per liter

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EXECUTIVE SUMMARY

This report presents a summary of the Corrective Measures Implementation (CMI) and Interim Measure (IM) implementation activities that occurred from January 2022 through April 2023 at the Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, Solid Waste Management Unit 056 (SWMU 056), located at the John F. Kennedy Space Center, Florida.

The following summaries briefly describe areas within SWMU 056 identified by historical site investigation activities where groundwater monitoring and remedial actions have been implemented to date.

Former Hot Spot 1

Former Hot Spot 1 was located near the VAB where trichloroethene (TCE) impacts were previously identified at concentrations greater than 11,000 micrograms per liter (µg/L), which represents 1 percent (%) of literature solubility (1,100,000 µg/L) and was identified as a source zone during Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) activities, at which time it was designated as Hot Spot 1. Former Hot Spot 1 was addressed through the implementation of bioremediation and the area was transitioned to the VAB area Long-Term Monitoring (LTM) Program in August 2015 after having achieved the corrective measure objectives. Details of subsequent biennial VAB LTM events (now referred to as low concentration plume [LCP] LTM) are reported as relating to the VAB and surrounding area rather than Hot Spot 1; therefore, no additional activities have been reported for the Hot Spot 1 site.

To mitigate discharge of the dissolved plume that migrated from Former Hot Spot 1 to adjacent wetlands, a biosparge barrier system was installed as a CMI to treat groundwater immediately upgradient of the wetland where vinyl chloride concentrations were greater than 100 µg/L (NASA 2019b). The barrier has been operating since April 2005 and was expanded in February 2016.

The system shut down in December 2019 and remained off while the compressor was removed for repair. The compressor was reinstalled and the system restarted on June 25, 2020. The system operated until December 12, 2020, when it was destroyed by an electrical fire. During operation, the system effectively mitigated concentrations of chlorinated volatile compounds (CVOC). Groundwater performance monitoring and direct push technology (DPT) groundwater sampling performed in 2021 indicated the dissolved plume was migrating between biosparge barrier segments. A new trailer was mobilized and installed in November 2021. Startup of the biosparge system took place in June 2022 and operation, maintenance, and monitoring (OM&M) activities resumed in June 2022. The system was expanded in February 2023 with an additional five sparge

wells to treat the segments between the biosparge barrier segments. Additionally, from October 2022 through January 2023, monitoring wells were installed around the biosparge barrier as part of a sitewide HCP and LCP evaluation effort. Details of the biosparge barrier expansion, monitoring well installation, semi-annual performance groundwater monitoring, and LCP monitoring are provided in this report.

Former Hot Spot 2

Former Hot Spot 2 is located downgradient of the Former Hot Spot 1 area and was defined as the area with cis-1,2-dichloroethene concentrations greater than the Florida Department of Environmental Protection (FDEP) Natural Attenuation Default Concentration (NADC) of 700 µg/L and TCE concentrations greater than the NADC of 300 µg/L. Air sparging was implemented in the Hot Spot 2 area in 2012 as an IM (NASA 2019b). The air sparge system operated until April 2018, and groundwater quality continues to be monitored with interim groundwater sampling. DPT groundwater sampling was performed in and around the air sparge treatment area, post system shutdown in 2018, to evaluate the air sparge system operation and a possible expansion of the air sparge system. Analytical results indicated increased concentrations below and outside of the existing treatment area, therefore the system remained off (Decision Item 2203-D11). Details of the 2018 air sparge system OM&M and DPT groundwater sampling activities are included in the 2018 CMI and IM Annual Report dated August 2019 (NASA 2019b).

Groundwater monitoring continued since 2018, and contaminant concentrations indicated additional remediation efforts were warranted. Additional DPT groundwater data within the Former Hot Spot 2 treatment area were collected in March 2021 to support the development of a Remedial Alternatives Evaluation (RAE). Soil cores were collected around and downgradient of the treatment system to aid in developing the RAE. A RAE (Section 4) was conducted in 2023 with the purpose to treat a lower permeability fine-grained soil unit, below the air sparge treatment interval, where CVOC concentrations remain above FDEP Groundwater Cleanup Target Levels (GCTLs) and NADCs. The RAE recommended in-situ chemical reduction (ISCR) using two permeable reactive barriers (Decision Item 2310-D23). Additionally, the KSC Remediation Team (KSCRT) reached consensus to model the fate and transport of vinyl chloride at the site to support selection and optimal design of an ISCR remedy to manage matrix diffusion, to support cost evaluation, and confirm shorter remediation time frame for ISCR alternatives (Decision Item 2310-D24).

Monitoring wells were also installed within the former Hot Spot 2 area as part of a sitewide HCP and LCP evaluation effort. Details of the monitoring well installation and interim groundwater monitoring (IGM) activities are presented in this report.

Hot Spot 3

Hot Spot 3 is located adjacent to and underneath the western MLP structure, when present, and was defined as the area where CVOC impacts are greater than 10 times NADCs (10xNADC).

Bioremediation and DPT groundwater sampling were implemented as an IM in this area. A summary of the activities associated with the Hot Spot 3 Area Bioremediation IM is included in the 2018 CMI and IM Annual Report (NASA 2019b). The Western MLP Park site was leased to a commercial partner, and access to the area during the lease was restricted (area includes the Hot Spot 3 Bioremediation IM Area). Therefore, the Hot Spot 3 Bioremediation IM area monitoring wells (VABRA-MW0001 through VABRA-MW0005 and VABRA-IW0065 through VABRA-IW0075) were abandoned in April 2019 and the western MLP structure was removed between 2019 and 2020. Following the reinstatement of site access in March 2021, a DPT performance monitoring event was performed to evaluate current conditions and determine whether additional substrate is required to promote continued dissolved plume degradation. Details of the DPT groundwater sampling event were provided in the 2021 CMI and IM Annual Report (NASA 2022). Based on the extent of CVOC concentrations, additional bioremediation injection methods were presented under separate cover for Hot Spot 3 as an Interim Measures Work Plan (IMWP) Advance Data Package (ADP). The Hot Spot 3 IMWP ADP received team consensus (Decision Items 2302-D28) and is undergoing FDEP review.

Hot Spot 3 (OFW)

The dissolved plume from Hot Spot 3 extends to an area near Outstanding Florida Water (OFW), and the leading edge of the dissolved plume (referred to as the Hot Spot 3 OFW area) is in interim groundwater monitoring (IGM) (NASA 2019b). Per recommendation from AECOM in the 2019 CMI and IM Annual Report, Hot Spot 3 OFW sampling frequency was transitioned from semi-annually to annually beginning in 2020 based on contaminant concentrations below FDEP GCTLs in monitoring wells. The September 2021 annual IGM activities at the Hot Spot 3 OFW area indicated that CVOC concentrations are less than GCTLs in monitoring wells sampled, and concentrations of VC continue to exhibit a decreasing trend. The details of the December 2022 annual IGM activities at the Hot Spot 3 OFW area are included in this report.

Hot Spot 4

Hot Spot 4 is located near the northeast corner of the eastern MLP structure and was defined as the area with 2-methylnaphthalene concentrations in groundwater above the NADC of 280 µg/L and where light non-aqueous phase liquid (LNAPL) was identified in one monitoring well (VABRA-MW0010). A passive skimmer was installed in VABRA-MW0010 to recover LNAPL and IGM was performed annually until the future of the MLP structure was determined (NASA 2019b). Monthly inspection of the passive skimmer indicated LNAPL was no longer present or detected with an in-well probe since April 2017. May 2018 IGM data indicated contaminant concentrations from monitoring well VABRA-MW0010 were below FDEP GCTLs; therefore, measurement of LNAPL was discontinued in September 2018. In a letter dated January 30, 2020, FDEP approved removal of the LNAPL skimmer and abandonment of monitoring wells VABRA-MW0007 through VABRA-MW0009. Monitoring well VABRA-MW0010 was left in place for future groundwater monitoring to comply with NFA criteria when the remainder of SWMU 056 achieves closure requirements.

Long Term Monitoring

LTM of the LCP (formerly referred to as the VAB LTM) has been conducted since May 2005 and involves the biennial sampling of monitoring wells throughout the MLP/VAB area. Following an assessment of the 2018 data, additional monitoring wells around the VAB and surrounding SWMU area were included in the 2020 LTM event to obtain data in areas with perceived data gaps. Sampling results from 2020 indicated elevated vinyl chloride at select monitoring wells. The select wells and periphery monitoring wells were resampled and the results were within the same magnitude as data from previous groundwater sampling events since 2014 and DPT groundwater data collected in 2012 and 2013. The LCP LTM monitoring well network was evaluated and details were provided in the 2021 CMI and IM Annual Report (NASA 2022). A total of 50 monitoring wells (37 new monitoring wells installed throughout the MLP/VAB site and 13 existing monitoring wells) were added to the biennial sampling plan to further monitor plume characteristics .

Sitewide Water Gauging

Sitewide water gauging events are alternated seasonally to capture hydrogeologic conditions during the dry and wet seasons. Since the 2021 CMI and IM Annual Report (NASA 2022a) included a sitewide water gauging event performed during the dry season in March 2021, the next scheduled water gauging event was scheduled for the wet season (generally from May and October) in 2022. However, the 2022 sitewide gauging event was postponed until completion of monitoring well installations and will occur outside of this report. A sitewide water gauging event during the wet season will be included in a subsequent report detailing activities performed in the remainder of 2023. Groundwater elevations were collected from sampled monitoring wells during the 2022 (March, April and December) and 2023 (March) IGM activities.

MLP/VAB Groundwater Monitoring Program

Monitoring locations in the MLP/VAB groundwater monitoring program fall within semi-annual, annual, or biennial sampling frequencies based on historical trends. The sampling frequencies for the MLP/VAB areas are as follows:

- Former Hot Spot 2 (Air Sparge Area): Semi-annual IGM
- Biosparge Area: Semi-annual performance monitoring
- Hot Spot 3 (OFW): Annual performance monitoring
- Hot Spot 4: To be sampled during SWMU closure
- LCP LTM: Biennial groundwater monitoring

The path forward for each MLP/VAB area is summarized below:

- **Biosparge Barrier for Mitigating the HCP**: Continued operation of the system which includes weekly telemetric readings, monthly operation and maintenance activities, semi-annual biosparge well cleanouts (as needed), and semi-annual performance monitoring for

CVOCs (Decision Items 2310-D02 and 2310-D03). Three monitoring wells downgradient of the biosparge barrier in the adjacent wetland area will be transitioned from the LCP LTM plan to the biosparge area semi-annual performance monitoring sampling plan (Decision Item 2310-D04).

- **HCP Interim Measures within the Former Hot Spot 2 Area (Air Sparge Area)**: The air sparge system for the Former Hot Spot 2 area will remain off and IGM will continue with a reduced analyte list. Based on 2021 DPT CVOC concentrations, HCP plume migration toward the treatment barrier was observed and the need for additional remediation efforts was confirmed. A RAE was performed and details are summarized in this report. Semi-annual IGM will continue (Decision Item 2310-D05) and the sampling plan will be evaluated one year after implementation of the selected technology from the RAE (Decision Item 2310-D06).
- **Hot Spot 3 (Bioremediation IM Area)**: Based on 2021 DPT analytical results, an IMWP for supplemental injections to promote in situ chemical reduction of CVOCs was developed and is undergoing review. Implementation of the IMWP is anticipated following FDEP approval.
- **Hot Spot 3 (OFW)**: IGM will continue on an annual basis to monitor groundwater quality downgradient of the Hot Spot 3 treatment area (Decision Item 2310-D07).
- **Hot Spot 4**: FDEP approved removal of the LNAPL skimmer monitoring wells VABRA-MW0007 through VABRA-MW0009 that were abandoned in 2020. Monitoring well VABRA-MW0010 will remain in active status to be available for confirmation sampling during SWMU closure. No additional activities are planned for this area.
- **LCP LTM**: LTM will continue on a biennial basis with a reduced analyte list and modified monitoring well network (Decision Items 2310-D12, D13 and D16), including the transition of three wells to the biosparge area sampling plan (Decision Item 2310-D14). The overall LTM program evaluation determined additional monitoring wells are needed to further evaluate GCTL plume behavior (Decision Items 2310-D08, D10 and D11). New wells were installed and sampled following installation in Fall of 2023. One additional set of data will be collected in 2025 to obtain a second biennial data set that will reflect four years of groundwater conditions from the newly installed monitoring wells (Decision Item 2310-D15) prior to re-evaluating the LTM well network or modifying the sampling plan.

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1. INTRODUCTION

1.1 OVERVIEW

The National Aeronautics and Space Administration (NASA), through its Environmental Assurance Branch, is managing cleanup of four sites in the Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area of Kennedy Space Center (KSC), Florida. The MLP/VAB Area has been designated Solid Waste Management Unit 056 (SWMU 056) under KSC's Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

AECOM Technical Services, Inc. (AECOM) has prepared this report and completed the referenced site activities for NASA under Contract 80KSC019D0010, Task Order 80KSC019F0075. The Advanced Data Packages (ADPs), presented in preparation for this report, received KSC Remediation Team (KSCRT) approval at the October 2023 KSCRT meeting. Meeting minutes are included in **Appendix A**. This report presents the activities, findings, and recommendations associated with corrective measures implementation (CMI) and interim measures (IM) performed at this site from January 2022 through April 2023. Activities include: interim groundwater monitoring (IGM) in former treatment areas, monitoring well installation and retrofitting in support of evaluating the low concentration plume (LCP) and overall monitoring well maintenance, soil cores to aid in developing a remedial alternatives evaluation (RAE), summary of the RAE, and expansion, trouble-shooting, startup and operation, maintenance and monitoring (OM&M) of the biosparge barrier treatment system.

1.2 SITE LOCATION

KSC is located on the east-central Atlantic Coast of Florida in the northern portion of Merritt Island, between the Indian River and Banana River Lagoons in Brevard County (**Figure 1-1**). The MLP/VAB Area is located within KSC in Sections 7, 8, 17, and 18 of Township 22 South, Range 37 East, as shown on the Orsino, Florida Quadrangle map (United States Geological Survey 1976) (**Figure 1-2**).

The MLP/VAB facilities were originally built to support the Apollo/Saturn V vehicle assembly and were later modified (1975) to support Space Transportation System (STS) shuttle missions. The MLP area was used to repair post launch corrosion and/or blast damage on the launch platforms prior to reuse. The VAB was used to stack and prepare the space vehicles prior to launch (NASA 2019b).

1.3 BACKGROUND

During the RCRA Facility Investigation (RFI) and pre-Corrective Measures Design (CMD) activities, chlorinated volatile organic compound (CVOC) groundwater impacts encompassing

an area of approximately 115 acres were delineated (NASA 2000, 2003). In addition, a trichloroethene (TCE) source area was identified (within the CVOC impacted area) beneath the parking lot northeast of the VAB, which was associated with an anecdotal TCE spill (approximately 4,000 gallons) that occurred in 1966. A CMD presented a multicomponent remedial strategy developed for the source area and the 115-acre CVOC plume (NASA 2004).

Additional investigations that occurred at the site included a reassessment of the VAB area commissioned by Ground Systems Development & Operations following the completion of the STS Program. The reassessment activities were performed throughout the VAB Reassessment Area (VABRA) from 2012 through 2014. These activities evaluated the absence or presence of groundwater and soil impacts associated with electrical equipment (NASA 2015d). Groundwater samples were collected from a 112-acre area surrounding the VAB to recharacterize the overall low concentration plume (LCP) and ancillary plumes. A total of 4,922 DPT samples were collected from 556 locations as well as several hundred soil samples to evaluate soil impacts of electrical equipment. Details are summarized in the 2015 Environmental Conditions Assessment Report (NASA 2015d). These sampling efforts also identified two new hot spots (Hot Spot 3 and Hot Spot 4). Through the multiple site investigations, four hot spot areas were identified (Hot Spot 1 through Hot Spot 4) (**Figure 1-3**). Beginning in 2020, the groundwater sampling associated with SWMU 056 was removed from the VAB Long-Term Monitoring (LTM) Program to allow site groundwater to be evaluated and documented within one report under the separate MLP/VAB (SWMU 056) sampling program. **Sections 1.3.1** through **1.3.5** provide details regarding the impacts identified in each hot spot area and a brief description of remedial actions implemented.

1.3.1 Former Hot Spot 1

Former Hot Spot 1 is the area near the VAB (**Figure 1-3**) where TCE impacts were identified at concentrations greater than 11,000 micrograms per liter (µg/L), which represents 1% of literature solubility (1,100,000 µg/L) and was identified as a source zone during RFI activities and later renamed Hot Spot 1. The CMD to address the 115-acre CVOC plume and Hot Spot 1 included:

- LTM of the LCP (formerly referred to as the VAB LTM) (2005 to present);
- Enhanced bioremediation of the source area (Hot Spot 1) from 2006 to 2009; and
- Biosparging (2005 to present) with air to promote the in situ aerobic bioremediation of vinyl chloride (VC) to mitigate the potential discharge of the associated LCP (concentrations above FDEP Groundwater Cleanup Target Levels [GCTLs]) high concentration VC plume (concentrations greater than the Florida Department of Environmental Protection [FDEP] Natural Attenuation Default Concentration [NADC] of 100 µg/L) to adjacent wetland areas (surface water).

LTM of the low LCP has been conducted since May 2005 and involves the sampling of monitoring wells throughout the VAB and surrounding area. LTM activities were previously reported in annual and biennial reports under the VAB LTM Program. Beginning in 2020, groundwater monitoring associated with SWMU 056 in the VAB LTM Program was transitioned to the MLP/VAB sampling program to allow for data to be combined into one program and to allow for a more comprehensive evaluation of the sitewide dissolved plume characteristics. The results and data evaluation of the LTM sampling that occurred from January 2021 through December 2021 were submitted in the last report for the MLP/VAB in the 2021 CMI and IM Annual Status Report (NASA 2022).

Enhanced bioremediation of the TCE source area was implemented from August 2006 until March 2009 using ethyl lactate as an electron donor. The Corrective Action Objective (CAO) was achieved, and documentation of the enhanced bioremediation activities and results are presented in the Biotreatability Study Implementation Annual Reports (NASA 2008, 2009). IGM (which was previously referred to as interim LTM) of the TCE source zone was recommended to the KSCRT and was implemented following team consensus in 2009. IGM was terminated in 2015 and two of the monitoring wells in the former source area (SAMW0001 and SAMW0003) were transitioned into the VAB LTM program (documented in the 2015 CMI and IM Annual Report [NASA 2015b]).

The biosparge barrier that was installed to mitigate migration from the Former Hot Spot 1 area has been operating since April 2005 and was expanded in February 2016 (NASA 2016a). Monthly OM&M activities have been performed on the biosparge barrier, along with scheduled groundwater sampling of performance monitoring wells. In the 2019 CMI and IM Annual Report Revision 1 submitted in December 2020 (NASA 2020), it was recommended to continue operation of the biosparge system and performance monitoring as the biosparge barrier was effectively mitigating contaminant migration to the adjacent wetlands. In December 2020, the biosparge system was shut down due to a fire within the treatment trailer. Based on IGM data from the March and September 2020 sampling events, it was recommended to modify the monitoring well network to include three additional wells in order to capture CVOC plume activity between the biosparge barrier segments. Additional recommendations were made for supplemental DPT groundwater sampling around the biosparge system to further evaluate the CVOC plume and determine whether expansion of the biosparge system is necessary. The DPT evaluation confirmed the need for additional remediation efforts as indicated in the 2021 CMI and IM Annual Report (NASA 2022a) and associated ADP (NASA 2022b).

A new equipment trailer was mobilized and installed in November 2021 and startup of the biosparge system took place in June 2022. In February 2023, five additional biosparge wells were installed in the gap of the existing biosparge barrier to aid in mitigating the CVOC plume migrating to the downgradient wetland area. This report details the biosparge system startup and

troubleshooting, the biosparge well expansion, and the semi-annual biosparge performance monitoring event completed in Spring 2022 and Spring 2023. Following completion of active remediation in the former Hot Spot 1 area, the biosparge barrier performance is discussed in relation to the plume from the upgradient Former Hot Spot 2 area, which is discussed in the next section.

1.3.2 Former Hot Spot 2

Following achievement of the CAO within Hot Spot 1, supplemental assessment activities occurred within the area downgradient of Former Hot Spot 1 to refine the understanding of the CVOC mass distribution of the dissolved plume (primary plume swath) that extended from Former Hot Spot 1 toward the biosparge barrier. During supplemental assessment activities, investigations followed the KSCRT multi-step Engineering Evaluation (EE) Process (NASA 2012). During this process TCE and cis-1,2-dichloroethene (cDCE) were delineated to their respective FDEP GCTLs, and VC was delineated to its NADC. The area of the primary plume swath with TCE concentrations greater than the NADC of 300 µg/L and cDCE concentrations greater than 7,000 µg/L (10 times the NADC [10xNADC] of 700 µg/L) was designated as Hot Spot 2 (**Figure 1-3**).

An air sparge IM was implemented in Hot Spot 2 and the air sparge system was installed in 2012, with system start-up in August 2012 (NASA 2013b). The existing remediation system used for operation of the biosparge barrier was modified to add two legs to supply the Hot Spot 2 air sparge wells so that both biosparge and air sparge operations could run off the same compressor. Additional details on the EE Process for Hot Spot 2 and air sparge system implementation are provided in the following documents:

- Site Characterization EE ADP (formerly referred to as a Step 1 EE) (NASA 2011c);
- RAE EE ADP (formerly referred to as a Step 2 EE) (NASA 2011d);
- 2011 CMI Report: Summary of Interim LTM, Supplemental Assessment, and Biosparge System OM&M (NASA 2011b);
- Air Sparge IM Work Plan EE ADP (formerly referred to as a Step 3 EE) (NASA 2011e);
- Air Sparge IM Work Plan (NASA 2011a);
- Air Sparge Construction Completion Report (CCR) ADP (formerly referred to as a Step 4a EE) (NASA 2012);
- Air Sparge System CCR (NASA 2013b); and
- Air Sparge System and Biosparge System Re-Start and Initial Performance Monitoring (Re-Start through Month 6) ADP (NASA 2014c).

As documented in the 2013 CMI and IM report (NASA 2013a), the compressor for the sparge system, which delivered air to both the biosparge and the air sparge well networks, reached the end of its useful life in September 2012 and the sparge system was shut down. The sparge system

compressor was replaced in May 2013, and operation of the biosparge and air sparge systems began in June and July 2013, respectively, following troubleshooting activities. System restart after the compressor replacement and results from the following 3 years of operation are documented in the 2014 CMI and IM Annual Report (NASA 2014b) and associated ADP (NASA 2014a), the 2015 CMI and IM Annual Report (NASA 2015b) and associated ADP (NASA 2015a), the 2016 CMI and IM Annual Report (NASA 2016c) and the associated ADP (NASA 2016b).

The sparge system again ceased operations in May 2016 due to compressor failure. The compressor was unable to be successfully repaired by a certified manufacturer technician; therefore, a new compressor was provided and successfully restarted in May 2017. After one year of operation, the Hot Spot 2 air sparge system was shut down in April 2018 to evaluate effectiveness. Post shut-down performance monitoring events in May 2018 and March 2019 indicated limited rebound of CVOC concentrations occurred in the treatment area, an overall reduction in NADC plume footprint, and no detections under the treatment area (55 feet to 65 feet at MLPV-IW0030).

In addition to post shutdown groundwater monitoring, results from the DPT groundwater sampling events (February and June 2018) within and outside the air sparge treatment area supported the evaluation and decision to shut down the Hot Spot 2 air sparge system. Details of these activities are summarized in the 2018 CMI and IM Annual Report (NASA 2019b) and associated ADP (NASA 2019a). Based on the analyses, it was recommended for the air sparge system to remain off and groundwater monitoring to continue for one year. Following one year of monitoring, the sampling frequency and locations were to be evaluated, and statistical analysis performed to evaluate trends after air sparge system shutdown.

October 2019 IGM data indicated that dissolved plumes remained stable since the shutdown of the air sparge system. The air sparge system remained off and IGM continued annually with a reduced analyte list of TCE, cDCE, trans-1,2-dichloroethene (tDCE), and VC only beginning in 2020. Following the 2020 IGM event, plume analytics indicated a significant mass and concentration of cDCE and VC remain below the treatment interval and are not expected to attenuate to target levels in the short term. The 2020 CMI and IM Annual Report (NASA 2021) recommended continued IGM sampling for analysis of cDCE, tDCE and VC only and additional DPT groundwater sampling for evaluation of remedial alternatives for the cDCE and VC concentrations present in lower permeability soil under the vertical extent of the air sparge wells.

In March and April 2021, a total of 25 DPT groundwater samples from 12 locations were collected at 4-foot intervals of 41 feet to 45 feet below land surface (bls) and 45 feet to 49 feet bls. One deep sample was collected from 51 feet to 55 feet bls to confirm the vertical boundary of the HCP. Evaluation of DPT data indicated VC remains the predominant contaminant within

the Former Hot Spot 2 treatment area, with the highest concentrations located north of the treatment area. VC concentrations that exceed its NADC indicate an HCP persists in the deeper lower permeability layer and is migrating toward the treatment barrier at higher concentrations than in shallower groundwater that was treated by the air sparge system. The overall evaluation confirmed the need for additional remediation efforts as indicated in the 2021 CMI and IM Annual Report (NASA 2022a) and associated ADP (NASA 2022b). Team consensus was obtained in the March 2022 KSCRT meeting to collect soil cores for soil permeability analysis to gain an understanding of current soil characteristics in the low permeability soil layer and to aid in the development of a Remedial Alternatives Evaluation (RAE), (Decision item 2203-D10).

This report summarizes two semi-annual IGM sampling events performed in Spring 2022 and Spring 2023, soil core activities, and RAE.

1.3.3 Hot Spot 3 and Hot Spot 3 OFW Area

During VAB reassessment activities, an area with CVOC concentrations greater than 10xNADC was identified adjacent to the former western MLP structure (NASA 2015d); the western structure was removed in 2021. This area (Hot Spot 3) is located partially beneath and south of the former western MLP structure and adjacent to the crawler tracks (**Figure 1-3**). Other groundwater impacts associated with Hot Spot 3 include a TCE source zone (TCE greater than 11,000 µg/L), a high concentration plume (HCP) (CVOC greater than NADCs), and an LCP (CVOC greater than FDEP GCTL). The activities in this area followed the KSCRT multi-step EE process and details are provided in the following documents:

- Site Characterization EE ADP (formerly referred to as Step 1 EE) (NASA 2015c);
- Remedial Alternative Evaluation EE ADP (formerly referred to as Step 2 EE) (NASA 2016e);
- Hot Spot 3 Bioremediation IM Work Plan (NASA 2016d);
- Hot Spot 3 Bioremediation Implementation Work Plan (NASA 2017a);
- Hot Spot 3 Bioremediation CCR (NASA 2018c); and
- Hot Spot 3 Bioremediation IM Annual Report (NASA 2018b).

In the Hot Spot 3 Bioremediation IM Annual Report, it was recommended to (1) perform semi-annual performance monitoring; (2) discontinue underground injection control monitoring; (3) complete a DPT groundwater sampling event within the bioremediation treatment area to evaluate CVOC concentration changes since the pre-IM DPT sampling event; and (4) utilize performance monitoring results and DPT groundwater sampling results to develop a Bioremediation Implementation Work Plan Addendum for additional injection activities. Details of the Hot Spot 3 Bioremediation IM activities from October 2018 through April 2019 are included in the 2018 CMI and IM Annual Report (NASA 2019b). Analytical data following bioremediation activities indicated an approximate 80% to 100% mass reduction of CVOC down

to 30 feet below land surface (bls), aquifer conditions are favorable to microbial reductive dechlorination in both the shallow and deep treatment areas, and microbial reduction of CVOC was occurring. Due to the access restrictions imposed from a commercial leasing partner in 2019, the site monitoring wells were abandoned. Access to the site was reinstated in 2021 and data from additional DPT groundwater sampling performed in March and April 2021 is provided in the 2021 CMI and IM Annual Status Report (NASA 2022a).

In October 2015, two monitoring wells (MW0011 and MW0012) were installed northwest of the railroad tracks to evaluate the extent of the dissolved VC plume identified adjacent to the Outstanding Florida Water (OFW) that is the portion of the LCP downgradient from the Hot Spot 3 area. Groundwater samples collected from those monitoring wells indicated that VC concentrations were greater than the NADC and/or the GCTL. Subsequent sampling events completed in January and July 2016 indicated that VC concentrations in groundwater samples collected from both monitoring wells were less than the NADC but were greater than the GCTL. Due to the fluctuating VC concentrations, an investigation of the area (using DPT groundwater sampling) was performed to evaluate whether an additional source area was present. No additional source areas were identified during this investigation. The results of the investigation and the delineation of the 1 µg/L VC plume were presented in the Hot Spot 3 OFW Site Characterization ADP (NASA 2018d). In the Hot Spot 3 OFW Site Characterization ADP, KSCRT consensus was obtained to transition the area to IGM with semi-annual sampling and to install two additional monitoring wells in the area. Monitoring wells VABRA-MW0013 and VABRA-MW0014 were installed on September 13, 2018. DPT groundwater sampling was performed in March 2019 at four historical DPT locations (DPT0578, DPT0579, DPT0597, and DPT0601) to evaluate downgradient VC concentrations in the OFW area. Additional details of the monitoring well installation and the DPT IGM sampling are provided in the 2018 CMI and IM Annual Report (NASA 2019b). In October 2019, groundwater sampling was performed and CVOC concentrations remained less than the GCTL, with the exception of VC in monitoring well VABRA-MW0013. It was recommended to continue sampling in this area, with a modification in frequency from semi-annually to annually, as well as a reduced analyte list of TCE, cDCE, tDCE, and VC only.

In March 2021, site access to Hot Spot 3 was reinstated and DPT performance monitoring was implemented to evaluate the extent of current CVOC contamination above NADCs and whether additional treatment is required to promote continued dissolved plume degradation. Details of the April 2021 DPT sampling were presented at the September 2021 KSCRT and team consensus was reached to proceed with an IMWP to implement additional in situ chemical reduction (Decision Item 2109-D35). At the time of this report's submission, the IMWP submittal is undergoing review. This report summarizes the annual sampling event performed on December 14, 2022.

1.3.4 Hot Spot 4

During the VAB reassessment activities, light non-aqueous phase liquid (LNAPL) was identified in samples collected from monitoring well VABRA-MW0006, which was located near the eastern MLP area (**Figure 1-3**). Hot Spot 4 is defined as the area around monitoring well VABRA-MW0006 where the concentration of 2-methylnaphthalene was greater than its NADC. Other groundwater contaminants of concern identified within Hot Spot 4 included polycyclic aromatic hydrocarbons (PAHs), 1-methlynaphthalene, and naphthalene at concentrations greater than their respective FDEP GCTLs. Details of the Hot Spot 4 delineation activities are presented in the Site Characterization EE ADP (NASA 2015c) and IGM was selected to monitor the stability of the LNAPL and groundwater concentrations until the future of the MLP structure was known.

Monitoring well VABRA-MW0006 was over-drilled with a larger diameter well (VABRA-MW0010) to allow installation of a passive LNAPL skimmer in November 2015. A passive remedial action was selected because the area of impact was in the immediate vicinity of the former MLP structure construction activities and implementing active remediation for the very limited area of LNAPL was not feasible at the time due to site constraints. Following recommendations from the 2017 CMI and IM Annual Report (NASA 2018a), the skimmer was monitored monthly and no LNAPL was collected. An oil/water interface probe did not detect LNAPL greater than 0.01 foot in monitoring wells VABRA-MW0007 through VABRA-MW0009 and only a sheen was identified in VABRA-MW0010; therefore, a groundwater sample was collected from monitoring well VABRA-MW0010 in May 2018. The analytical results indicated that PAHs, benzene, toluene, ethyl benzene, and xylene, methyl tert-butyl ether, and total recoverable petroleum hydrocarbon concentrations were not detected. Details of the associated activities are provided in the 2018 CMI and IM Annual Report (NASA 2019b), which recommended the skimmer be removed and monitoring wells be abandoned. No Further Action (NFA) for Hot Spot 4 was requested. Per FDEP letter dated January 30, 2020, NFA will be approved once the entire SWMU achieves NFA requirements. FDEP approval was granted on the LNAPL skimmer removal from monitoring well VABRA-MW0010 and abandonment of monitoring wells VABRA-MW0007 through VABRA-MW0009. The three monitoring wells were abandoned in 2020. Additional sampling of VABRA-MW0010 will occur before NFA.

1.3.5 Long-Term Groundwater Monitoring Program

The MLP/VAB site is one of several sites located within SWMU 056. Prior to 2018, sampling results were documented in annual and biennial reports under the VAB LTM Program. Beginning in 2020, groundwater monitoring associated with SWMU 056 in the VAB LTM Program was transitioned to the MLP/VAB sampling program to allow for data to be combined into one program and to allow for a more comprehensive evaluation of the sitewide dissolved plume characteristics.

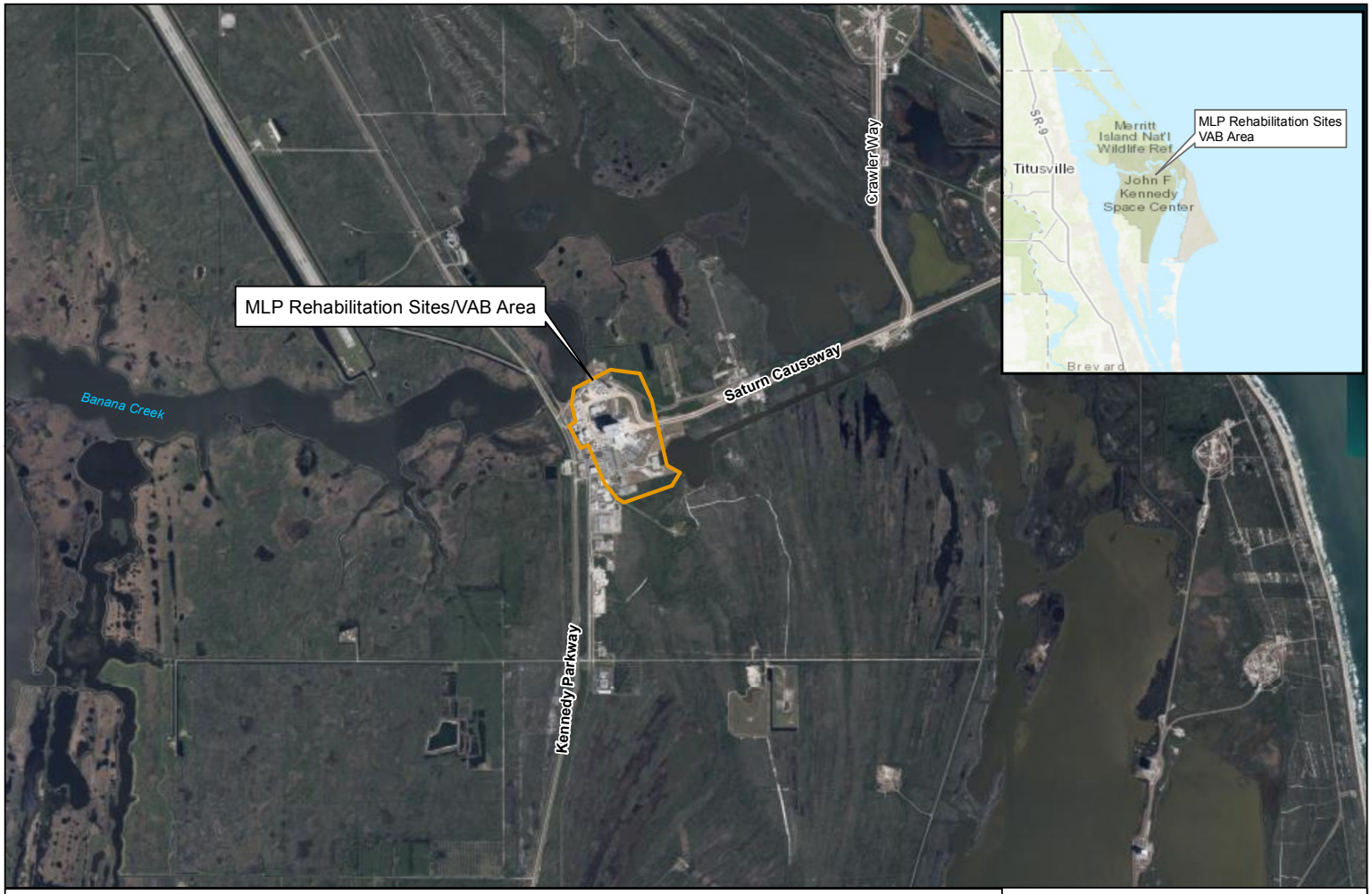
Sampling frequency for LTM remains biennial and the sampling program is now referenced as LCP LTM. In 2021, an evaluation of the LCP LTM network concluded that additional monitoring wells were needed to observe the LCP characteristics. This report summarizes the 2022 and 2023 monitoring well installation activities and the 2023 LTM sampling event.

1.4 PURPOSE

The purpose of this report is to provide an updated status on CMI and IM activities by summarizing the field activities from January2022 through April 2023 and presenting the results associated with:

- CMI activities related to the biosparge barrier area, including expansion, start-up and OM&M;
- IGM activities within the Former Hot Spot 2 and Hot Spot 3 OFW areas, including soil core activities, and RAE; and
- LCP LTM monitoring well network modifications;

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Notes:
1. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Area (VAB) (Solid Waste Management Unit 056)
2. Aerial Basemap Dated 2017

FIGURE 1-1
Site Location Map

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

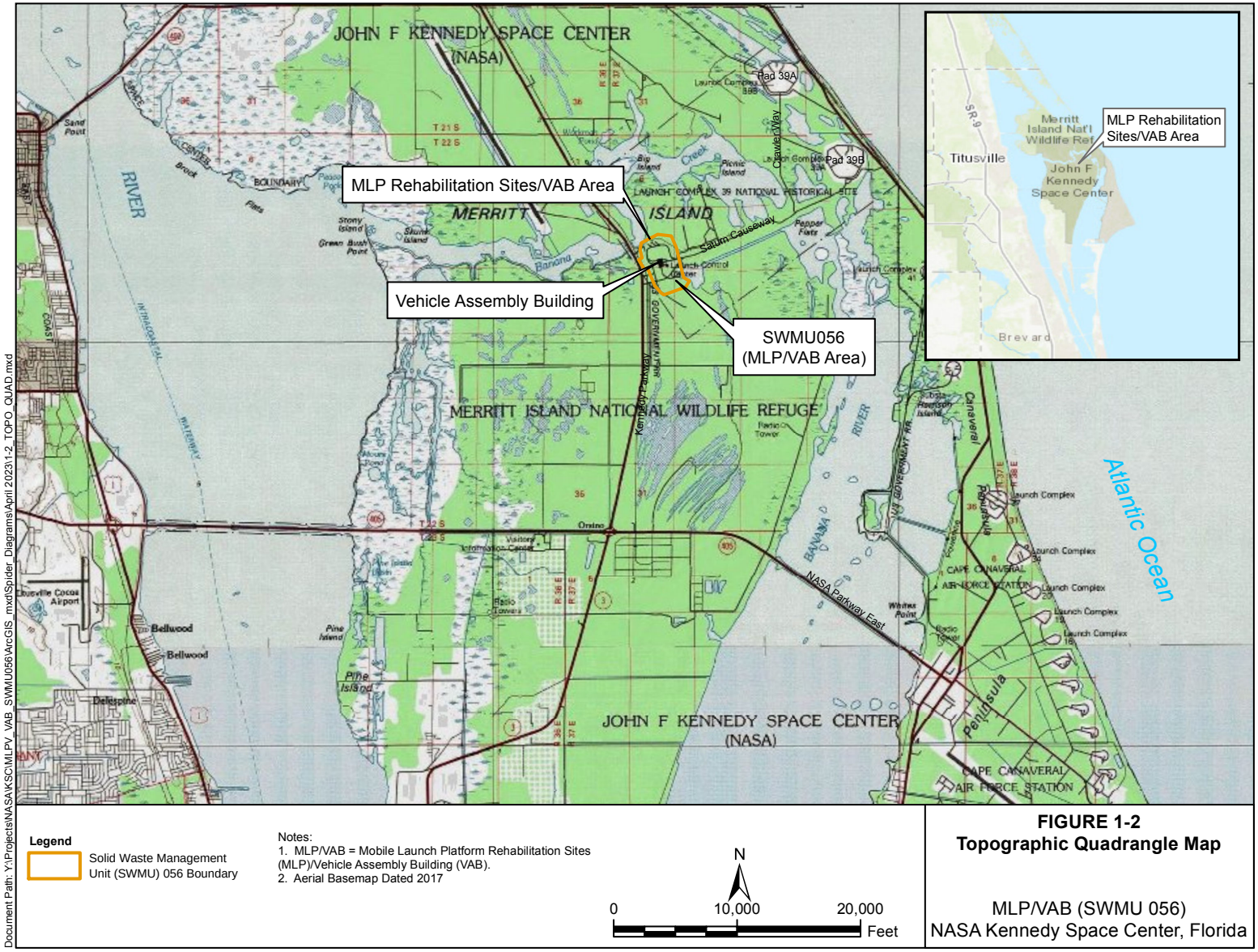


FIGURE 1-2
Topographic Quadrangle Map

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

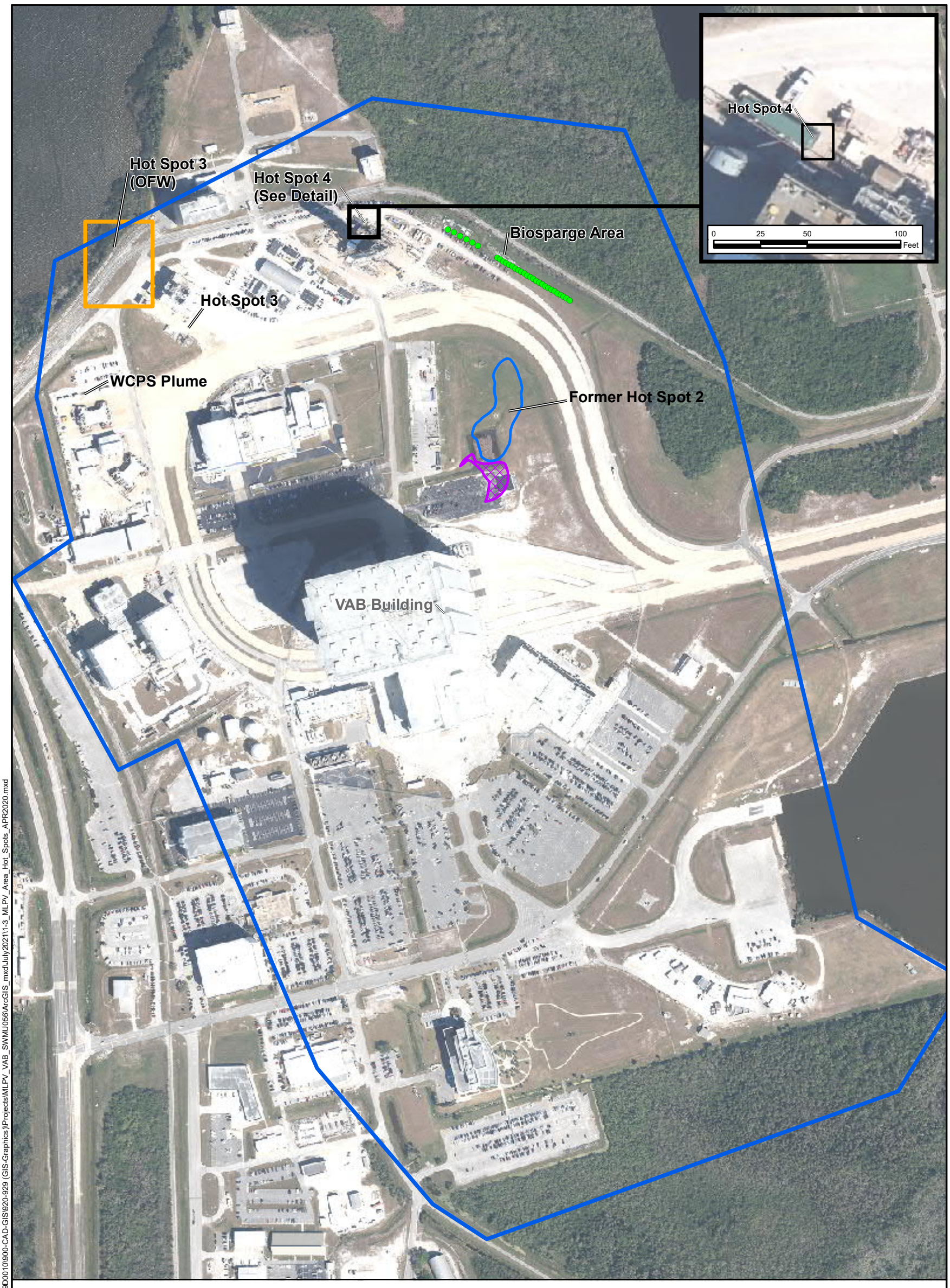


FIGURE 1-3
Hot Spot Areas

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

2. REMEDIAL ACTION FIELD ACTIVITIES

2.1 OVERVIEW

As reported in **Section 1**, three historical remedial action efforts have been implemented at this site (air sparge system, bioremediation, and passive LNAPL skimmer), and are complete or no longer active. Air sparging was implemented in the Hot Spot 2 area in 2012 and operated until April 2018 (NASA 2019b). Bioremediation within Former Hot Spot 1 (the former source area) was implemented through the CMD and is complete (NASA 2008, 2009). A passive skimmer was installed in Hot Spot 4 monitoring well VABRA-MW0010 to recover LNAPL and IGM was performed annually until LNAPL was no longer present and contaminant concentrations in this monitoring well were below FDEP GCTLs (NASA 2019b). Per FDEP letter dated January 30, 2020, FDEP approved removal the LNAPL skimmer from monitoring well VABRA-MW0010 completing this remedial action effort.

The biosparge system treatment, a fourth remedial action, is ongoing. The biosparge barrier was installed to mitigate CVOC plume migration from the Former Hot Spot 1 area and has been in operation since April 2005. The system was expanded in February 2016 and shut down due to a fire within the treatment trailer in December 2020. The electrical fire rendered the treatment system and housing structure unusable. A new treatment trailer was mobilized to the site and installed in November 2021 and sparge line connections were completed in December 2021 (NASA 2022).

2.1 FORMER HOT SPOT 2 SOIL CORE COLLECTION AND SAMPLING

On October 25, 28, and 31, 2022, November 1 through 3, 2022, and November 16 through 18, 2022, AECOM conducted oversight of Environmental Drilling Services during the collection of five soil cores (SB0-300 through SB0-304). Soil cores were completed via sonic drilling techniques to 60 feet bls in areas with limited soil classifications downgradient of the former Hot Spot 2 area. The purpose of soil cores was to record area-specific lithology to depth, aid in the determination of an appropriate remediation strategy by a RAE, and evaluate the feasibility of sparging within the low permeability layer (Decision Item 2104-D28). Soil core locations are illustrated in **Figure 2-1**. Soil Boring logs are provided in **Appendix B**. Where no recovery was encountered, lithology was obtained from a second core used for collecting samples for geotechnical analysis.

Lithologic analysis included the depth of samples, % recovery, soil type, and description (color, texture, structure, moisture content, consistency, etc.) in accordance with KSC's Sampling Analysis Plan. Data was recorded on digital boring logs for use in developing an Environmental Visualization System (EVS) model. A photo log of soil cores is provided as **Appendix C**.

Soil samples were submitted for testing to the geotechnical laboratory of Ardaman & Associates out of Orlando, Florida. Eight samples were tested for permeability via ASTM D 5084, the

standard test method for measurement of constant head hydraulic conductivity using a Flexible Wall Permeameter. Additionally, each sample was analyzed by the Atterberg limit test via ASTM D4318, grain size analyses via ASTM D6913, and % fines via ASTM D1140.

2.1.1 Lithology

The observed lithology was largely consistent within the five soil cores. Lithology consisted generally of poorly graded, fine to medium loose sand and silty sand from land surface to approximately 45 feet bls, clayey sand from 45 feet bls to 55 feet bls and, and lean clay with sand and varying amounts of silt and shell fragments from 55 feet bls to 60 feet bls. Lithologic cross sections are provided in **Figure 2-2** through **Figure 2-4.**

2.1.2 Test Results

Geotechnical analysis was performed on soil depths of between 50 to 55 feet bls and 55 to 60 feet bls. Test results indicated that measured hydraulic conductivity ranged from 3.5E-08 centimeters per second (cm/sec) to 8.7E-06 cm/sec. Percent fines ranged from 16.8% in SB0-302 at 55 feet bls to 60 feet bls to 94.9% in SB0-302 at 50 feet bls to 55 feet bls. The plasticity index of the tested samples ranged from not plastic in SB0-302 at 55 feet bls to 60 feet bls to an index of 43 in SB0-304 at 50 feet bls to 55 feet bls. Soil permeability test results are provided in **Appendix D**. These results were used in the RAE, summarized in **Section 4**.

2.2 BIOSPARGE SYSTEM STARTUP, EXPANSION, AND OM&M

The following sections summarize biosparge activities completed in 2022 through April 2023. From March 2022 through June 2022, electrical installation activities occurred. Biosparge system startup activities occurred in July 2022, followed by four weeks of system OM&M activities. In February 2023, five biosparge expansion wells were installed. Field notes for the reporting period are provided in **Appendix E**. The OM&M logs for the reporting period are provided in **Appendix F**. The expanded biosparge system layout is presented in **Figure 2-5**.

2.2.1 Electrical Installation

Details from the previous system installation activities, including mobilization and installation of the biosparge system trailer in November 2021 and sparge line connections completed in December 2021, are presented in the 2021 CMI and IM Report (NASA 2022a). This report includes activities to connect the system trailer to power and restart the system.

Since previous power connections were removed with the damaged equipment shed, new disconnect panels and electrical conduits required installation. The electrical service for the system trailer was provided by tying into an existing 3-phase Transformer T-USS-848 near Launcher Road, north of the trailer location and approximately 40 feet southeast of the Comm Equipment Building K6-0548. The electrical service utilizes an existing circuit breaker and 1.25-inch electrical conduit originating from Panel LP-E-01-002. Electric work was completed by

Chrome Electric, a licensed electrical subcontractor. On March 29, 2022, Chrome Electric evaluated the position and layout of the new remediation trailer (same location as previous equipment shed) and designated a new location for the disconnect panels. Disconnect panels and the transformer were installed by Chrome Electric on April 21, 22, and 26, 2022. On May 12, 2022, KSC utility locators marked underground utilities with Chrome Electric present to determine an acceptable location for installing the grounding rod on May 27, 2022. On June 4 and 11, 2022, Chrome Electric was on site to feed the cable to the main breaker panel and connect the line to the trailer. New circuiting, local disconnecting means, and a step-down transformer were installed to serve the new system trailer which required approximately 72 Amps (A) at 120/240 Volts, 3 phase, 4-wire. A photo log of electrical connection activities is provided as **Appendix G**.

2.2.2 Startup

On June 2 and 3, 2022, prior to startup, sparge wells were cleaned out by purging groundwater from the screened interval using a peristaltic pump to remove sediment that could potentially plug the screen and inhibit air flow. On June 20, 2022, AECOM personnel were onsite to start the system, ensure the motors were properly rotating, test each component to confirm that nothing was damaged during transportation, and program the programmable logic controller (PLC). Additional startup activities included:

- Recording individual air sparge well readings (flow rates and pressures) where accessible. Center operations restricted access to wellhead readings along Launcher Road.
- Checking for leaks in the air sparge system and infrastructure. Low flow observed to Leg 5 indicated a possible leak in the transfer lines. Close monitoring and further investigation was performed.
- Checking for and addressing initial groundwater surfacing caused by the biosparge system operation. No groundwater surfacing was observed.
- Replace valves, gauges, and miscellaneous parts as needed. Replaced ball valve to ASW03. Additional ball valves were ordered to keep available when replacements are needed.
- Balancing air flow by adjusting flow rates as necessary. Flow rates (16 scfm at Leg 1 and 17 scfm at Leg 2) with and lower overall pressures (6 psi instead of 20 or 25 psi) were observed. Leaks were not observed from the above ground manifold to Leg 5 or trailer equipment components which indicated a possible subsurface leak from a transfer line. The system was shut down as a precautionary measure upon completion.

System mechanical components operated as anticipated and low flow investigations were scheduled (**Section 2.2.3**). The PLC was not OM&M logs are provided in **Appendix F**.

2.2.3 Repair

Following startup, during the July 5, 2022, OM&M event, continued low flow readings were observed at Leg 5. Leg 1 and 2 were reprogrammed to operate for 12-hour intervals each day, alternating continuously, to isolate Leg 5 for troubleshooting. After verifying that the manifold and legs were programmed correctly, confirming proper operation of gauges, and adjusting flows, it was determined that a leak was present in a transfer line leading to Leg 5 of the sparge system. Leg 5 remained cycled out of the operating schedule until the pipe investigation and repair could be completed. Three phases of investigation were performed requiring coordination with local Center operations and dig permit requirements. A photolog of investigations is provided as **Appendix H**.

- Phase I, September 22 through 23, 2022: Hand digging around above-ground manifold. Line was inspected for leaks. No leaks or damage were observed.
- Phase II, December 9, 2022: Hand dig to the transfer line from the east side of Launcher Road leading to the above ground manifold. No leaks or damage were observed.
- Phase III, February 16, 2023: Hand dig around base of stub-ups at the biosparge trailer and observed piping was not damaged. A scoping camera was advanced to evaluate the transfer line between stub-ups and above-ground manifold. A pipe break was observed approximately 11 feet south of the system trailer. The piping was repaired with a coupling and the system was restarted. Leg 5 flow rates were balanced to run for two hours a day for two weeks to confirm proper performance before running full scale (8 hours).

2.2.4 System Expansion

Biosparge system expansion activities were conducted from February 15 through 21, 2023. Five additional biosparge wells, BSW032 through BSW036, were installed using DPT between the two existing sparge walls (**Figure 2-5**). Wells were screened 48 to 50 feet bls. Wells were constructed of 1-inch diameter schedule 40 PVC flush thread riser and 2 feet of 1-inch ID factory-slotted (0.010-inch) well screen. Filter pack consists of 20/30-grade sand extending 0.5 to 1-foot above the well screen interval, followed by a bentonite seal to a minimum thickness of 3 feet. The borehole was filled with grout approximately 2 feet bls and topped off with sand until the wellhead was constructed and tied into the existing transfer piping. One soil sample was collected from BSW036 to confirm lithology consistent with the existing sparge well screen intervals (**Appendix I**).

Wellheads were completed with a 1-inch Schedule 40 PVC tee and reinforced female adapter to allow for well cleanouts and monitoring at the wellhead, as needed. The tee is followed by one globe valve to control air flow and a DWYER DS-300-1 in-line flow sensor for monitoring flow. The 1-inch diameter Schedule-40 PVC leader pipe transitions to a 2 ½-inch diameter segment of Schedule 80 PVC piping that is tied into the existing 2 ½-inch transfer pipe using a 2-inch Schedule 80 PVC reducing tee. Wellheads are housed in a 24 by 24-inch square steel vault set in a concrete pad. Sparge wells BSW032 through BSW034 are tied into the transfer pipe feeding air

to Zone 2, while BSW035 and BSW036 are tied into Zone 1 for more even flow distribution. Prior to backfilling and compaction, magnetic tracer tape was placed above piping for future locating. A photolog for biosparge expansion activities is provided as **Appendix J**. Biosparge well construction details are illustrated in **Figure 2-6**.

2.2.5 Operation, Maintenance & Monitoring

2.2.5.1 Telemetric Monitoring

PLC communications are received daily via email to confirm the sparge system is operating properly. The results of the telemetric monitoring are recorded by week in **Table 2-1**. During this reporting period (2022 startup through April 2023), the biosparge system was operational 265 out of 301 days (approximately 88%), with zero shutdowns due to mechanical part failures. The dates and reasons for loss of operation are summarized below:

- Periodically from June 20 (startup) through February 16, 2023: The sparge system was shut down following startup to troubleshoot low flow and program the telemetry system, and repair the transfer line to Leg 5;
- September 23, 2022: the sparge system was shut down in preparation for Hurricane Ian;
- February 15 through 22, 2023: the sparge system was shut down due to the biosparge well expansion activities, including biosparge well installation, trenching, and pipe connections;
- March 7 through March 16, 2023: the sparge system was shut down in preparation for and during the sitewide groundwater sampling event.

2.2.5.2 Operational Data

A summary of the sparge system operational readings is provided in **Table 2-2**. A piping and instrumentation diagram (P&ID) for the sparge system provided by the manufacturer is provided as **Appendix K**.

Note that due to health and safety concerns for the field staff, individual air sparge and biosparge well readings (flow rates and pressures) were not regularly collected. Sparge well locations are adjacent to a swale and due to the presence of water and dense vegetation, the risk of wildlife hazards prevented the collection of field data. AECOM and NASA mutually agreed that the field readings would be postponed until the area could be accessed, mowed and was deemed safe.

The summary of the sparge system operational parameters during biosparge operation are presented for 11 events from June 2022 through April 2023 for Legs 1, 2, and 5. As previously stated, Leg 5 was inoperable from June 2022 through February 2023. The biosparge system Legs 1 and 2 operated for 12-hour intervals each day, alternating continuously, until Leg 5 was repaired in February 2023. Once Leg 5 was operational, it was programmed to run for two hours a day for two weeks to confirm proper performance before running full scale. Once Leg 5 operation was proven successful, Legs 1, 2, and 5 were scheduled to operate 8-hour intervals per

day, alternating continuously, through April 2023. The operational parameter summary is provided below:

- Leg 1:
  - Air flow rates ranged from 13.0 to 20.0 standard cubic feet per minute (scfm) with an average of 16.4 scfm.
  - Pressures ranged from 6.0 to 28 pounds per square inch (psi) with an average of 21.4 psi.
- Leg 2:
  - Air flow rates ranged from 12.0 to 27.0 scfm, with an average of 18.1 scfm.
  - Pressures ranged from 6.0 to 27.5 psi, with an average of 22.2 psi.
- Leg 5:
  - Air flow rates ranged from 13.0 to 18.0 scfm, with an average of 15.0 scfm.
  - The Leg 5 pressure was 1.4 psi at startup and temporarily turned off until AECOM was able to troubleshoot, find, and fix the leak. From March through April 2023, the pressure was 22.0 psi.

2.2.5.3 Wellhead Pressures and Flow Rates

When accessible, wellhead readings were collected for recording pressures and air flow rates. Readings are provided in **Table 2-3**, and a summary of the air flow rates and pressures is provided below:

- Air flow rates in the original biosparge barrier wells and 2023 expansion biosparge wells (Legs 1 and 2) ranged from 0.00 to 7.40 scfm (average of 2.77 scfm) and the pressures ranged from 18.80 to 23.60 psi (average of 20.58 psi).
- Air flow rates and pressures were not collected in the expansion biosparge barrier wells (Leg 5) since Leg 5 was turned off for pressure loss investigation and subsequential pipe repair in February 2023. For the period of March through April 2023, the air flow rates ranged from 2.00 to 4.20 scfm (average of 2.65 scfm) and pressures ranged from 19.00 to 23.50 psi (average of 21.42 psi).

Limited access to wellheads reduced the available data to evaluate during this reporting period, however, the air flow and pressure data at biosparge wells in Legs 1 and 2 collected at startup were generally within the historical range averages, and the system continued to operate as designed.

2.2.5.4 Dissolved Oxygen Barrier Results

The goal of the biosparge barrier is to create a zone of elevated dissolved oxygen (DO) in the groundwater surrounding the biosparge barrier, enhancing the aerobic degradation of VC. To

assess the extent of the zone of elevated DO, concentrations were measured from performance monitoring wells ASMW0001 through ASMW0003 (upgradient) when access allowed. The DO measurements for the reporting period are presented in **Table 2-4** and are summarized below.

DO measurements were recorded at piezometers ASPZ0001R and ASPZ0002 during startup only and not recorded at monitoring wells ASMW0004, ASMW0005, and ASMW0006 due to biological hazards or construction material at the site blocking access to wells. The average DO concentration at piezometers ASPZ0001R and ASPZ0002 was 2.57 milligrams per liter (mg/L). The average DO concentration measured at the monitoring wells ASMW0001 through ASMW0003 was 5.34 mg/L.

The measured DO concentrations suggest that an aerobic zone exists around the biosparge barrier and extends approximately 40 to 50 feet from the biosparge barrier (the monitoring wells are approximately 40 to 50 feet from the biosparge barrier). The background DO is approximately 0.06 mg/L based on 2022 groundwater sampling data from upgradient monitoring wells MLPV-IW0057 through MLPV-IW0059.

Based on DO concentrations in monitoring wells surrounding the biosparge barrier, the biosparge barrier appears to be meeting the objective of providing an aerobic groundwater environment for the treatment of VC.

2.3 LCP LTM MONITORING WELL INSTALLATIONS

The 2021 CMI and IM annual Status Report (NASA. 2022a) proposed 13 existing monitoring wells (one replacement, WCPS-IW0002SRR) and 37 new (proposed for installation) monitoring wells be added to the LCP LTM biennial groundwater monitoring plan. One well (MLPV-IW0002IR) that is part of the original sampling plan was also proposed for replacement. Two of the proposed well locations are within the VAB area. Access within the VAB area was not obtainable at the time of installation, therefore two additional monitoring wells, E8 (screened 45 to 55 feet bls) and E15 (screened 47 to 57 feet bls), were installed in the fall of 2023 outside of this reporting period. Monitoring well installation activities for these two wells will be included in the next annual report.

In October 2022 through November 2022 and January 2023, Environmental Drilling Services, Inc. (EDS) installed 37 monitoring wells (MLPV-MW0076 through MLPV-MW110, MLPV-IW00021R, and West Crawler Park Site [WCPS] monitoring well WCPS-IW0002SRR) using sonic drilling technology and DPT. Monitoring wells were originally scoped for installation using sonic drilling, however, due to drilling rig equipment repairs and field conditions, the technology was switched to DPT in January 2023 for monitoring wells MLPV-MW0098 through MLPV-MW0110. Monitoring well installations were conducted within the biosparge area barrier wall, downgradient of the plume and in surrounding areas of the VAB based on the results of the 2021 DPT groundwater sampling and FDEP’s review comments from the 2021 CMI Progress

Report (NASA 2022). These monitoring wells were first sampled in March 2023 as detailed in Section 3.

Prior to monitoring well installation, proposed locations [as presented in the 2021 CMI and IM Update ADP (NASA 2022b) approved by the KSCRT in March 2022 (Decision Item 2203-D13)] were staked using a mobile Global Positioning System (GPS) unit and surveyed by KSC utility locators.

Monitoring wells were constructed with 1-inch diameter schedule 40 polyvinyl chloride riser and 10 feet of 0.010-slot screen, prepacked with a 20/30 sand. The wells were sealed with 30/65 fine sand and finished with Type I/II Portland cement to the surface. Wellheads were completed with lockable well caps and enclosed within 8-inch round bolt-down vaults encased in 2-foot by 2-foot by 4-inch deep square concrete pads. The monitoring wells were installed to varying depths ranging from 25 feet bls to 57 feet bls, based on location and historical lithology. The rationale for the LCP LTM monitoring well network evaluation was submitted in the 2021 CMI Progress Report (NASA 2022). The newly installed monitoring well locations are shown on **Figure 2-7**. Monitoring well installations were installed and evaluated within the following intervals:

- **1 to 20 feet bls, four monitoring wells**: MLPV-MW0010 (1 to 10 feet bls) was relocated to the west due to access restrictions within the Orbiter Processing Facility to verify if westerly migration has occurred; MLPV-MW0086 (15 to 25 feet bls) within isolated TCE plume; and two wells in the WCPS area, MLPV-IW0002SRR and MLPV-MW0100 both screened 3 to 13 feet bls.
- **20 to 35 feet bls, ten monitoring wells**: two wells screened 20 to 30 feet bls (MLPV-MW0098 and MLPV-MW0109), one replacement well, MLPV-IW0002IR screened 28-33 feet bls, and seven wells screened 25 to 35 feet bls (MLPV-MW0077, MLPV-MW0078, MLPV-MW0079, MLPV-MW0081, MLPV-MW0095, MLPV-MW0102, and MLPV-MW0106).
- **35 to 45 feet bls, ten monitoring wells**: ten wells screened 35 to 45 feet bls (MLPV-MW0082, MLPV-MW0088, MLPV-MW0089, MLPV-MW0093, MLPV-MW0094, MLPV-MW0096, MLPV-MW0097, MLPV-MW0103, MLPV-MW0107, and MLPV-MW0108). Monitoring well MLPV-MW0108 was relocated further south due to restrictions from site layout and conditions in the originally proposed location.
- **Greater than 45 feet bls, thirteen wells**: two wells screened 40 to 50 feet bls (MLPV-MW0099 and MLPV-MW101) and eleven wells screened 47 to 57 feet bls (MLPV-MW00076, MLPV-MW0080, MLPV-MW0083, MLPV-MW0084, MLPV-MW0085, MLPV-MW0087, MLPV-MW0090, MLPV-MW0091, MLPV-MW0092, MLPV-MW104 and MLPV-MW0105).

A professional land survey of the 37 LCP monitoring wells was postponed until the remaining monitoring wells were installed.

Field notes for the monitoring well installation activities are provided in **Appendix L**. Monitoring well construction logs and completion reports are provided in **Appendix M**. A photolog of the newly installed monitoring wells is provided in **Appendix N**.

2.4 SITEWIDE MONITORING WELL RETROFITTING

In November 2022 and January 2023, as part of site-wide monitoring well maintenance efforts, 17 monitoring wells were retrofitted. Some wells were damaged by local construction operations and the quality of other wells had degraded with time. Retrofitting activities included raising or lowering the top-of-casing to land surface, repairing grout within manholes, and replacing pads as needed. With the exception of MLPV-IW0007I, MLPV-IW0027D, retrofitted wells are part of an existing sampling plan. Details of the MLPV-IW0053 replacement in the Fall of 2023 will be provided in the next annual report. A monitoring well retrofitting table is provided as **Table 2-5**. Photos of retrofitting activities are provided in **Appendix N**.

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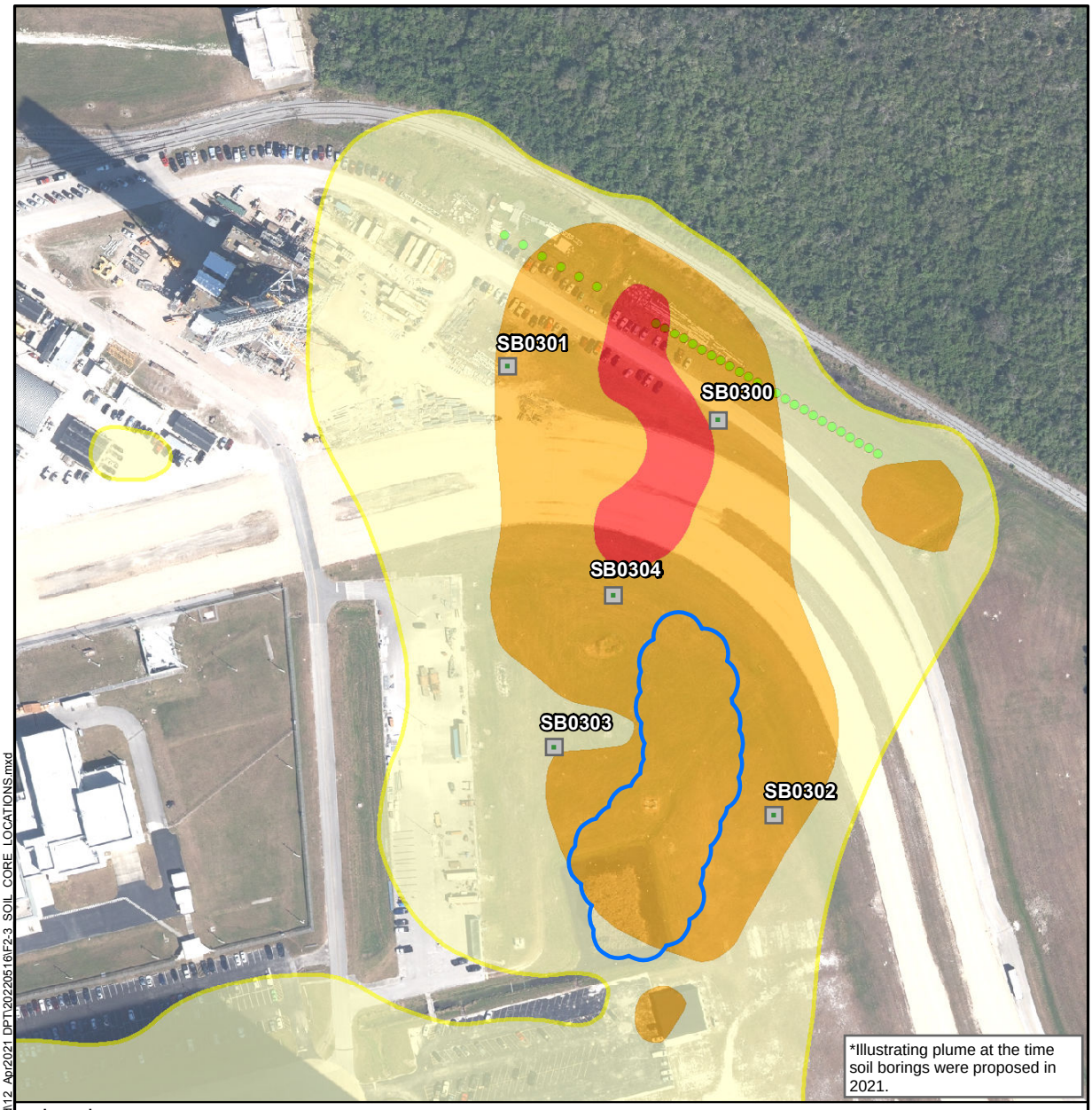
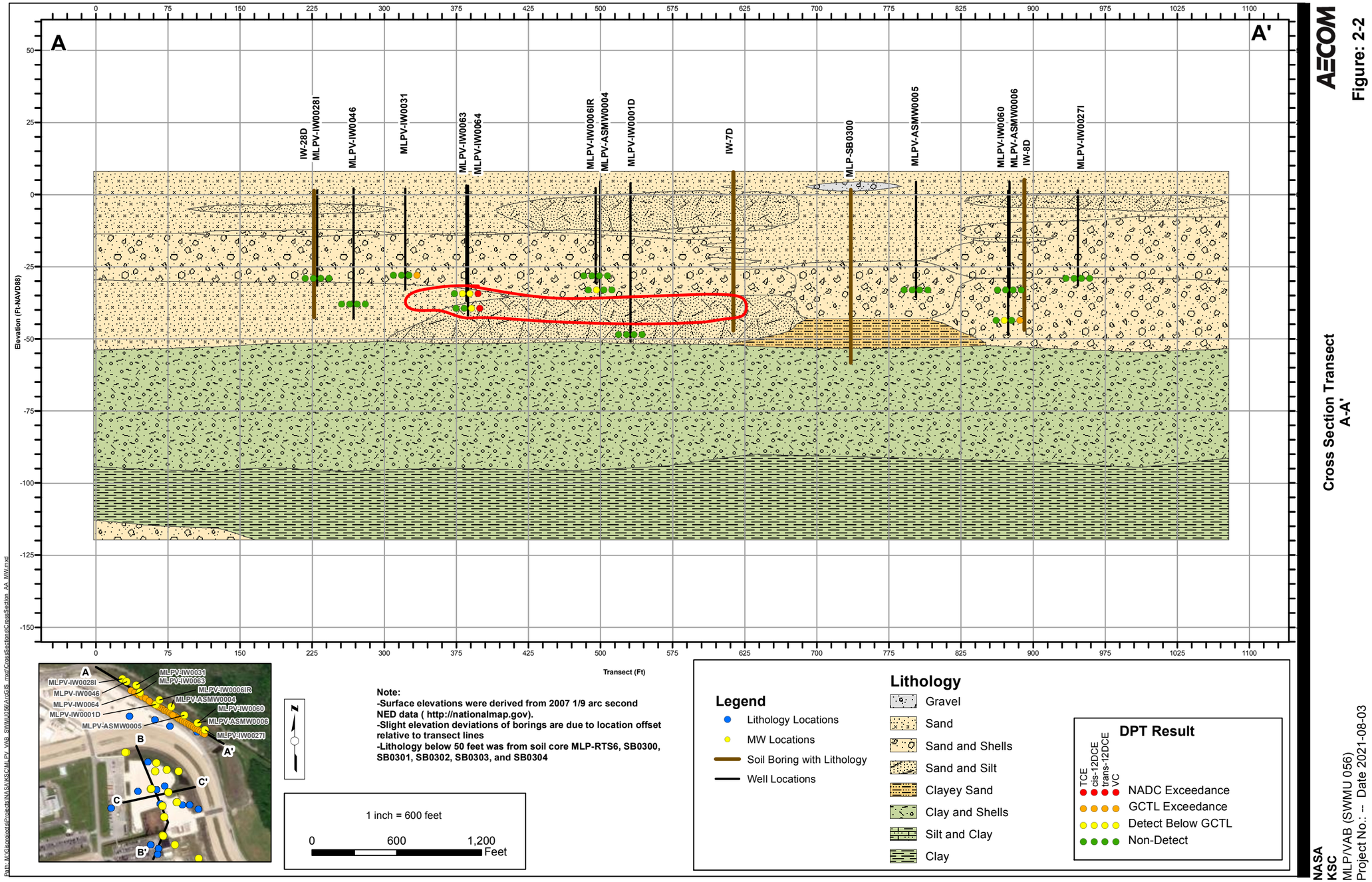
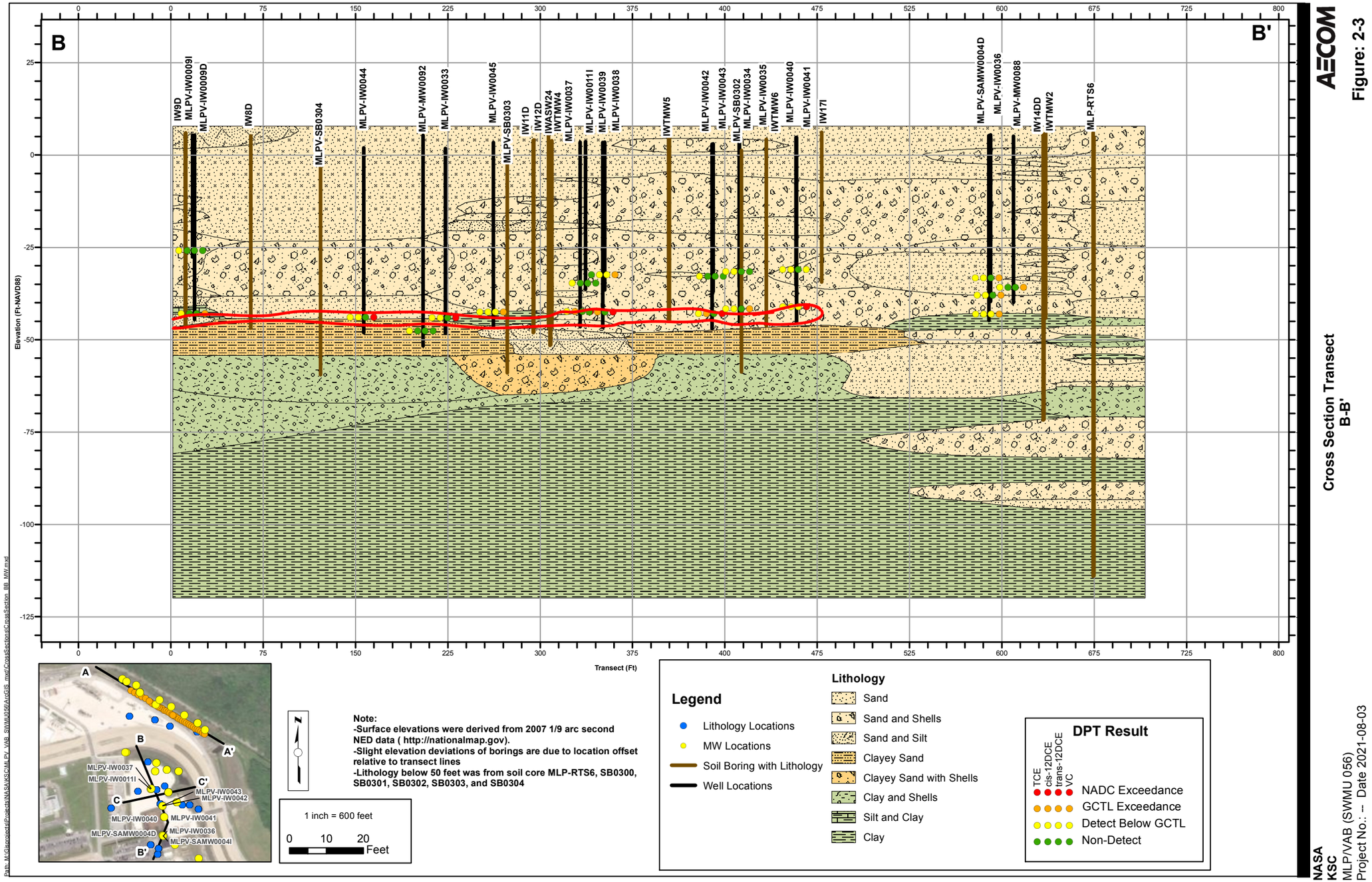
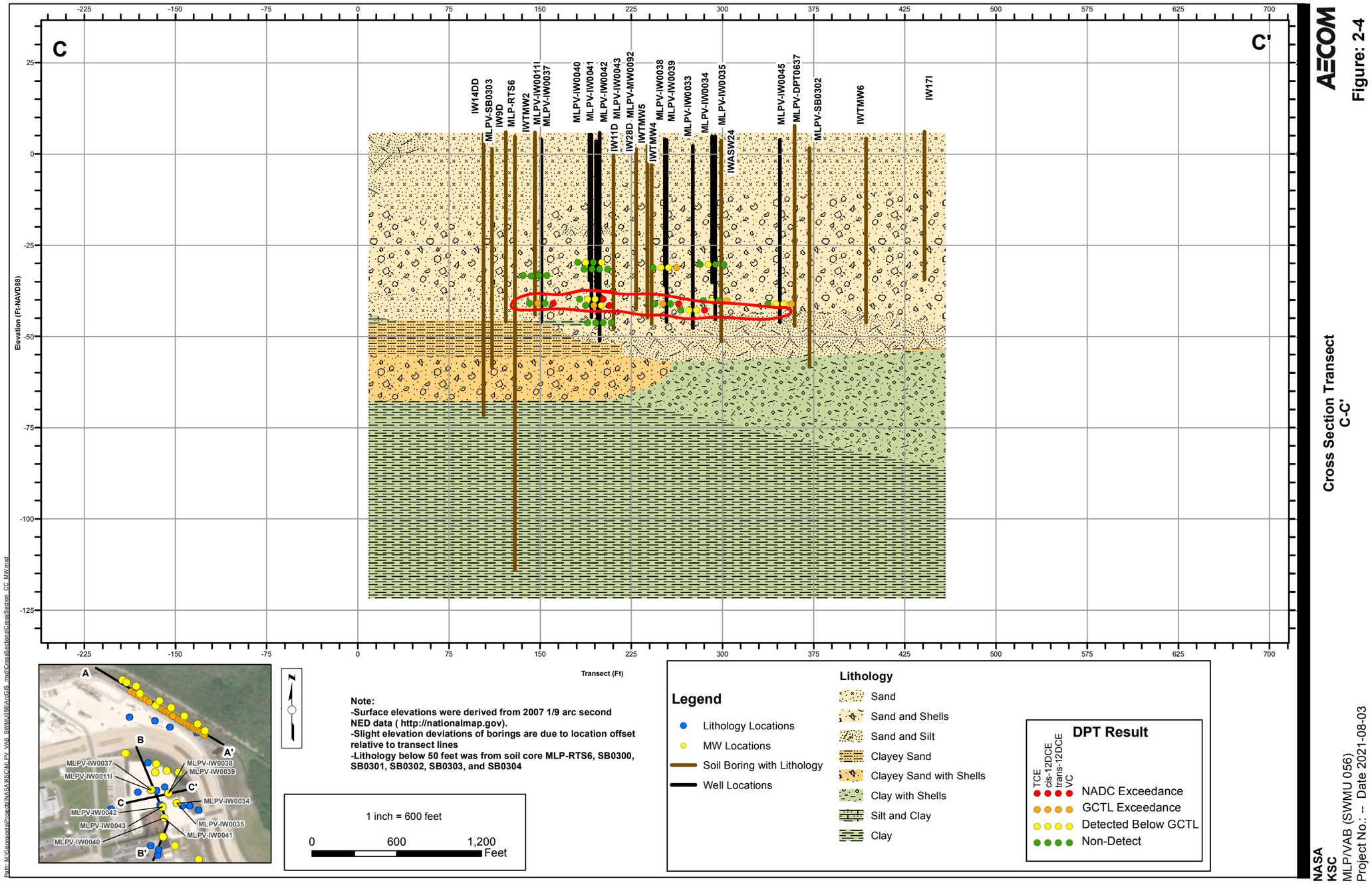


FIGURE 2-1
SOIL CORE LOCATIONS

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida


A
A'
IW-28D
MLPV-IW0028I
MLPV-IW0046
MLPV-IW0031
MLPV-IW0063
MLPV-IW0064
MLPV-IW0006IR
MLPV-ASMW0004
MLPV-IW0001D
IW-7D
MLP-SB0300
MLPV-ASMW0005
MLPV-IW0060
MLPV-ASMW0006
IW-8D
MLPV-IW0027I
Elevation (Ft-NAVD88)
Transect (Ft)
Note:
-Surface elevations were derived from 2007 1/9 arc second NED data (http://nationalmap.gov).
-Slight elevation deviations of borings are due to location offset relative to transect lines
-Lithology below 50 feet was from soil core MLP-RTS6, SB0300, SB0301, SB0302, SB0303, and SB0304
1 inch = 600 feet
0 600 1,200 Feet
Legend
Lithology Locations
MW Locations
Soil Boring with Lithology
Well Locations
Lithology
Gravel
Sand
Sand and Shells
Sand and Silt
Clayey Sand
Clay and Shells
Silt and Clay
Clay
DPT Result
TCE
cis-12DCE
trans-12DCE
VC
NADC Exceedance
GCTL Exceedance
Detect Below GCTL
Non-Detect
AECOM
Figure: 2-2
Cross Section Transect A-A'
NASA KSC
MLP/VAB (SWMU 056)
Project No.: -- Date 2021-08-03


B
B'
IW9D
MLPV-IW0009I
MLPV-IW0009D
IW8D
MLPV-SB0304
MLPV-IW0044
MLPV-MW0092
MLPV-IW0033
MLPV-IW0045
MLPV-SB0303
IW11D
IW12D
IWASW24
IWTMW4
MLPV-IW0037
MLPV-IW0011I
MLPV-IW0039
MLPV-IW0038
IWTMW5
MLPV-IW0042
MLPV-IW0043
MLPV-SB0302
MLPV-IW0034
MLPV-IW0035
IWTMW6
MLPV-IW0040
MLPV-IW0041
IW17I
MLPV-SAMW0004D
MLPV-IW0036
MLPV-MW0088
IW14DD
IWTMW2
MLP-RTS6
Elevation (Ft-NAVD88)
25
0
-25
-50
-75
-100
-125
0
75
150
225
300
375
400
475
525
600
675
725
800
Transect (Ft)
A
A'
B
B'
C
C'
MLPV-IW0037
MLPV-IW0011I
MLPV-IW0043
MLPV-IW0042
MLPV-IW0040
MLPV-IW0041
MLPV-SAMW0004D
MLPV-IW0036
MLPV-SAMW0004I
N
1 inch = 600 feet
0 10 20
Feet
Note:
-Surface elevations were derived from 2007 1/9 arc second NED data (http://nationalmap.gov).
-Slight elevation deviations of borings are due to location offset relative to transect lines
-Lithology below 50 feet was from soil core MLP-RTS6, SB0300, SB0301, SB0302, SB0303, and SB0304
Legend
Lithology Locations
MW Locations
Soil Boring with Lithology
Well Locations
Lithology
Sand
Sand and Shells
Sand and Silt
Clayey Sand
Clayey Sand with Shells
Clay and Shells
Silt and Clay
Clay
DPT Result
TCE
cis-12DCE
trans-12DCE
VC
NADC Exceedance
GCTL Exceedance
Detect Below GCTL
Non-Detect
Path: M:\Geospatial\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\CrossSection\CrossSection_BB_MW.mxd
AECOM
Figure: 2-3
Cross Section Transect
B-B'
NASA
KSC
MLP/VAB (SWMU 056)
Project No.: -- Date 2021-08-03

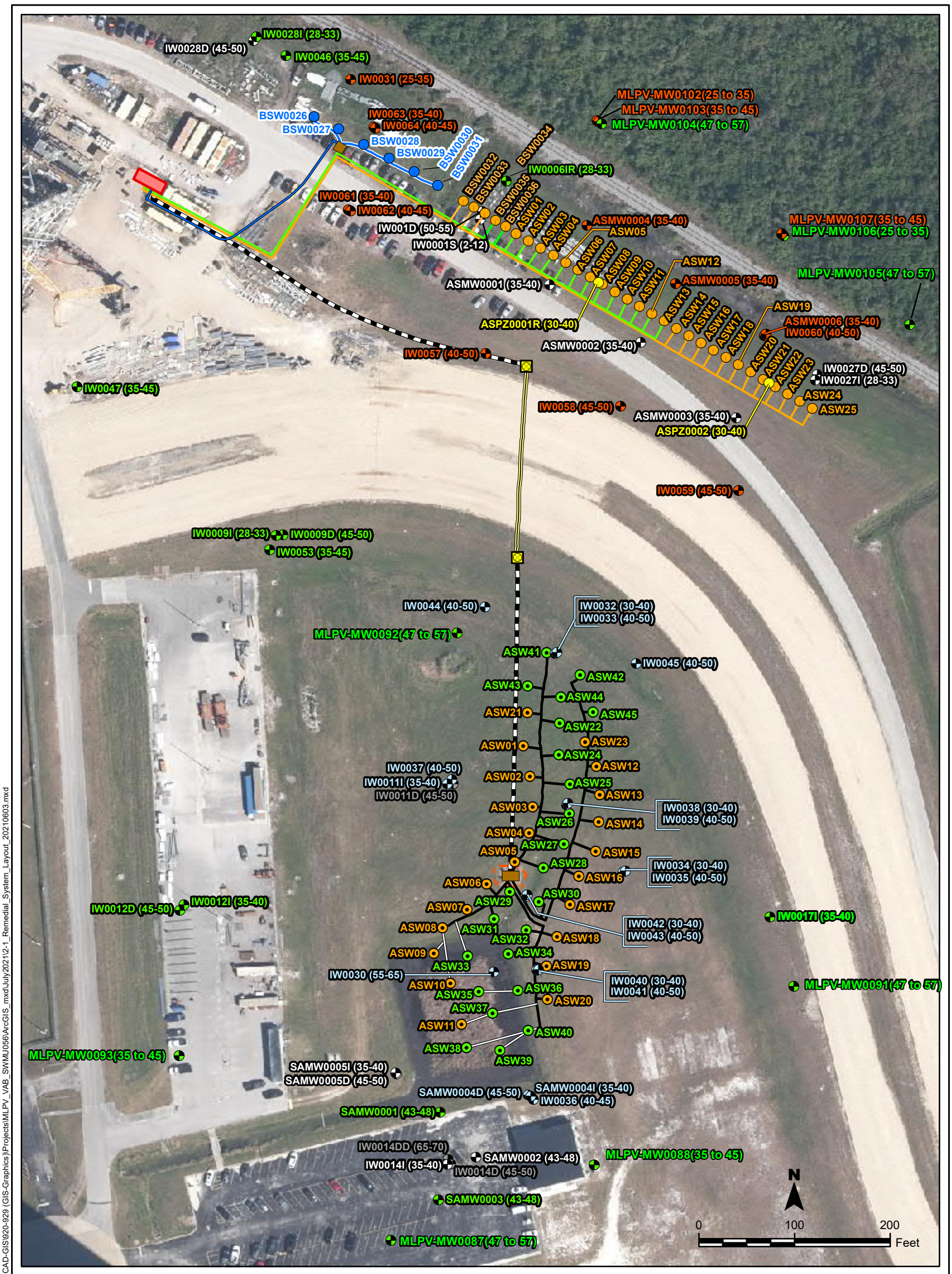


AECOM

Figure: 2-4

Cross Section Transect C-C'

NASA KSC
MLP/VAB (SWMU 056)
Project No.: -- Date 2021-08-03



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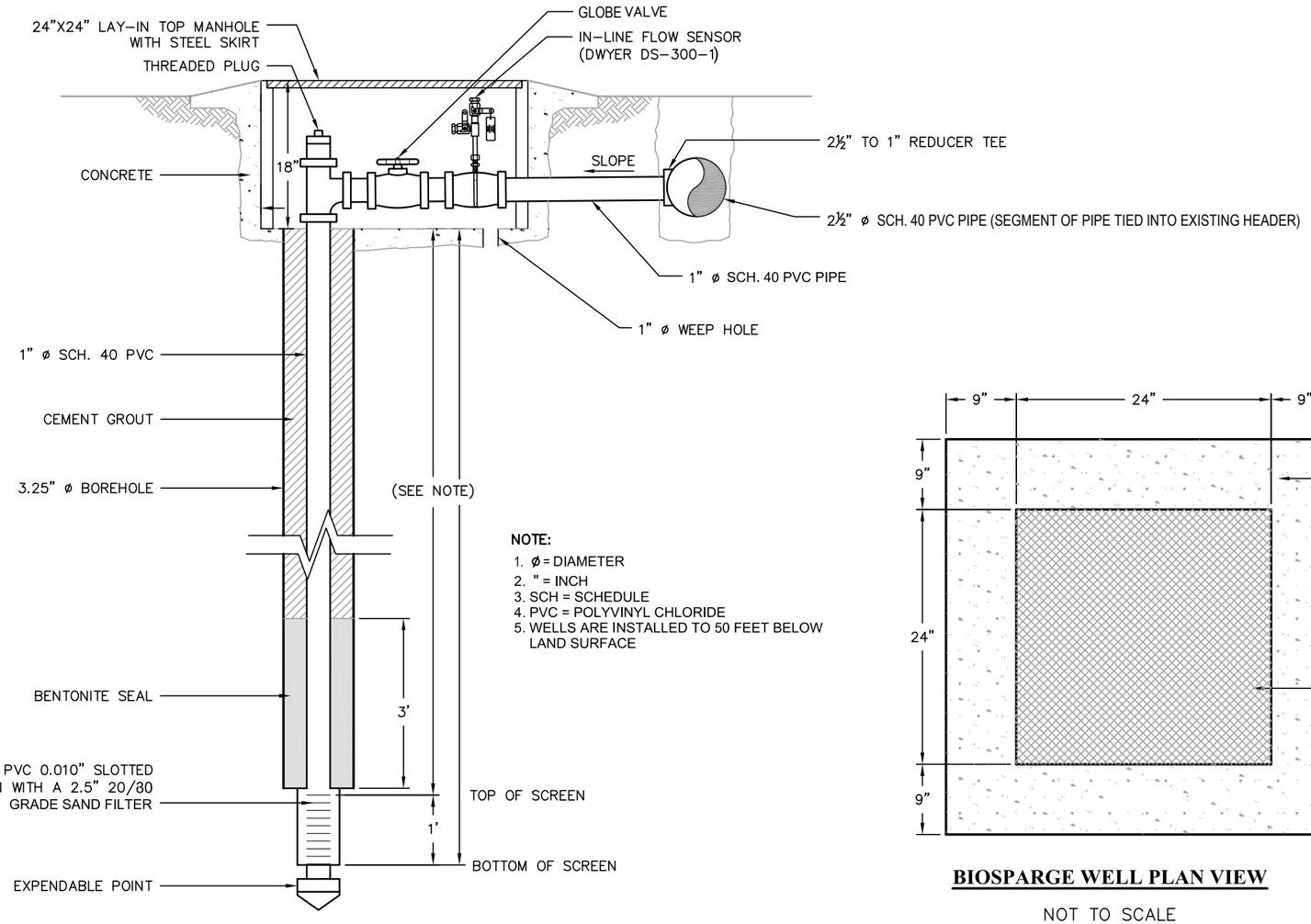
Legend

- Air Sparge Monitoring Well Location (screen interval [ft bls])
- Biosparge Monitoring Well Location (screen interval [ft bls])
- Long Term Monitoring Program Monitoring Well Location (screen interval [ft bls])
- Abandoned Monitoring Well Location (screen interval [ft bls])
- Other Monitoring Well Location (screen interval [ft bls])
- Piezometer Location (screen interval [ft bls])
- Biosparge Well Location
- Biosparge Expansion Well Location, Leg 5
- Air Sparge Well Location, Leg 3
- Air Sparge Well Location, Leg 4
- Junction Box
- Sparge Manifold Location (not to scale)
- Biosparge Header Pipe - Leg 1
- Biosparge Header Pipe - Leg 2
- Biosparge Expansion Piping - 2" Sch. 80 PVC, Leg 5
- Biosparge Expansion Piping - 1" Sch. 80 PVC
- Air Sparge Piping - 2, 4" SCH 80 PVC pipes
- Air Sparge Piping - 2, 4" High-Density Polyethylene (HDPE) pipes under Crawler Track
- Air Sparge Piping - 1" Flex hose
- Air Sparge Piping - 1" SCH 80 PVC from Manifold to Well
- Temporary Construction Fencing
- Equipment Building

Notes:
1. Biosparge header piping placement is approximate.
2. Source of 2018 aerial: FDOT
3. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building Area (VAB)
4. SWMU = Solid Waste Management Unit 056

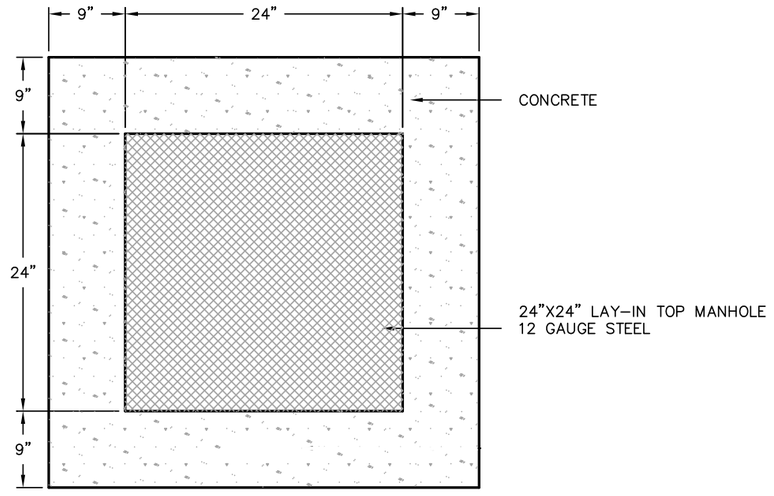
FIGURE 2-5
Airsparge and Biosparge System Layout

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



NOT TO SCALE

BIOSPARGE WELL BSW032 THROUGH BSW036 DETAILS

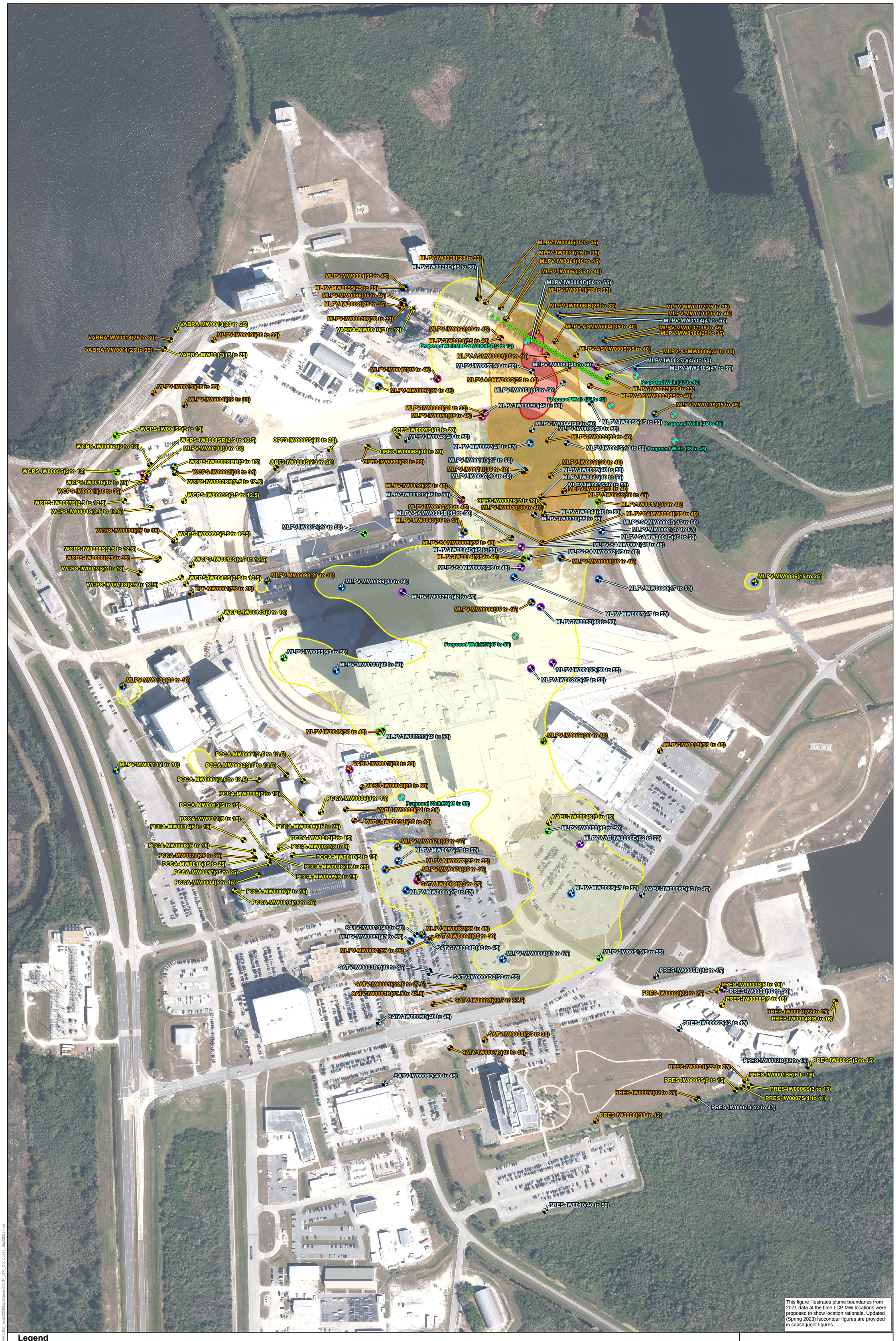


BIOSPARGE WELL PLAN VIEW

NOT TO SCALE

FIGURE 2-6
BIOSPARGE WELL CONSTRUCTION DETAIL

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- Shallow Monitoring Well Location (1 to 25)
- Intermediate Monitoring Well Location (20 to 45)
- Deep Monitoring Well Location (40 to 57)
- Existing Well Part of an Existing Sampling Plan
- Existing Well Added to the Sampling Plan
- Newly Installed Well Added to the Sampling Plan
- Proposed LCP LTM Monitoring Well Location (Screen Interval)
- Biosparge Well Location
- Composite 10xNADC Isocontour (2012-2021 Data)
- Composite NADC Isocontour (2012-2021 Data)
- Composite GCTL Isocontour (2012-2021 Data)

Notes:
1. Screen interval is presented in feet below land surface.
2. Locations presented on this figure are only those that are associated with the Mobile Launch Platform (MLP)/Vehicle Assembly Building (VAB), Solid Waste Management Unit (SWMU) 056
3. Per Kennedy Space Center Remediation Information Systemmonitoring wells VABU-IW0004S and VABU-IW0006D are the same wells as MLPV-VAB-IW0004S and MLPV-VAB-0006D, respectively.
4. * indicates which well in the cluster is being referenced.

N

0 200 400 800 Feet

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901
Scale 1:200'

FIGURE 2-7
LCP LTM 2022-2023 Monitoring Well Layout

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: N:\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\2023MapsGeneral\LCP_LTM_Composite_Sept2023.mxd

Table 2-1
Sparge System Telemetric Monitoring
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

Date/time system was checked		System Operational Yes/No	Identify Any Operational Abnormalities and Corrective Action Taken to Restore Operation
06/20/2024	NA	No	System off after startup activities due to subsurface transfer line leak. PLC remained on but remote communications were not received. PLC modem reset on 6/28/2022.
07/05/2022	9:45	No	
07/12/2022	8:30	Yes	No system information attached in the email. PLC system reset.
07/16/2022	9:52	Yes	System Flow - 176.4 scfm
08/02/2022	9:00	Yes	System Flow - 176.4 scfm
08/09/2022	7:00	Yes	System Flow - 114.0 scfm
08/16/2022	7:00	Yes	System Flow - 106.0 scfm
08/23/2022	10:38	Yes	System Flow - 140.8 scfm
08/30/2022	7:00	Yes	System Flow - 111.2 scfm
09/07/2022	7:00	Yes	System Flow - 119.6 scfm
09/12/2022	8:00	Yes	No system information attached in the email. PLC system reset.
09/19/2022	7:00	Yes	No system information attached in the email. PLC system reset.
10/04/2022	7:00	Yes	System Flow - 8.9 scfm
10/11/2022	7:00	Yes	System Flow - 148.7 scfm
10/18/2022	7:00	Yes	System Flow - 146.1 scfm
10/25/2022	7:00	Yes	System Flow - 132.6 scfm
11/01/2022	7:00	Yes	No system information attached in the email. PLC system reset.
11/07/2022	7:00	Yes	No system information attached in the email. PLC system reset.
11/16/2022	7:00	Yes	System Flow - 141.0 scfm
11/22/2022	7:00	Yes	System Flow - 152.6 scfm
11/29/2022	7:00	Yes	System Flow - 131.5 scfm
12/06/2022	7:00	Yes	System Flow - 144.5 scfm
12/16/2022	7:00	Yes	System Flow - 119.2 scfm
12/20/2022	7:00	Yes	No system information attached in the email. PLC system reset.
12/29/2022	7:00	Yes	System Flow - 129.3 scfm
01/03/2023	7:00	Yes	System Flow - 127.8 scfm
01/10/2023	7:00	Yes	No system information attached in the email. PLC system reset.
01/17/2023	7:00	Yes	No system information attached in the email. PLC system reset.
01/24/2023	7:00	Yes	System Flow - 127.8 scfm
01/31/2023	7:00	Yes	System Flow - 121.3 scfm
02/07/2023	7:00	Yes	System Flow - 128.8 scfm
02/14/2023	7:00	Yes	No system information attached in the email. PLC system reset.
02/21/2023	7:00	Yes	System Flow - 120.6 scfm
02/28/2023	7:00	Yes	System Flow - 128.3 scfm
03/07/2023	7:00	Yes	System Flow - 166.9 scfm
03/14/2023	7:00	Yes	System Flow - 174.2 scfm
03/21/2023	7:00	Yes	System Flow - 145.5 scfm

Table 2-1
Sparge System Telemetric Monitoring
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

Date/time system was checked		System Operational Yes/No	Identify Any Operational Abnormalities and Corrective Action Taken to Restore Operation
03/28/2023	7:00	Yes	System Flow - 148.4 scfm
04/05/2023	7:00	Yes	System Flow - 143.0 scfm
04/11/2023	7:00	Yes	System Flow - 148.1 scfm
04/19/2023	7:00	Yes	System Flow - 162.1 scfm
04/25/2023	7:00	Yes	System Flow - 156.6 scfm

Notes:
1. O&M = operation and maintenance.
2. psi = pounds per square inch.
3. PLC = Program logic control
4. PRM = Product Recovery Management, Inc.
5. Beginning 6/21/23, total system flow captured which includes bleed for Zone 4 for compressure operation.

Table 2-2
Sparge System Operational Readings
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

O&M Date	Hour Meter	Total Run Time	Vacuum (PI-1)		Temperature after Compressor (TI-1)	Temperature after Aftercooler (TI-2)	Biosparge									Air Sparge			
							Leg 1			Leg 2			Leg 5			Leg 3		Leg 4	
			Biosparge / Air Sparge				Differential	Flow Rate (FI-1)	Pressure (PI-2)	Differential	Flow Rate (FI-2)	Pressure (PI-3)	Flow Rate (FI-5)	Pressure (PI-6)	Biosparge Total Flow (Zone 1, Zone 2, and Zone 5 [expansion])	Flow Rate (FI-3)	Pressure (PI-4)	Flow Rate (FI-4)	Pressure (PI-5)
		(hrs/month)	(inches H_20)		(^oF)	(^oF)	(inches H_20)	(scfm)	(psi)	(inches H_20)	(scfm)	(psi)	(scfm)	(psi)	(scfm)	(scfm)	(psi)	(scfm)	(psi)
12/30/2019	45573.2	19.8	Compressor seized upon arrival. Pending Repair in 2020.																
06/26/2020	45575.4	2.2	4.0	NM	150	105	NR	20.0	24.0	NR	20.0	27.0	18.0	22.0	NA	NM	NM	NM	NM
07/29/2020	46367.1	791.7	4.0	NM	165	105	NR	20.0	25.0	NR	21.0	29.0	18.0	22.0	NA	NM	NM	NM	NM
08/28/2020	47019.3	652.2	2.5	NM	142	105	NR	20.0	25.0	NR	15.0	24.8	20.0	23.0	NA	NM	NM	NM	NM
09/29/2020	47641.4	622.1	4.0	NM	150	110	NR	10.0	24.0	NR	10.0	26.0	10.0	21.0	NA	NM	NM	NM	NM
10/28/2020	48189.7	548.3	5.0	NM	150	110	NR	12.0	23.5	NR	10.0	25.0	10.0	22.0	NA	NM	NM	NM	NM
11/30/2020	48982.4	792.7	3.5	NM	150	100	NR	15.0	23.0	NR	8.0	25.0	15.0	20.0	NA	NM	NM	NM	NM
12/12/2020	49294.4		System Fire																
06/21/2022	17919.2		NA	NA	NA	90	NR	16.0	6.0	NR	17.0	6.0	17.0	6.0		NM	NM	NM	NM
07/05/2022	17923.8	4.6	NA	NA	NA	100	NR	17.5	NR	NR	16.0	NR	off						
07/12/2022	18090.0	166.2	NA	NA	NA	96.5	NR	19.0	6.0	NR	27.0	6.0	No Pressure. Troubleshooting performed in three phases.			NM	NM	NM	NM
08/02/2022	18761.0	671.0	NA	NA	NA	95	NR	17.0	27.5	NR	18.0	27.5							
08/16/2022	18924.4	163.4	NA	NA	NA	100	NR	16.0	24.0	NR	16.0	24.0				NM	NM	NM	NM
09/12/2022	19592.7	668.3	NA	NA	NA	131	NR	17.0	25.0	NR	12.0	25.0				NM	NM	NM	NM
10/11/2022	19959.5	366.8	NA	NA	NA	82.5	NR	16.0	20.0	NR	18.0	25.0				NM	NM	NM	NM
11/15/2022	25306.0	5346.5	NA	NA	NA	78.0	NR	14.0	28.0	NR	21.0	27.0				NM	NM	NM	NM
12/12/2022	25955.0	649.0	NA	NA	NA	127.5	NR	15.0	25.0	NR	18.0	25.5				NM	NM	NM	NM
01/16/2023	26794.0	839.0	NA	NA	NA	54.5	NR	13.0	25.0	NR	17.0	23.0				NM	NM	NM	NM
02/14/2023	27488.0	694.0	NA	NA	NA	71.5	NR	15.0	24.0	NR	17.0	24.0				NM	NM	NM	NM
03/02/2023	27839.0	351.0	NA	NA	NA	125.0	NR	18.0	20.0	NR	19.0	24.0	18.0	NR	24.0	NM	NM	NM	NM
03/14/2023	28123.0	284.0	NA	NA	NA	73.5	NR	20.0	24.0	NR	22.0	26.0	14.0	22.0	28.0	NM	NM	NM	NM
04/18/2023	28958.0	835.0	NA	NA	NA	86.7	NR	16.0	24.0	NR	16.0	25.0	13.0	22.0	26.0	NM	NM	NM	NM
05/16/2023	29887.6	929.6	NA	NA	NA	98.3	NR	15.0	20.0	NR	16.0	25.0	NR	14.5	25.5	NM	NM	NM	NM

Notes:
1. hrs = hours.
2. inches H2O = inches of water.
3. oF = degrees Fahrenheit.
4. psi = pounds per square inch.
5. scfm = standard cubic feet per minute.
6. NI = not installed.
7. NR = not recorded.
8. NM = that air sparge operational parameters were not collected because the air sparge system was turned off following the April 2018 O&M.
9. hrs/month = hours per month.
10. O&M = Operation and maintenance.
11. Flow Meter (FI-1) was broken on 7 September 2012, so a flow rate was not recorded.
12. Variable frequency drive installed (30 May 2013) and compressor programmed to operate at different capacities for biosparge and air sparge legs (12 July 2013).
13. Flow rates reported after 17 July 2013 are corrected because observed flow rates are based on standard temperature and pressure.
14. Flow rates reported for 28 July 2015 event are low due to a broken pressure relief valve.
15. Vacuum gauge was replaced on 31 August 2017 after it was determined that the existing vacuum gauge was broken and was unable to measure the applied vacuum.
16. Vacuum reported on 27 November 2017 was high due to a broken vacuum gauge. This was replaced with a magnehelic gauge on 20 December 2017.
17. NA = Not Applicable
18. System hour readings on 12/12/2020 had to be estimated based on daily telemetry data, due to equipment fire that destroyed the system
19. 6/21/2022 through 4/18/2023 - Hour meter from compressor collected at 2 different places on trailer. For actual hours, telemetry hours are used.

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	ASW01		ASW02		ASW03		ASW04		ASW05	
Screen Interval (ft BLS)	48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	2.00	NR	NR	NR	8.30	10.80	8.20	9.80	8.20	9.80
06/26/2020	18.50	2.00	18.00	2.80	19.00	2.40	18.50	3.30	19.00	2.40
07/29/2020	20.00	4.10	20.00	4.10	20.00	2.90	20.00	1.20	20.10	2.10
08/28/2020	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/29/2020	20.00	2.70	20.00	1.70	20.00	2.90	20.00	3.20	20.00	2.70
10/28/2020	9.70	2.00	9.70	2.20	9.80	0.00	9.80	2.00	9.80	2.30
11/30/2020	20.00	2.40	20.00	6.60	20.00	1.20	20.00	2.10	20.00	1.70
06/21/2022	19.60	1.20	19.70	2.40	19.60	0.00	19.50	2.10	19.60	2.70
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	19.20	2.10	19.20	1.20	19.20	0.0	19.20	2.40	19.10	1.70
03/14/2023	19.00	3.40	19.00	3.80	19.00	4.00	19.10	2.10	19.10	2.40
04/18/2023	20.00	3.20	20.00	4.20	20.00	4.80	20.00	5.00	20.00	3.20

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	ASW06		ASW07		ASW08		ASW09		ASW10	
Screen Interval (ft BLS)	48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	8.30	14.60	8.30	NR	8.20	NR	8.20	9.80	8.20	10.70
06/26/2020	18.50	5.70	18.00	3.30	19.00	NR	18.00	8.20	18.50	2.30
07/29/2020	20.00	3.80	20.00	1.20	20.60	1.70	20.80	4.80	20.70	1.20
08/28/2020	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/29/2020	20.00	2.90	20.00	2.40	20.00	0.00	19.80	NR	19.90	2.70
10/28/2020	9.80	2.70	9.70	2.00	9.80	1.00	9.80	1.00	9.80	2.30
11/30/2020	20.00	2.90	20.00	1.70	20.50	1.70	20.00	8.50	20.00	1.20
06/21/2022	19.60	3.20	19.50	2.90	19.50	2.40	19.50	0.00	19.60	4.10
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	19.10	1.70	19.20	5.10	19.10	2.90	19.10	0.0	19.20	2.90
03/14/2023	19.10	1.70	19.10	4.10	19.10	2.40	18.90	2.10	19.00	2.40
04/18/2023	20.00	2.40	20.50	7.00	20.50	3.20	20.00	1.20	20.50	2.10

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	ASW11		ASW12		ASW13		ASW14		ASW15	
Screen Interval (ft BLS)	48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	9.60	11.90	8.30	11.60	NR	NR	9.50	NR	9.50	10.10
06/26/2020	18.50	2.30	18.00	1.60	18.00	2.80	21.00	5.00	20.80	2.40
07/29/2020	20.70	1.70	20.10	1.20	19.70	2.40	22.30	3.50	22.20	1.70
08/28/2020	NR	NR	NR	NR	NR	NR	21.00	2.40	21.00	3.00
09/29/2020	19.90	2.40	19.90	1.70	19.50	2.90	21.40	2.40	21.40	2.70
10/28/2020	9.80	2.00	9.90	1.70	9.90	2.00	9.60	1.40	11.20	1.80
11/30/2020	20.50	1.20	20.00	1.70	20.50	3.80	21.50	2.10	22.00	1.70
06/21/2022	19.60	2.10	19.40	2.40	18.80	3.10	22.30	1.80	22.50	2.80
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	19.20	1.70	19.20	1.70	19.10	5.30	22.00	2.50	21.90	2.10
03/14/2023	19.00	1.70	19.00	1.20	19.00	2.40	20.30	1.20	20.30	1.20
04/18/2023	20.50	1.70	20.00	1.20	20.00	2.10	22.00	2.10	22.00	2.10

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	ASW16		ASW17		ASW18		ASW19		ASW20	
Screen Interval (ft BLS)	48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5		48 to 50.5	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	9.50	9.00	9.50	NR	9.50	6.40	9.50	6.40	9.50	4.50
06/26/2020	20.60	3.40	20.60	7.00	20.50	2.40	20.50	2.70	20.40	NR
07/29/2020	22.70	2.80	22.20	7.80	22.30	4.30	22.20	1.70	22.30	2.50
08/28/2020	21.00	2.10	21.00	1.70	21.00	1.70	21.00	1.70	21.00	1.70
09/29/2020	21.50	3.00	21.40	2.70	21.60	3.00	21.50	2.50	21.60	4.90
10/28/2020	11.30	1.80	11.40	1.00	11.40	2.10	11.40	2.10	11.20	1.50
11/30/2020	21.50	1.20	21.50	1.70	22.00	2.10	21.50	2.10	22.00	2.50
06/21/2022	22.50	3.50	22.30	3.00	22.30	3.30	22.70	5.30	22.60	4.30
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	21.50	1.70	21.90	3.50	21.70	2.80	21.50	3.00	21.80	5.40
03/14/2023	20.40	2.10	20.30	1.70	20.40	2.70	20.20	1.20	20.30	2.10
04/18/2023	22.00	1.70	22.00	2.20	22.00	2.20	22.00	2.20	22.00	1.20

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	ASW21		ASW22		ASW23		ASW24		ASW25	
Screen Interval (ft BLS)	**48 to 50.5**		**48 to 50.5**		**47.5 to 50**		**47.5 to 50**		**47.5 to 50**	
Sample Date	**Pressure (psi)**	**Flow Rate (scfm)**	**Pressure (psi)**	**Flow Rate (scfm)**	**Pressure (psi)**	**Flow Rate (scfm)**	**Pressure (psi)**	**Flow Rate (scfm)**	**Pressure (psi)**	**Flow Rate (scfm)**
11/26/2019	9.50	4.50	9.60	6.40	9.50	NR	9.50	3.20	9.40	6.40
06/26/2020	16.10	1.60	20.00	1.70	20.00	2.70	20.50	2.90	18.50	0.00
07/29/2020	22.40	1.70	22.30	1.80	22.60	2.10	22.60	8.40	NR	NR
08/28/2020	21.00	1.20	21.00	1.20	21.00	1.70	21.00	2.10	22.00	1.70
09/29/2020	21.50	2.70	21.60	2.70	21.60	2.50	21.60	3.90	21.30	2.10
10/28/2020	11.40	1.80	11.40	1.80	11.30	2.50	11.20	4.10	11.10	2.10
11/30/2020	22.00	2.50	22.00	3.00	22.00	4.30	21.50	4.90	21.50	1.70
06/21/2022	22.70	2.80	22.60	3.50	22.60	3.90	22.60	3.00	23.10	2.50
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	21.80	2.80	21.70	4.80	23.50	3.30	23.60	1.80	21.80	3.10
03/14/2023	20.30	1.20	20.10	2.10	20.10	2.10	20.20	1.70	19.80	1.20
04/18/2023	22.00	2.10	21.50	3.50	22.00	2.50	22.00	1.80	22.00	7.40

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	BSW26		BSW27		BSW28		BSW29		BSW30	
Screen Interval (ft BLS)	46 to 48		46 to 48		46 to 48		46 to 48		46 to 48	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	23.50	3.20	20.00	3.40	20.50	3.10	19.00	2.90	21.00	3.40
06/26/2020	23.00	4.10	21.00	3.00	20.00	3.60	19.00	2.30	21.00	3.60
07/29/2020	24.00	4.00	22.00	3.30	22.00	4.30	20.00	0.26	22.00	4.00
08/28/2020	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/29/2020	24.00	1.60	20.00	1.50	20.00	1.50	20.00	1.50	21.00	1.50
10/28/2020	23.50	2.20	21.00	2.50	20.00	2.30	20.00	2.10	21.00	1.50
11/30/2020	23.00	1.60	21.00	2.30	21.00	2.30	20.00	2.30	21.00	0.80
06/21/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
07/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
08/16/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
09/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
10/11/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
11/15/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
03/02/2023	20.00	2.20	23.00	2.30	19.00	2.10	20.00	2.00	21.00	2.00
03/14/2023	20.00	2.00	23.00	3.00	19.00	2.60	19.50	2.40	21.00	2.50
04/18/2023	21.00	3.40	23.50	4.20	19.50	3.00	20.00	3.00	21.00	3.40

Table 2-3
Biosparge Barrier Well Head Pressure and Air Flow Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

	BSW31		BSW32		BSW33		BSW34		BSW35		BSW36	
Screen Interval (ft BLS)	46 to 48		46 to 48		46 to 48		46 to 48		46 to 48		46 to 48	
Sample Date	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)	Pressure (psi)	Flow Rate (scfm)
11/26/2019	22.00	2.20										
06/26/2020	23.00	4.60										
07/29/2020	23.00	4.60										
08/28/2020	NR	NR										
09/29/2020	21.00	NR										
10/28/2020	23.00	1.60										
11/30/2020	22.00	1.60										
06/21/2022	NR	NR										
07/12/2022	NR	NR										
08/16/2022	NR	NR										
09/12/2022	NR	NR										
10/11/2022	NR	NR										
11/15/2022	NR	NR										
12/12/2022	NR	NR										
01/16/2023	NR	NR										
02/14/2023	NR	NR										
03/02/2023	22.00	2.20	21.40	3.70	22.20	3.30	22.00	2.50	19.20	2.90	19.10	2.10
03/14/2023	22.00	2.30	20.60	4.70	20.40	4.20	20.20	3.60	19.10	2.90	19.10	1.70
04/18/2023	22.00	3.10	22.00	6.30	22.00	6.60	22.50	6.80	20.50	4.40	20.50	3.00

Notes:

1. ASW and BSW indicate biosparge wells.
2. feet bls = feet below land surface.
3. psi = pounds per square inch.
4. scfm ind=icates standard cubic feet per minute.
5. NR = not recorded.
6. NI = not installed.
10. Pressure data from 11/26/19 does not appear usable. Suspect bad field pressure gauge. Replaced pressure gauge for subsequent field readings.
11. Wellhead pressure data from 10/28/2020 does not appear usable. Suspect faulty digital manometer. Instrument will be evaluated for accuracy.
12. Data shown from the last five years.

Table 2-4
Biosparge Barrier Dissolved Oxygen Measurements
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	ASMW01	ASMW02	ASMW03	ASMW04	ASMW05	ASMW06	ASPZ01R*	ASPZ02
Screen Interval (feet BLS)	35 to 40	35 to 40	35 to 40	35 to 40	35 to 40	35 to 40	30 to 40	30 to 40
Sample Date	DO (mg/L)	DO (mg/L)	DO (mg/L)	DO (mg/L)	DO (mg/L)	DO (mg/L)	DO (mg/L)	DO (mg/L)
12/30/2019[a]	5.55	4.75	3.49	4.77	3.61	0.74	0.94	2.64
01/30/2020	6.16	4.46	2.21	5.60	4.62	1.51	0.78	5.76
06/26/2020	1.04	5.38	4.63	1.75	3.42	1.72	3.13	1.29
07/29/2020	1.71	1.39	6.97	2.57	2.16	0.57	4.91	0.64
08/28/2020	NR	NR	NR	4.77	NR	NR	NR	6.07
09/29/2020	5.74	3.78	3.61	0.51	5.23	0.62	1.25	6.65
10/28/2020	6.39	4.53	4.56	1.48	6.20	3.70	1.34	7.50
11/30/2020	6.67	5.59	4.58	2.83	6.20	5.41	3.19	7.63
03/04/2021	0.66	3.63	0.58	0.69	5.35	4.72	0.59	0.57
06/21/2022	-	-	-	-	-	-	2.11	3.03
07/12/2022	5.24	6.04	-	-	-	-	-	-
08/16/2022	6.17	5.12	-	-	-	-	-	-
09/12/2022	3.65	2.77	4.32	-	-	-	-	-
10/11/2022	5.10	6.64	6.58	-	-	-	-	-
11/15/2022	4.97	6.31	6.47	-	-	-	-	-
12/12/2022	-	-	-	-	-	-	-	-
01/16/2023	7.27	7.74	6.39	-	-	-	-	-
02/14/2023	6.69	6.45	6.05	-	-	-	-	-
03/02/2023	-	-	-	-	-	-	-	-
03/14/2023	6.17	5.59	5.76	5.44	8.52	4.11	2.21	7.69
04/18/2023	5.65	5.38	5.96	5.48	2.36	2.65	3.62	8.03
Historical Avg	**1.10**	**0.94**	**0.91**	**1.26**	**1.38**	**0.81**	**1.22**	**3.22**

Notes:
Avg = Average
BLS = Below land surface
DO = Dissolved oxygen
mg/L = Milligrams per liter
NR = Not recorded
SWMU = Solid Waste Management Unit
* = The original biosparge well ASPZ01 was replaced with ASPZ01R (same construction details) on October 16 2008
[a] = Compressor had been inactive for 32 days when these readings were collected
Gray highlighting indicates that the operational parameters were collected during the reporting period (May through December 2019)
March 4, 2021 readings are part of baseline data collected due to biosparge system fire in December 2020

Table 2-5
Monitoring Well Retrofitting Details
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

No.	Well ID	Date of Retrofit	Uncover Buried Well	Raise TOC	Lower TOC	New Well Pad	New Manhole Cover (bolted)	Number in Photo Log	Notes
1	MLPV-IW0007I	1/9/2023			X	X	X	35	
2	MLPV-IW0009D	1/10/2023	X			X	X	36	
3	MLPV-IW0009I	1/10/2023	X			X	X	36	
4	MLPV-IW0011I	1/10/2023	X	X		X	X	37	
5	MLPV-IW0027D	1/10/2023	X			X	X	38	
6	MLPV-IW0027I	1/10/2023	X			X	X	38	
7	MLPV-IW0034	1/11/2023		X		X	X	39	
8	MLPV-IW0035	1/11/2023		X		X	X	39	
9	MLPV-IW0037	1/11/2023	X			X	X	37	
10	MLPV-IW0040	1/11/2023		X		X	X	40	
11	MLPV-IW0041	1/11/2023		X		X	X	40	
12	MLPV-IW0045	1/11/2023				X		41	
13	MLPV-IW0047	1/11/2023	X					42	Pad and well in good condition. Located in gravel near construction area. Decided to keep as-is since raising may make it vulnerable to damage by heavy equipment traffic.
14	MLPV-IW0053	1/10/2023						NA	Could not locate. Requires repair/replacement.
15	MLPV-IW0057	11/23/2022	X	X		X	X	43	
16	MLPV-IW0058	11/23/2022	X					44	Pad and well in good condition. Located in gravel near construction area. Decided to keep as-is since raising may make it vulnerable to damage by crane or other heavy equipment traffic.
17	MLPV-IW0059	11/23/2022						47	Left as-is. Slightly above grade and in good condition
18	MLPV-IW0061	11/23/2022				X		45	
19	MLPV-IW0062	11/23/2022				X		45	
20	MLPV-IW0063	1/9/2023	X			X		46	
21	MLPV-IW0064	1/9/2023	X			X		46	

Notes:
No. = number
SWMU = Solid Waste Management Unit
TOC = Top of casing

3. PERFORMANCE, INTERIM, AND LONG TERM GROUNDWATER MONITORING ACTIVITIES AND RESULTS

Monitoring locations in the MLP/VAB groundwater monitoring program fall within semi-annual, annual, or biennial sampling frequencies based on historical trends. The sampling frequencies for the MLP/VAB areas are as follows:

- Former Hot Spot 2 (Air Sparge Area): Semi-annual IGM
- Biosparge Area: Semi-annual performance monitoring
- Hot Spot 3 (OFW): Annual performance monitoring
- Hot Spot 4: To be sampled during SWMU closure
- LCP LTM: Biennial groundwater monitoring

In 2022 and early 2023, as recommended in the 2021 CMI and IM Annual Report (NASA 2022a), 37 monitoring wells were installed (35 new and 2 replacement) for inclusion to the LCP LTM program. Additionally, thirteen existing site monitoring wells were added to the LCP LTM program (including one replacement). Two monitoring well locations could not be accessed within the VAB and were later installed and sampled in the Fall of 2023, outside of this reporting period. Data from these wells are included in the evaluations for both the LCP and other focus areas.

From March 14 through 16, 2022, April 21, 2022, and March 8 through 10 and 13 through 15, 2023 semi-annual sampling was performed at the Former Hot Spot 2 (Air Sparge Area) and Biosparge Areas. Select monitoring wells were resampled on April 26, 2023 to confirm March 2023 concentrations. The Hot Spot 3 (OFW) annual groundwater sampling was performed in December 2022. Additionally, a wet season sitewide groundwater gauging event was postponed until proposed monitoring wells were installed. Therefore, a water gauging event was not conducted in the summer of 2022. A wet season (generally from May and October) water gauging event was performed in July 2023 and will be detailed in a subsequent report.

Following water level gauging prior to each sampling event, monitoring well purging and sampling activities were conducted using the low flow purging method in general accordance with FDEP Standard Operating Procedures (SOPs) (FDEP 2005), the KSC Sampling and Analysis Plan (NASA 2017b), and the FDEP Petroleum Storage Systems Petroleum Cleanup Program SOPs (FDEP 2018), where applicable. During monitoring well purging, the following geochemical parameters were recorded at regular intervals: pH, temperature, DO, conductivity, oxidation reduction potential, salinity, and turbidity. Groundwater samples were submitted to Eurofins Testing (Eurofins [formerly Environmental Conservation Laboratories, Inc.]) for analysis under chain-of-custody protocol. Eurofins is certified within the state of Florida under the National Environmental Laboratory Accreditation Program. Investigation derived waste from field activities included purge water, which was contained in properly labeled 55-gallon drums.

The drums were stored on NASA-provided spill pallets and secured with cargo straps to be properly disposed of by NASA at a later date.

Field notes are provided in **Appendix O**. Groundwater sampling logs and calibration records are provided in **Appendix P**. Groundwater elevations, calculated from depth to groundwater measurements recorded prior to each sampling event, are provided in **Table 3-1**. Groundwater analytical results are summarized in **Table 3-2** through **Table 3-5**, and geochemical results are summarized in **Table 3-6** through **Table 3-9**. Laboratory analytical reports are provided in **Appendix Q**. Data were uploaded to KSC's Remediation Information System (RIS) upon receipt. RIS completion tickets are provided in **Appendix R**.

3.1 GROUNDWATER ELEVATION AND FLOW DIRECTION

A wet season (generally from May through October) sitewide groundwater gauging event was not performed in 2022 due to ongoing Center operations and monitoring well installation activities in the fall and summer of 2022. A sitewide groundwater gauging event was performed in July 2023 (wet season) and results will be reported in the next annual CMI and IM Report. Prior to the sampling event completed in March and April 2022, and March 2023, depth to groundwater measurements were collected from accessible monitoring wells prior to sampling. The December 2023 event included only four monitoring wells and was therefore not tabulated. In 2023, water level gauging was conducted on March 7, 2023, a week prior to sampling activities, when site access was less restricted.

Groundwater level measurements from the top-of-casing and groundwater elevations calculated as feet relative to the National American Vertical Datum of 1988 are summarized in **Table 3-1**. March 2021 (dry season) groundwater contour maps (originally presented in the 2021 CMI and IM Annual Status Report [NASA 2022a]) depicting groundwater flow directions at each sampling interval are provided as **Figure 3-1** for the 2 feet to 20 feet bls sampling interval, **Figure 3-2** for the 20 feet to 45 feet bls sampling interval, and **Figure 3-3** for depths below 45 feet bls.

Groundwater contour maps for the shallow interval indicate a radial groundwater flow to the north and northwest with a southeasterly flow in the southern half of the SWMU. Groundwater flow in both the intermediate and deep intervals indicates a radial flow to the north and northeast in the northern half of the SWMU and similar southeasterly flow as observed in the shallower interval the southern half of the SWMU. Water level measurement logs are provided in **Appendix S**.

3.2 HCP INTERIM GROUNDWATER MONITORING

The semi-annual sampling plan for Former Hot Spot 2 includes 17 monitoring wells (MLPV-IW0011I, MLPV-IW0032, MLPV-IW0033, MLPV-IW0034, MLPV-IW0035, MLPV-IW0036, MLPV-IW0037, MLPV-IW0038, MLPV-IW0039, MLPV-IW0040, MLPV-IW0041, MLPV-

IW0042, MLPV-IW0043, MLPV-IW0044, MLPV-IW0045, MLPV-SAMW0004D, and MLPV-SAMW0004I). Since portions of this site are an active construction zone, access was limited in 2022 and the sampling event was performed over an extended period. Nine monitoring wells were sampled in March 15 and 16, 2022 (MLPV-IW0034, MLPV-IW0036, MLPV-IW0038, MLPV-IW0039, MLPV-IW0041, MLPV-IW0042, MLPV-IW0043, MLPV-SAMW0004D, and MLPV-SAMW0004I). and the remaining eight monitoring wells were instead sampled on April 21, 2022 (MLPV-IW0011I, MLPV-IW0032, MLPV-IW0033, MLPV-IW0035, MLPV-IW0037, MLPV-IW0040, MLPV-IW0044, and MLPV-IW0045).

Semi-annual sampling was tasked to occur in the Fall of 2022; however, due to Center operations at the site and on-going sitewide monitoring well installation activities, sampling was postponed until March 2023. On March 9 through 14, 2023, the 17 monitoring wells were located and sampled. Three monitoring wells were resampled on April 26, 2023 to confirm March 2023 concentrations (MLPV-IW0036, MLPV-IW0038, and MLPV-IW0039). Samples for the 2022 and 2023 sampling events were analyzed for a reduced analyte list of cDCE, tDCE, and VC using USEPA Method 8260B by a fixed-base laboratory.

Additionally, seven existing monitoring wells (MLPV-IW0009I, MLPV-IW0009D, MLPV-IW0012D, MLPV-IW0014I, MLPV-IW0017I, MLPV-SAMW0001, and MLPV-SAMW0003) and five newly installed monitoring wells (MLPV-MW0087, MLPV-MW0088, MLPV-MW0091, MLPV-MW0092, and MLPV-MW0093) were sampled in the Former Hot Spot 2 area in March 2023 as part of the LCP LTM plan. LCP LTM monitoring wells were sampled for TCE, cDCE, tDCE, and VC using USEPA Method 8260B. Data from these wells are also included in the evaluation of the Former Hot Spot 2 area.

Analytical results are summarized by depth interval in the subsequent sections. Groundwater analytical results for Former Hot Spot 2 and surrounding area are summarized in **Table 3-2** and illustrated on **Figure 3-4**. Geochemical parameters from the sampling events are provided on **Table 3-6**.

3.2.1 30 feet to 40 feet bls Sampling Interval Results

The March 2022 laboratory analytical results indicated CVOC concentrations were less than GCTLs or laboratory detection limits in five monitoring wells: MLPV-IW0011I, MLPV-IW0034, MLPV-IW0038, MLPV-IW0040, and MLPV-IW0042. Exceedances were as follows:

- **VC GCTL**: MLPV-IW0032 (3.1 µg/L) and MLPV-SAMW0004I (15 µg/L). VC concentrations in MLPV-IW0038 decreased to below GCTLs since the March 2021 sampling event.
- **NADC**: No exceedances

The March and April 2023 laboratory analytical results indicated CVOC concentrations were less than GCTLs or laboratory detection limits in five monitoring wells: MLPV-IW0011I, MLPV-IW0032, MLPV-IW0034, MLPV-IW0040, and MLPV-IW0042. Exceedances were as follows:

- **VC GCTL**: MLPV-IW0038 (1.8 µg/L) and MLPV-SAMW0004I (12 µg/L).
- **NADC**: No exceedances.

In March 2023 cDCE and VC concentrations in MLPV-IW0038 significantly increased above the GCTL and NADC, respectively, since the March 2022 sampling event. Concentrations in this monitoring well were historically below or slightly above GCTLs. To confirm analytical results of the March 2023 sampling event, monitoring well MLPV-IW0038 was resampled on April 26, 2023. Analytical results indicated that cDCE concentrations were below GCTLs at 0.85 µg/L and VC concentrations were slightly above the GCTL at 1.8 µg/L. The results of the April 2023 sampling event are consistent with historical contaminant concentrations. The April 2023 data for MLPV-IW0038 was applied to analytical figures in place of March 2023 for more accurate plume representation.

Analytical results from the monitoring wells sampled under the LCP LTM plan (MLPV-IW0009I, MLPV-IW0014I, MLPV-IW0017I, and MLPV-MW0088) indicate CVOC concentrations were less than GCTLs or laboratory detection limits, with the exception of VC in MLPV-MW0088 which was above the GCTL at 2.3 µg/L.

3.2.2 40 feet to 50 feet bls Sampling Interval Results

March and April 2022 laboratory analytical results indicate CVOC concentrations were less than GCTLs or laboratory detection limits in one monitoring well, MLPV-IW0035. No detections of tDCE were present above GCTLs or laboratory method detection limits. Exceedances were as follows:

- **cDCE GCTL**: MLPV-IW0033 (100 µg/L), MLPV-IW0037 (100 µg/L), MLPV-IW0039 (140 µg/L), and MLPV-IW0043 (98 µg/L).
- **VC GCTL**: MLPV-IW0036 (44 µg/L), MLPV-IW0043 (88 µg/L), MLPV-IW0045 (92 µg/L) and MLPV-SAMW0004D (17 µg/L). MLPV-IW0043 and MLPV-IW0045 decreased to a concentration below NADCs from the previous sampling event in September 2021.
- **VC NADC**: MLPV-IW0033 (950 µg/L), MLPV-IW0037 (200 µg/L), MLPV-IW0039 (160 µg/L), MLPV-IW0041 (150 µg/L), and MLPV-IW0044 (200 µg/L).

The March and April 2023 laboratory analytical results indicate concentrations exceeded GCTLs for at least one COC in each of the sampled wells. No detections of tDCE were present above GCTLs or laboratory method detection limits. Exceedances were as follows:

- **cDCE GCTL**: MLPV-IW0037 (79 µg/L), MLPV-IW0039 (150 µg/L), and MLPV-IW0043 (170 µg/L).
- **VC GCTL**: MLPV-IW0035 (78 µg/L), MLPV-IW0036 (29 µg/L), MLPV-IW0045 (59 µg/L), and MLPV-SAMW0004D (18 µg/L).
- **cDCE NADC**: No exceedances
- **VC NADC**: MLPV-IW0033 (560 µg/L), MLPV-IW0037 (170 µg/L), MLPV-IW0039 (170 µg/L), MLPV-IW0041 (130 µg/L), MLPB-IW0043 (280 µg/L), and MLPV-IW0044 (620 µg/L).

To confirm analytical results of the March 2023 sampling event, monitoring wells MLPV-IW0036 and MLPV-IW0039 were resampled on April 26, 2023. Analytical results indicated that VC concentrations in MLPV-IW0036 remained above GCTLs at 29 µg/L, and slightly below the reported concentration from March 2023. In MLPV-IW0039, concentrations of cDCE were above the GCTL at 150 µg/L and VC concentrations were above the NADC at 270 µg/L. The results of the April 2023 sampling event are consistent with historical contaminant concentrations in both monitoring wells. The April 2023 data for MLPV-IW0036 and MLPV-IW0039 were applied to analytical figures in place of March 2023 for more accurate plume representation.

Analytical results from the monitoring wells within the former Hot Spot 2 area that are sampled under the LCP LTM plan (MLPV-IW0009D, MLPV-IW0012D, MLPV-SAMW0001, and MLPV-SAMW0003) indicate CVOC concentrations were less than GCTLs or laboratory detection limits, with the exception of VC in MLPV-IW0009D, MLPV-IW0012D, and MLPV-SAMW0003 which was above the GCTL at 23 µg/L, 2.5 µg/L, and 67 µg/L, respectively. Three monitoring wells sampled under the LCP LTM plan (MLPV-MW0087, MLPV-MW0091, and MLPV-MW0092) are screened in the deeper interval of 47 to 57 feet bls. Analytical results from these monitoring wells indicate CVOC concentrations were below laboratory detection limits.

3.2.3 Summary of Centerline Results

Eight monitoring wells (MLPV-IW0032, MLPV-IW0033, and MLPV-IW0038 through MLPV-IW0043) are located within the centerline of the Former Hot Spot 2 area plume and centerline of the air sparge treatment well layout. These wells are sampled to monitor air sparge system performance when in operation and residual impacts when shut down. The system has remained off since 2018. Centerline analytical results indicate the following:

- **30 feet to 40 feet bls**: CVOC concentrations were less than GCTLs or not detected in MLPV-IW0040 and MLPV-IW0042. Concentrations in MLPV-IW0032 increased to above GCTLs in the 2021 and 2022 sampling events but decreased to below GCTLs in March 2023. Concentrations in MLPV-IW0038 decreased to below in March 2022, and rebounded to above GCTLs in April 2023. Based on visual trend evaluation, CVOC concentrations at this

interval are steady or generally increasing, except for MLPV-IW0038 which exhibits a fluctuating trend.

- **40 feet to 50 feet bls**: Concentrations of cDCE exceeded its GCTL in MLPV-IW0039 and MLPV-IW0043. Concentrations of cDCE increased above its GCTL in MLPV-IW0033 during the 2022 sampling event and decreased below its GCTL in the 2023 sampling event. VC exceeded its NADC in each well (MLPV-IW0033, MLPV-IW0039, MLPV-IW0041, and MLPV-IW0043). A review of concentration trends in this interval indicate CVOC concentrations have decreased since sampling began and exhibit a relatively stable trend since the system was shut down in 2018.

Trend graphs for select wells within the centerline of the offline air sparge system treatment area are provided as **Appendix T**.

3.2.4 Summary of Perimeter Results

Nine monitoring wells, MLPV-SAMW0004D, MLPV-SAMW0004I, MLPV-IW0011I, MLPV-IW0034 through MLPV-IW0037, MLPV-IW0044, and MLPV-IW0045, are designated perimeter wells located on the periphery of the air sparge system. These wells are sampled to monitor contamination migration and plume extent outside of the treatment area. Additionally, data from newly installed monitoring well MLPV-MW0092, located downgradient and just south of MLPV-IW0044 and sampled under the LCP LTM plan, was analyzed to aid in air sparge perimeter evaluation. Perimeter analytical results indicate the following:

- **30 feet to 40 feet bls**: Includes three monitoring wells MLPV-SAMW0004I, MLPV-IW0011I, and MLPV-IW0034. CVOC concentrations were less than GCTLs or not detected, except for VC in MLPV-SAMW0004I. Results are consistent with previous years.
- **40 feet to 50 feet bls**: Includes six monitoring wells (MLPV-IW0035 through MLPV-IW0037, MLPV-IW0044, MLPV-IW0045, and MLPV-SAMW0004D). Laboratory analytical results indicate concentrations of VC above its GCTL in MLPV-SAMW0004D, MLPV-IW0035, MLPV-IW0036, and MLPV-IW0045 and above its NADC in MLPV-IW0037 and MLPV-IW0044. Concentrations of cDCE decreased to below the GCTL in MLPV-IW0045 and remained above the GCTL in MLPV-IW0037. The concentration of VC decreased to below NADC in MLPV-IW0035. Results exhibit a fluctuation within the reporting period.
- **47 feet to 57 feet bls (screened below the HCP)**: Analytical results from LCP monitoring well MLPV-MW0092 indicate CVOC concentrations were not detected.

3.3 BIOSPARGE AREA PERFORMANCE MONITORING

Semi-annual performance monitoring for the biosparge system includes a network of 15 monitoring wells (MLPV-IW0006IR, MLPV-IW0028I, MLPV-IW0031, MLPV-IW0046, MLPV-IW0057, MLPV-IW0058, MLPV-IW0059, MLPV-IW0060, MLPV-ASMW0004,

MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0061, MLPV-IW0062, MLPV-IW0063, and MLPV-IW0064). Monitoring wells were sampled in March 14 and 15, 2022. Semi-annual sampling was originally also scheduled for the Fall of 2022; however, due to Center operations in the area and on-going sitewide monitoring well installation activities, sampling was postponed until March 2023. From March 8 through 15, 2023, 15 monitoring wells were located and sampled. Eight monitoring wells were resampled on April 26, 2023 to confirm March 2023 concentrations (MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0031 MLPV-IW0046, MLPV-IW0057, MLPV-IW0061 and MLPV-IW0062). Samples for the 2022 and 2023 sampling events were analyzed for select CVOCs (TCE, cDCE, tDCE, and VC) using USEPA Method 8260B by a fixed-base laboratory.

Additionally, three monitoring wells (MLPV-IW0001D, MLPV-IW0027I, and MLPV-IW0047), one replacement monitoring well (MLPV-IW0002IR), and eleven newly installed monitoring wells (MLPV-MW0094 through MLPV-MW0097 and MLPV-MW0102 through MLPV-MW0108) were sampled in and around the Biosparge area in March 2023 as part of the LCP LTM plan. LCP LTM monitoring wells were sampled for TCE, cDCE, tDCE, and VC using USEPA Method 8260B. Data from these wells is included in the evaluation of the Biosparge area.

Analytical results are summarized in the following sections by depth for the biosparge system area. When a monitoring well screen intersects multiple referenced sampling intervals, results from the monitoring well are discussed with the interval in which a majority of the screen resides. Groundwater analytical results for the biosparge system area are summarized in **Table 3-3** and illustrated on **Figure 3-5**. Geochemical parameters from the sampling events are provided on **Table 3-7**. Trend charts are provided in **Appendix T**.

3.3.1 25 feet to 35 feet bls Sampling Interval Results

Three monitoring wells, MLPV-IW006IR, MLPV-IW0028I, and MLPV-IW0031, were evaluated from this interval. The March 2022 laboratory analytical results indicate CVOC concentrations were less than GCTLs or below laboratory detection limits except for VC in monitoring wells MLPV-IW0006IR and MLPV-IW0031. The VC concentration in MLPV-IW0006IR, which is located between the biosparge barriers, was above the GCTL at 1.6 µg/L and remained consistent with the 2021 sampling results. The VC concentration decreased to less than the GCTL in downgradient well MLPV-IW0028I. The VC concentration in MLPV-IW0031 increased since 2021 and remained above the GCTL at 6.1 µg/L. MLPV-IW0031 shows an increasing trend since 2018.

March 2023 analytical data indicated CVOC concentrations were below laboratory method detections limits in each sampled well. Since VC concentrations in monitoring well MLPV-IW0031 were historically above the GCTL, confirmation sampling was performed in April 2023. Analytical results from MLPV-IW0031 indicated that the VC concentration exceeded the GCTL

at 5.6 µg/L, which consistent with historical trends at this well. The April 2023 data for MLPV-IW0031 were applied to analytical figures in place of March 2023 for more accurate plume representation.

Analytical results from the monitoring wells sampled under the LCP LTM plan (MLPV-IW0002IR, MLPV-IW0027I, MLPV-MW0095, MLPV-MW0102, and MLPV-MW0106) indicate CVOC concentrations were less than GCTLs or laboratory detection limits, with the exception of VC in MLPV-MW0102 which was above the NADC at 440 µg/L. Monitoring well MLPV-MW0102 is located downgradient of the biosparge barrier in the wetland area east of the barrier.

3.3.2 35 feet to 40 feet bls Sampling Interval Results

Six monitoring wells, MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0046, MLPV-IW0061, and MLPV-IW0063 were evaluated from this interval.

The March 2022 laboratory analytical results indicate concentrations of cDCE, tDCE, and TCE were less than their respective GCTLs in each well. The concentration of VC in each well evaluated at this interval exceeded either GCTL or NADC criteria as follows:

- **VC GCTL**: MLPV-ASMW0005 (36 µg/L), MLPV-ASMW0006 (96 µg/L), MLPV-IW0046 (7.4 µg/L) and MLPV-IW0061 (13 µg/L)
- **VC NADC**: MLPV-ASMW0004 (290 µg/L) and MLPV-IW0063 (200 µg/L)

The March 2023 laboratory analytical results indicate concentrations of CVOC were less than their respective GCTLs or below laboratory detection limits in each well, with the exception of VC in MLPV-IW0063 which exceeded the NADC at 190 µg/L. Due to inconsistencies with the reported CVOC concentrations in comparison to historical data, monitoring wells MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0046, and MLPV-IW0061 were resampled in April 2023. April 2023 results were consistent with historical results and therefore data was used to evaluate exceedances in place of March 2023 data. Exceedances in 2023 are as follows:

- **VC GCTL**: MLPV-IW0046 (7.0 µg/L) and MLPV-IW0061 (8.7 µg/L)
- **VC NADC**: MLPV-IW0063 (190 µg/L)

The concentration of VC in MLPV-ASMW0004, MLPV-ASMW0005, and MLPV-ASMW0006 decreased below the GCTL since the March 2022 sampling event. The April 2023 data for MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0046, and MLPV-IW0061 were applied to analytical figures in place of March 2023 for more accurate plume representation.

Analytical results from the monitoring wells sampled under the LCP LTM plan (MLPV-IW0047I, MLPV-MW0094, MLPV-MW0096, MLPV-MW0097, MLPV-MW0103, MLPV-MW0107 and MLPV-MW0108) indicate CVOC concentrations were less than GCTLs or laboratory detection limits, except for VC in MLPV-MW0103, MLPV-MW0107, and MLPV-MW0108. MLPV-MW0103 and MLPV-MW0107 are located downgradient of the biosparge barrier in the wetland area east of the barrier. MLPV-MW0108 is located southeast of the biosparge barrier. The concentration of VC in MLPV-MW0103 exceeded the NADC at 1000 µg/L. The VC concentrations in MLPV-MW0107 and MLPV-MW0108 exceeded the GCTL at 21 µg/L and 25 µg/L, respectively.

In April 2023, confirmation sampling was performed for monitoring wells MLPV-IW0047I, MLPV-MW0097, and MLPV-MW0108. Analytical results were consistent with the March 2023 analytical results. The April 2023 data were applied to analytical figures in place of March 2023 since data represented more recent conditions.

3.3.3 40 feet to 50 feet bls Sampling Interval Results

Six monitoring wells, MLPV-IW0057, MLPV-IW0058, MLPV-IW0059, MLPV-IW0060, MLPV-IW0062, and MLPV-IW0064, were evaluated from this interval.

The March 2022 laboratory analytical results indicate TCE, cDCE, and tDCE were less than their GCTLs or less than laboratory detection limits in each well at this interval. VC concentrations are above its NADC or GCTL in sampled wells. Exceedances were as follows:

- **VC GCTL**: MLPV-IW0058 (88 µg/L), MLPV-IW0059 (37 µg/L) and MLPV-IW0060 (88 µg/L)
- **VC NADC**: MLPV-IW0057 (350 µg/L), MLPV-IW0062 (170 µg/L), and MLPV-IW0064 (370 µg/L)

The March 2023 laboratory analytical results indicate TCE, cDCE, and tDCE were less than their GCTLs or less than laboratory detection limits in each well at this interval. VC concentrations are above its NADC or GCTL in sampled wells, with the exception of MLPV-IW0057. Exceedances were as follows:

- **VC GCTL**: MLPV-IW0058 (90 µg/L), MLPV-IW0059 (8.4 µg/L), MLPV-IW0060 (4.6 µg/L), and MLPV-IW0062 (34 µg/L)
- **VC NADC**: VC in MLPV-IW0064 (460 µg/L)

Due to inconsistencies with the reported CVOC concentrations in comparison to historical data, monitoring wells MLPV-IW0057 and MLPV-IW0062 were resampled in April 2023. Analytical results indicated VC exceeded the NADC in MLPV-IW0057 and MLPV-IW0062 at 280 µg/L and 120 µg/L, respectively, which is consistent with historical results. The April 2023 data for

MLPV-IW0057 and MLPV-IW0062 were applied to analytical figures in place of March 2023 for more accurate plume representation.

Analytical results from the monitoring wells sampled under the LCP LTM plan (MLPV-IW0001D, MLPV-MW0104, and MLPV-MW0105) in the deeper interval of 47 to 57 feet bls indicate CVOC concentrations were less than laboratory detection limits in each well.

3.3.4 Biosparge Barrier Overall Results

Monitoring wells upgradient of the biosparge barrier, MLPV-IW0057 through MLPV-IW0059, were sampled for evaluating the potential collapse of the cDCE and VC plumes migrating from the Former Hot Spot 2 area. Results from these wells indicate an overall reduction of CVOC concentrations in MLPV-IW0057, specifically VC concentrations. MLPV-IW0057 VC concentrations decreased to 280 µg/L in 2023 from 457 µg/L in 2021, which remains greater than its NADC. The VC concentration in MLPV-IW0059 increased to 37 µg/L from 4.4 µg/L in the previous year; however, the VC concentration decreased to 8.4 µg/L in 2023 and remains greater than its GCTL. The VC concentration in MLPV-IW0059 has fluctuated from 4.4 µg/L to 45 µg/L since 2019. VC concentrations in MLPV-IW0058 have fluctuated above and below its NADC since 2017. Other CVOCs cDCE, tDCE, and TCE remained less than GCTLs in each well.

Monitoring wells upgradient of the barrier expansion (northernmost barrier) include MLPV-IW0061 and MLPV-IW0062. CVOC concentrations exhibit a decreasing trend yet remain above the respective GCTL and NADC.

Monitoring wells downgradient of the barrier include MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0031, MLPV-IW0060, MLPV-IW0063, and MLPV-IW0064. Concentrations of cDCE, tDCE and TCE remained less than GCTLs or laboratory method detection limits. VC concentrations show an increasing trend since 2020 to above its NADC in MLPV-IW0063 and MLPV-IW0064. VC concentrations in MLPV-ASMW0004 increased above NADC in 2021 and show a potentially stable trend with VC concentrations below the GCTL in 2023. Elevated concentrations reported in 2021 are indicative of contaminant migration from the upgradient HCP after the biosparge system was shut down in December 2020. Prior to the system shutdown, concentrations were below the NADC indicating that the biosparge barrier was effectively mitigating the HCP. Additionally, VC concentrations remain above its GCTL in MLPV-IW0031 and increased above the GCTL in MLPV-IW0060. VC concentrations in MLPV-ASMW0005 and MLPV-ASMW0006 increased above GCTL in 2022 and decreased below the GCTL in 2023. This increase of VC also correlates with the timeframe in which the biosparge system was not operating July 2022 through February 2023, during the 2022-2023 reporting period.

Plume maps illustrating the overall footprint of the cDCE and VC plumes in both the Former Hot Spot 2 and biosparge areas at each interval are provided on **Figure 3-6** through **Figure 3-9**.

3.4 HOT SPOT 3 (OFW AREA) PERFORMANCE MONITORING

On December 14, 2022, the annual network of four monitoring wells, VABRA-MW0011, VABRA-MW0012, VABRA-MW0013, and VABRA-MW0014, was sampled and analyzed for TCE, cDCE, tDCE, and VC using USEPA Method 8260B by a fixed-base laboratory. Analytical results are summarized by depth in the following subsections. Groundwater analytical data are summarized in **Table 3-4** and illustrated on **Figure 3-10**. Geochemical parameters from the sampling events are provided on **Table 3-8**. Trend charts are provided in **Appendix T**.

3.4.1 15 to 25 feet bls Sampling Interval Results

Laboratory analytical results from two wells, VABRA-MW0012 and VABRA-MW0013, indicate CVOC concentrations were not detected.

3.4.2 25 to 35 feet bls Sampling Interval Results

Laboratory analytical results from two wells, VABRA-MW0011 and VABRA-MW0014, indicate CVOC concentrations were not detected.

3.4.3 Hot Spot 3 (OFW) Overall Results

The groundwater analytical results from the 2022 annual sampling results are consistent with the previous year, indicating CVOC concentrations remain less than GCTLs. **Figure 3-10** provides the updated CVOC plume based on the 2022 monitoring well results and the historical 2018 DPT groundwater results that support no GCTL exceedances.

3.5 BIENNIAL LCP LONG TERM GROUNDWATER MONITORING

From March 8 through 21, 2023, 67 monitoring wells from the biennial network were sampled (including 35 new monitoring wells installed in 2022, 13 existing monitoring wells added to the sampling plan [including one replacement], and 19 monitoring wells historically part of the sampling plan). Select monitoring wells were resampled on April 26, 2023 to confirm March 2023 concentrations. Samples were analyzed for a reduced analyte list for cDCE, tDCE, and VC using USEPA Method 8260B by a fixed-base laboratory. Two remaining LCP LTM monitoring wells were installed and sampled outside of this reporting period. Although not originally part of analysis, TCE was later reported by the laboratory to better evaluate the LCP in areas with TCE detections reported from historical DPT groundwater samples. Results indicate TCE concentrations from sampled monitoring wells were below the laboratory method detection limit. A full list of the 67 monitoring wells sampled along with groundwater analytical data are summarized in **Table 3-5** and illustrated on **Figure 3-11** through **Figure 3-14**. Geochemical parameters from the sampling events are provided on **Table 3-9**.

3.5.1 1 to 20 feet bls Sampling Interval Results

Eight monitoring wells (WCPS-IW0001SR, WCPS-IW0002SRR, WCPS-IW0005S, WCPS-IW0015S, WCPS-IW0016, MLPV-MW0086, MLPV-MW0100, and MLPV-MW0110) were evaluated from this interval.

Laboratory analytical results indicate CVOC concentrations were less than GCTLs or not detected in sampled wells with the exception of VC in WCPS-IW001SR. Exceedances were as follows:

- **VC GCTL**: WCPS-IW0001SR at 38.0 µg/L. Previously, detections ranged from 20 to 54.3 µg/L since 2014.
- **NADC**: No exceedances

Analytical results for the 1 to 20 feet bls interval are provided on **Figure 3-11**.

3.5.2 20 to 35 feet bls Sampling Interval Results

Fourteen monitoring wells (MLPV-IW0002IR, MLPV-IW0009I, MLPV-IW0027I, MLPV-MW0077, MLPV-MW0078, MLPV-MW0079, MLPV-MW0081, MLPV-MW0095, MLPV-MW0098, MLPV-MW0102, MLPV-MW0106, MLPV-MW0109, SATV-IW0009, and VABU-IW0001I) were evaluated from this interval.

Laboratory analytical results indicate CVOC concentrations were less than GCTLs in sampled wells with the exception of VC exceedances as follows:

- **VC GCTL**: No GCTL only exceedances (less than NADCs)
- **VC NADC**: MLPV-MW0102 (440 µg/L)

Analytical results for the 20 to 35 feet bls interval are provided on **Figure 3-12**. Monitoring wells MLPV-IW006IR and MLPV-IW0028I were sampled under the Biosparge Area sampling plan and the respective data is included in the referenced figure to aid in plume evaluation.

3.5.3 35 to 45 feet bls Sampling Interval Results

Seventeen monitoring wells (MLPV-IW0014I, MLPV-IW0017I, MLPV-IW0047, MLPV-IW0049, MLPV-IW0056, MLPV-MW0082, MLPV-MW0088, MLPV-MW0089, MLPV-MW0093, MLPV-MW0094, MLPV-MW0096, MLPV-MW0097, MLPV-MW0103, MLPV-MW0107, MLPV-MW0108, MLPV-SAMW0001, and MLPV-SAMW0003) were evaluated from this interval. Monitoring well MLPV-IW0012I was inadvertently excluded from the sampling event, however sufficient data was received to perform an overall LCP evaluation. Monitoring well MLPV-IW0053 was planned for sampling, but field efforts could not locate the well and is presumed destroyed. A replacement well is recommended in **Section 5**.

Laboratory analytical results indicate CVOC concentrations were less than GCTLs in sampled wells with the exception of cDCE and VC in select wells as follows:

- **cDCE GCTL**: cDCE in MLPV-SAMW0003 (95 µg/L)
- **VC GCTL**: MLPV-MW0088 (2.3 µg/L), MLPV-MW0089 (1.8 µg/L), MLPV-MW0107 (21 µg/L), MLPV-MW0108 (28 µg/L), and MLPV-SAMW0003 (67 µg/L)
- **VC NADC**: MLPV-MW0103 (1,000 µg/L)

Monitoring well MLPV-MW0108 was resampled in April 2023 and analytical results confirmed the VC concentration exceeds the GCTL. The April 2023 data for MLPV-IW0108 is presented and applied to analytical figures in place of March 2023 since data represents more recent conditions. Analytical results for the 35 to 45 feet bls interval are provided on **Figure 3-13**. Monitoring wells MLPV-ASMW0004, MLPV-ASMW0006, and MLPV-IW0046 were sampled under the Biosparge Area sampling plan. Monitoring well MLPV-IW0011I was sampled under the former Hot Spot 2 sampling plan. Data for these wells is included in the referenced figure to aid in plume evaluation.

3.5.4 Greater than 45 feet bls Sampling Interval Results

A total of 29 monitoring wells (MLPV-IW0001D, MLPV-IW0009D, MLPV-IW0012D, MLPV-IW0018D, MLPV-IW0020D, MLPV-IW0022D, MLPV-IW0029D, MLPV-IW0050 through MLPV-IW0052, MLPV-IW0054, MLPV-IW0055, MLPV-MW0076, MLPV-MW0080, MLPV-MW0083 through MLPV-MW0085, MLPV-MW0087, MLPV-MW0090 through MLPV-MW0092, MLPV-MW0099, MLPV-MW0101, MLPV-MW0104, MLPV-MW0105, PRES-IW0009, VABU-IW0005D, and MLPV-SAMW0001, MLPV-SAMW0003) were evaluated from this interval.

Laboratory analytical results indicate CVOC concentrations were less than GCTLs in sampled wells except for cDCE and VC in select wells as follows:

- **cDCE GCTL**: MLPV-SAMW0003 (95 µg/L)
- **VC GCTL**: MLPV-IW0009D (23 µg/L), MLPV-IW0012D (2.5 µg/L), MLPV-IW0018D (3.6 µg/L), MLPV-IW0020D (3.1 µg/L), MLPV-IW0029D (39 µg/L), MLPV-IW0051 (1.7 µg/L), MLPV-IW0052 (12 µg/L), MLPV-MW0085 (1.9 µg/L), MLPV-SAMW0003 (67 µg/L), and VABU-IW0005D (2.5 µg/L)
- **NADC**: No exceedances

Monitoring well MLPV-SAMW0001 was resampled in April 2023 and analytical results confirmed the CVOC concentrations were below the laboratory detection limits. The April 2023 data for MLPV-SAMW0001 is presented and applied to analytical figures in place of March 2023 since data is more recent. Analytical results for the 40 to 57 feet bls interval are provided

on **Figure 3-14**. Monitoring well MLPV-IW0060 is sampled under the Biosparge Area sampling plan and the data is included in the referenced figure to aid in plume evaluation.

3.5.5 LCP LTM Overall Results

LCP Area analytical results were evaluated in combination with results from the overlapping sites within the SWMU to construct a figure that illustrates a combined sitewide plume footprint (**Figure 3-15**). Various monitoring wells are presented on multiple figures when well screens intersect two intervals. An updated version of the LCP Well Rationale table sorted by intervals is provided as **Table 3-10** with the permanent well IDs added.

*3.5.5.1 **1 to 20 feet bls***

Analytical results from monitoring wells in this screen interval indicate the LCP is limited to WCPS-IW0001SR, located in West Crawler Park northeast of the VAB. Monitoring well MLPV-MW0086, located east of the VAB and Launcher Road, was installed inside the 2021 DPT GCTL plume footprint. Analytical results for MLPV-MW0086 indicate CVOC concentrations are below laboratory detection limits, confirming a collapsed GCTL footprint for this location.

3.5.5.2 20 to 35 feet bls

Analytical results from monitoring wells in this screen interval indicate the LCP is limited to the biosparge area, downgradient of the biosparge barrier. Monitoring well MLPV-MW0102, located downgradient of the biosparge barrier in the wetland area, exceeds the NADC for VC. MLPV-IW0031, sampled under the biosparge sampling plan and located downgradient of the biosparge expansion barrier, exceeds GCTL for VC. Exceedances downgradient of the biosparge increased since the system shutdown in December 2020 and July 2022.

Monitoring well MLPV-MW0098, located northwest of the Orbiter Processing Facility and west of the VAB, was installed inside the 2021 DPT GCTL plume footprint. Analytical results for MLPV-MW0098 indicate CVOC concentrations are below laboratory detection limits, confirming a collapse of the isolated GCTL plume at this location. Monitoring wells MLPV-MW0077 through MLPV-MW0079, and MLPV-MW0081, located throughout the parking lots south of the VAB, were installed inside the 2021 DPT GCTL plume footprint and CVOC concentrations were below GCTLs in monitoring wells. The March 2023 CVOC concentrations exhibit a reduced GCTL footprint for this interval.

3.5.5.3 35 to 45 feet bls

Analytical results from monitoring wells in this screen interval indicate the LCP is limited to the biosparge area and the former Hot Spot 2 surrounding area. Monitoring well MLPV-MW0103, located downgradient of the biosparge barrier in the wetland area, exceeds the NADC for VC. Monitoring wells MLPV-MW0107, located downgradient of the biosparge barrier, and MLPV-MW0108, located south of the biosparge barrier, exceed the GCTL for VC. Exceedances

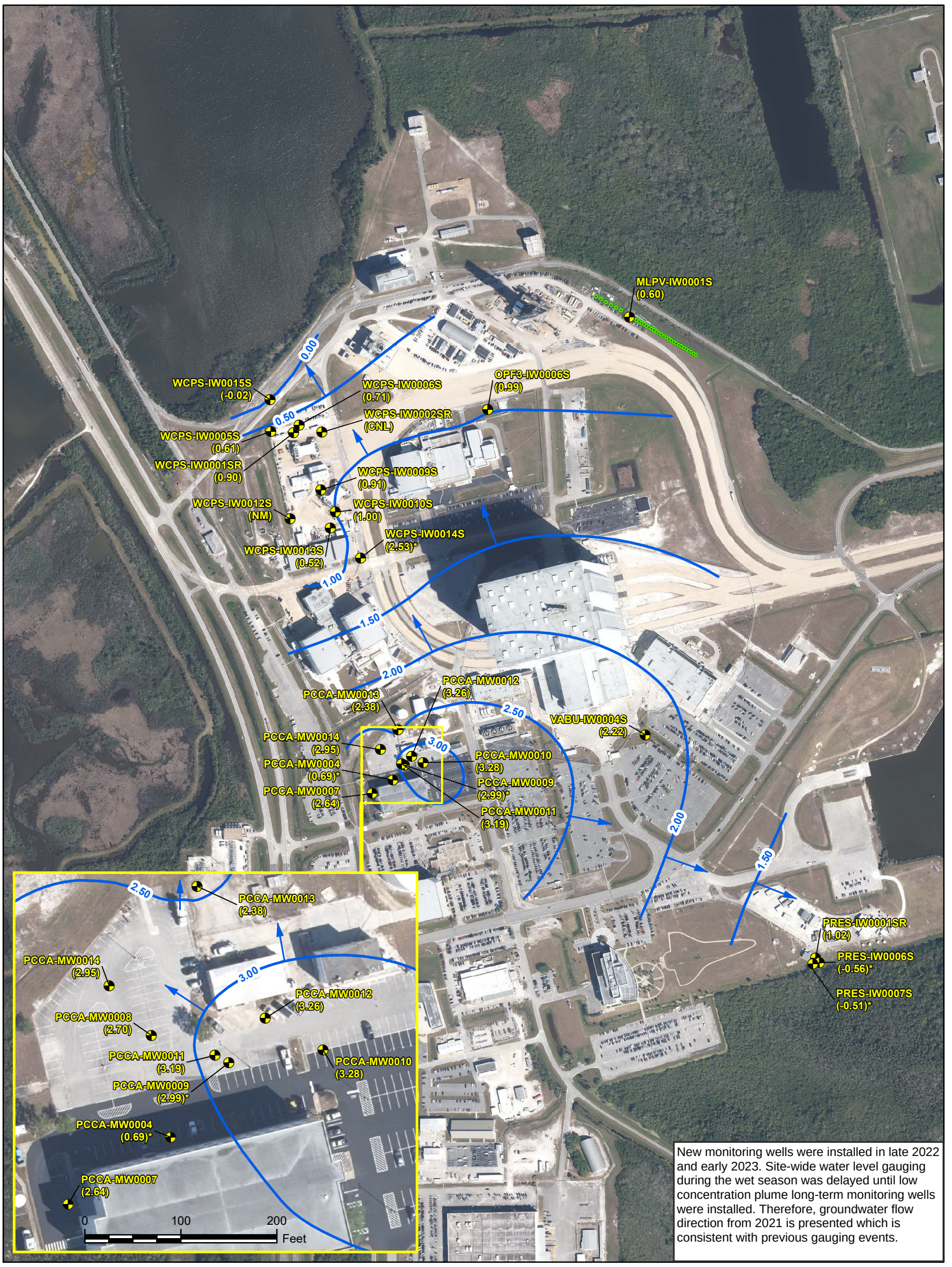
downgradient of the biosparge increased since the system shutdown in December 2020 and July 2022.

Monitoring well MLPV-MW0097, located west of the biosparge area, was installed inside the 2021 DPT plume footprint. Analytical results for MLPV-MW0097 indicate CVOC concentrations are below laboratory detection limits, indicating collapse of the isolated GCTL plume. Monitoring wells MLPV-MW0088, MLPV-MW0089, and MLPV-SAMW0003, located south of Former Hot Spot 2 and north of the VAB, exceed the GCTL for VC. The remaining monitoring wells sampled in this interval indicate CVOC concentrations below GCTLs, exhibiting a reduced GCTL footprint for this interval.

3.5.5.4 Greater than 45 feet bls

Analytical results from monitoring wells indicate the LCP comprises the majority of the GCTL plume at this interval. Monitoring wells MLPV-IW0009D and MLPV-IW0012D, located east of former Hot Spot 2, exceed the GCTL for VC. Monitoring wells MLPV-IW0018D, MLPV-IW0020D, MLPV-IW0029D and MLPV_IW0052, located north and east of the VAB, exceed the GCTL for VC. Monitoring wells MLPV-IW0051, MLPV-MW0085, and VABU-IW0005D, located in the southeast parking lots of the VAB, exceed the GCTL for VC. The remaining monitoring wells sampled in this interval indicate CVOC concentrations below GCTLs, exhibiting a reduced GCTL footprint for this interval.

The location of TCE concentrations above GCTLs detected in historical DPT groundwater samples correlate with seven new monitoring wells at various intervals (MLPV-MW0077, MLPV-MW0078, MLPV-MW0081, MLPV-MW0082, MLPV-MW0086, MLPV-MW0097, and MLPV-MW0098). TCE was not detected in these monitoring wells.



Legend

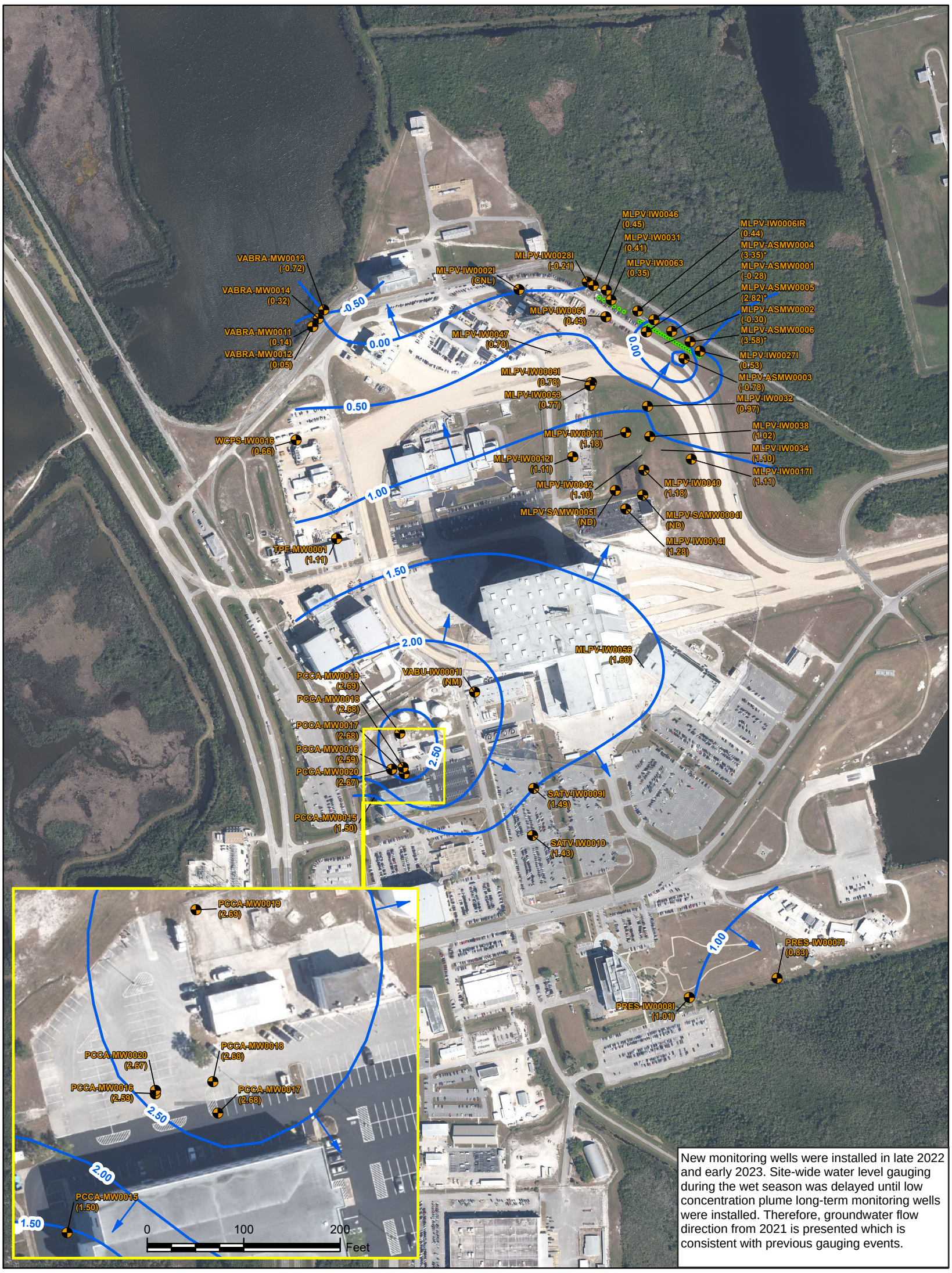
- Shallow Monitoring Well
- Groundwater Contour (NAVD88 ft.)
- Approximate Direction of Groundwater Flow
- Biosparge Well Location

Notes:
1. bls = Below land surface.
2. NAVD88 = North American Vertical Datum of 1988.
3. * = Elevation was not used for contouring.
4. ND = No data available. Top-of-casing survey is pending for MLPV-IW0030, MLPV-SAMW002, and MLPV-SAMW0004D.
5. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/ Vehicle Assembly Building Area (VAB) (Solid Waste Management Unit 056)
6. CNL = Could not locate

FIGURE 3-1
Sitewide Groundwater Contour Map
Shallow Interval (2 to 20 Feet bls)
March 18, 2021

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: M:\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\12_Apr2021 DPT\20220516\F4-1_GWELEV_SZ_20210318.mxd



Legend

- Intermediate Monitoring Well (Groundwater Elevation NAVD88 ft.)
- Groundwater Contour (NAVD88 ft.)
- Approximate Direction of Groundwater Flow
- Biosparge Well Location

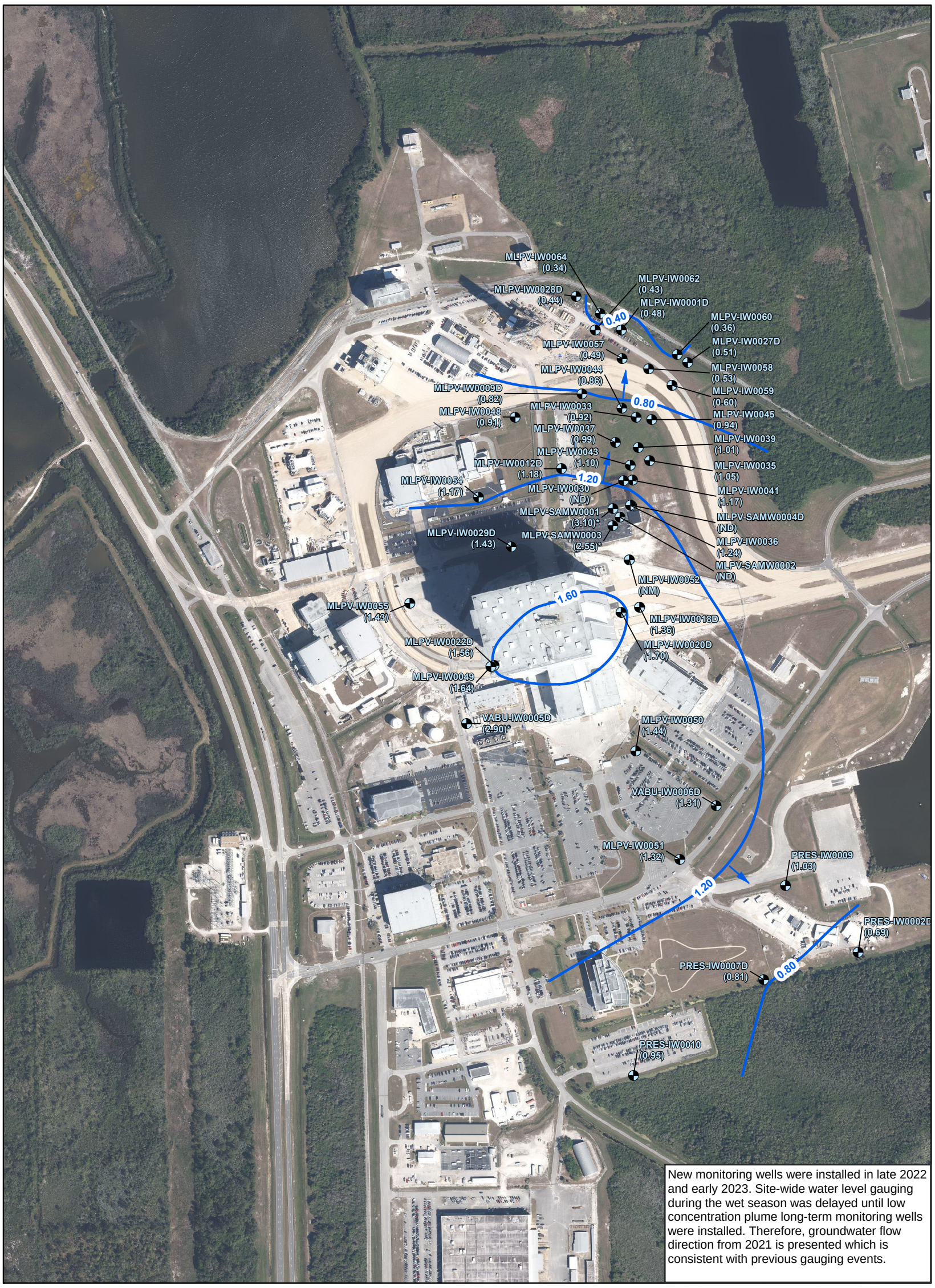
Notes:
1. bls = Below land surface.
2. NAVD88 = North American Vertical Datum of 1988.
3. * = Elevation was not used for contouring.
4. ND = No data available. Top-of-casing survey is pending for MLPV-IW0030, MLPV-SAMW002, and MLPV-SAMW0004D.
5. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/ Vehicle Assembly Building Area (VAB) (Solid Waste Management Unit 056)
6. CNL = Could not locate

N

0 500 1,000 Feet

FIGURE 3-2
Sitewide Groundwater Contour Map
Intermediate Interval (20 to 45 Feet bls)
March 18, 2021

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- Deep Monitoring Well Location (Groundwater Elevation NAVD88 ft.)
- Groundwater Contour (NAVD88 ft.)
- Approximate Direction of Groundwater Flow

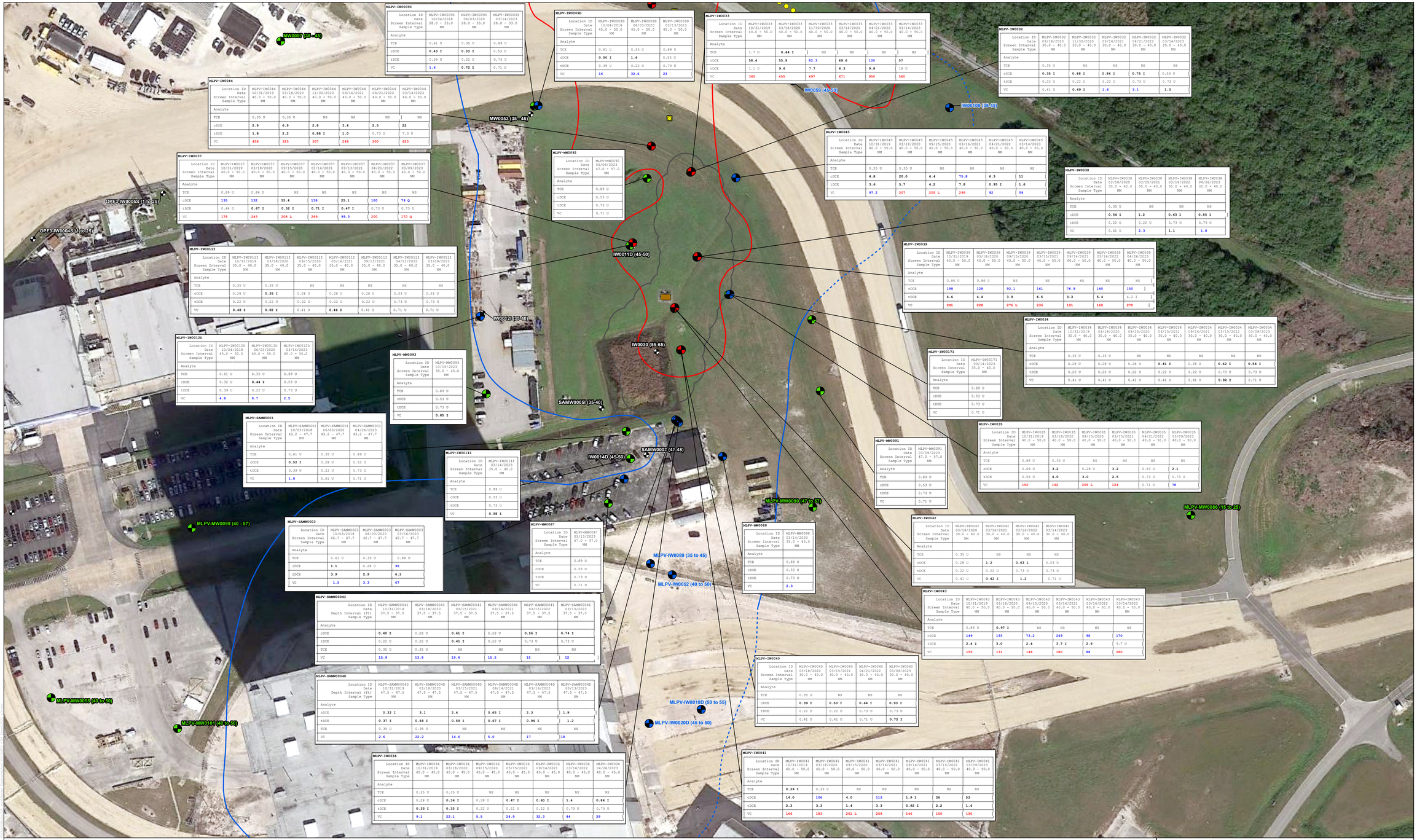
Notes:
1. bls = Below land surface.
2. NAVD88 = North American Vertical Datum of 1988.
3. * = Elevation was not used for contouring.
4. ND = No data available. Top-of-casing survey is pending for MLPV-IW0030, MLPV-SAMW002, and MLPV-SAMW0004D.
5. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/ Vehicle Assembly Building Area (VAB) (Solid Waste Management Unit 056)

N

0 500 1,000 Feet

FIGURE 3-3
Sitewide Groundwater Contour Map
Deep Interval (45 to 70 Feet bls)
May 18, 2021

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



MLPV-IW0009I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0009I 10/04/2018 28.0 - 33.0 NM	MLPV-IW0009I 06/03/2020 28.0 - 33.0 NM	MLPV-IW0009I 03/14/2023 28.0 - 33.0 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.43 I**	**0.33 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.6**	**0.72 I**	0.71 U

MLPV-IW0009D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0009D 10/04/2018 45.0 - 50.0 NM	MLPV-IW0009D 06/03/2020 45.0 - 50.0 NM	MLPV-IW0009D 03/13/2023 45.0 - 50.0 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.50 I**	**1.4**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**16**	**32.6**	**23**

MLPV-IW0033

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0033 10/31/2019 40.0 - 50.0 NM	MLPV-IW0033 03/18/2020 40.0 - 50.0 NM	MLPV-IW0033 11/30/2020 40.0 - 50.0 NM	MLPV-IW0033 03/16/2021 40.0 - 50.0 NM	MLPV-IW0033 04/21/2022 40.0 - 50.0 NM	MLPV-IW0033 03/14/2023 40.0 - 50.0 NM
Analyte						
TCE	1.7 U	**0.44 I**	NS	NS	NS	NS
cDCE	**58.4**	**55.9**	**82.3**	**49.6**	**100**	**57**
tDCE	1.1 U	**9.6**	**7.7**	**6.3**	**9.8**	18 U
VC	**365**	**455**	**497**	**471**	**950**	**560**

MLPV-IW0032

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0032 03/18/2020 30.0 - 40.0 NM	MLPV-IW0032 11/30/2020 30.0 - 40.0 NM	MLPV-IW0032 03/16/2021 30.0 - 40.0 NM	MLPV-IW0032 04/21/2022 30.0 - 40.0 NM	MLPV-IW0032 03/14/2023 30.0 - 40.0 NM
Analyte					
TCE	0.35 U	NS	NS	NS	NS
cDCE	**0.35 I**	**0.68 I**	**0.84 I**	**0.75 I**	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	**0.49 I**	**1.4**	**3.1**	**1.3**

MLPV-IW0044

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0044 10/31/2019 40.0 - 50.0 NM	MLPV-IW0044 03/18/2020 40.0 - 50.0 NM	MLPV-IW0044 11/30/2020 40.0 - 50.0 NM	MLPV-IW0044 03/16/2021 40.0 - 50.0 NM	MLPV-IW0044 04/21/2022 40.0 - 50.0 NM	MLPV-IW0044 03/14/2023 40.0 - 50.0 NM
Analyte						
TCE	0.35 U	0.35 U	NS	NS	NS	NS
cDCE	**2.9**	**6.9**	**2.8**	**3.4**	**2.5**	**22**
tDCE	**1.8**	**2.2**	**0.88 I**	**1.0**	0.73 U	7.3 U
VC	**458**	**325**	**307**	**249**	**200**	**620**

MLPV-IW0045

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0045 10/31/2019 40.0 - 50.0 NM	MLPV-IW0045 03/18/2020 40.0 - 50.0 NM	MLPV-IW0045 09/15/2020 40.0 - 50.0 NM	MLPV-IW0045 03/16/2021 40.0 - 50.0 NM	MLPV-IW0045 04/21/2022 40.0 - 50.0 NM	MLPV-IW0045 03/14/2023 40.0 - 50.0 NM
Analyte						
TCE	0.35 U	0.35 U	NS	NS	NS	NS
cDCE	**4.8**	**20.0**	**6.4**	**75.8**	**6.3**	**11**
tDCE	**3.6**	**5.7**	**4.2**	**7.8**	**0.95 I**	**1.4**
VC	**97.2**	**207**	**205 L**	**295**	**92**	**59**

MLPV-IW0037

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0037 10/31/2019 40.0 - 50.0 NM	MLPV-IW0037 03/18/2020 40.0 - 50.0 NM	MLPV-IW0037 09/15/2020 40.0 - 50.0 NM	MLPV-IW0037 03/16/2021 40.0 - 50.0 NM	MLPV-IW0037 09/13/2021 40.0 - 50.0 NM	MLPV-IW0037 04/21/2022 40.0 - 50.0 NM	MLPV-IW0037 03/09/2023 40.0 - 50.0 NM
Analyte							
TCE	0.69 U	0.86 U	NS	NS	NS	NS	NS
cDCE	**135**	**132**	**55.4**	**138**	**25.1**	**100**	**79 Q**
tDCE	0.44 U	**0.67 I**	**0.52 I**	**0.71 I**	**0.47 I**	0.73 U	0.73 U
VC	**178**	**245**	**208 L**	**269**	**99.3**	**200**	**170 Q**

MLPV-IW0092

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0092 03/09/2023 47.0 - 57.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0038

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0038 03/18/2020 30.0 - 40.0 NM	MLPV-IW0038 03/15/2021 30.0 - 40.0 NM	MLPV-IW0038 03/16/2022 30.0 - 40.0 NM	MLPV-IW0038 04/26/2023 30.0 - 40.0 NM
Analyte				
TCE	0.35 U	NS	NS	NS
cDCE	**0.54 I**	**1.2**	**0.63 I**	**0.85 I**
tDCE	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	**2.3**	**1.1**	**1.8**

MLPV-IW0011I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0011I 10/31/2019 35.0 - 40.0 NM	MLPV-IW0011I 03/18/2020 35.0 - 40.0 NM	MLPV-IW0011I 09/15/2020 35.0 - 40.0 NM	MLPV-IW0011I 03/16/2021 35.0 - 40.0 NM	MLPV-IW0011I 09/13/2021 35.0 - 40.0 NM	MLPV-IW0011I 04/21/2022 35.0 - 40.0 NM	MLPV-IW0011I 03/09/2023 35.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS
cDCE	0.28 U	**0.35 I**	0.28 U	0.28 U	0.28 U	0.53 U	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**0.48 I**	**0.92 I**	0.41 U	**0.46 I**	0.41 U	0.71 U	0.71 U

MLPV-IW0039

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0039 10/31/2019 40.0 - 50.0 NM	MLPV-IW0039 03/18/2020 40.0 - 50.0 NM	MLPV-IW0039 09/15/2020 40.0 - 50.0 NM	MLPV-IW0039 03/15/2021 40.0 - 50.0 NM	MLPV-IW0039 09/14/2021 40.0 - 50.0 NM	MLPV-IW0039 03/14/2022 40.0 - 50.0 NM	MLPV-IW0039 04/26/2023 40.0 - 50.0 NM
Analyte							
TCE	0.86 U	0.86 U	NS	NS	NS	NS	NS
cDCE	**198**	**128**	**92.1**	**161**	**76.9**	**140**	**150**
tDCE	**4.6**	**4.4**	**3.9**	**6.5**	**3.3**	**5.4**	4.2 I
VC	**241**	**228**	**276 L**	**236**	**191**	**160**	**270**

MLPV-IW0034

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0034 10/31/2019 30.0 - 40.0 NM	MLPV-IW0034 03/18/2020 30.0 - 40.0 NM	MLPV-IW0034 09/15/2020 30.0 - 40.0 NM	MLPV-IW0034 03/15/2021 30.0 - 40.0 NM	MLPV-IW0034 09/14/2021 30.0 - 40.0 NM	MLPV-IW0034 03/15/2022 30.0 - 40.0 NM	MLPV-IW0034 03/09/2023 30.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS
cDCE	0.28 U	0.28 U	0.28 U	**0.41 I**	0.28 U	**0.62 I**	**0.54 I**
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	**0.92 I**	0.71 U

MLPV-IW0012D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0012D 10/04/2018 45.0 - 50.0 NM	MLPV-IW0012D 06/03/2020 45.0 - 50.0 NM	MLPV-IW0012D 03/14/2023 45.0 - 50.0 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	0.32 U	**0.44 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**4.8**	**9.7**	**2.5**

MLPV-IW0093

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0093 03/15/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**0.85 I**

MLPV-IW0172

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0172 03/14/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0035

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0035 10/31/2019 40.0 - 50.0 NM	MLPV-IW0035 03/18/2020 40.0 - 50.0 NM	MLPV-IW0035 09/15/2020 40.0 - 50.0 NM	MLPV-IW0035 03/15/2021 40.0 - 50.0 NM	MLPV-IW0035 09/14/2021 40.0 - 50.0 NM	MLPV-IW0035 03/09/2023 40.0 - 50.0 NM
Analyte						
TCE	0.86 U	0.35 U	NS	NS	NS	NS
cDCE	0.69 U	**3.2**	0.28 U	**3.2**	0.53 U	**2.1**
tDCE	0.55 U	**4.0**	**3.0**	**2.5**	0.73 U	0.73 U
VC	**152**	**192**	**205 L**	**124**	0.71 U	**78**

MLPV-SAMW0001

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0001 10/03/2019 43.2 - 47.7 NM	MLPV-SAMW0001 06/03/2020 43.2 - 47.7 NM	MLPV-SAMW0001 04/26/2023 43.2 - 47.7 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.52 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.8**	0.41 U	0.71 U

MLPV-IW0141

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0141 03/14/2023 35.0 - 40.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**0.98 I**

MLPV-MW0091

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0091 03/09/2023 47.0 - 57.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0042

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0042 03/18/2020 30.0 - 40.0 NM	MLPV-IW0042 03/16/2021 30.0 - 40.0 NM	MLPV-IW0042 03/16/2022 30.0 - 40.0 NM	MLPV-IW0042 03/14/2023 30.0 - 40.0 NM
Analyte				
TCE	0.35 U	NS	NS	NS
cDCE	0.28 U	**1.2**	**0.63 I**	0.53 U
tDCE	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	**0.42 I**	**1.2**	0.71 U

MLPV-MW0088

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0088 03/14/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**2.3**

MLPV-IW0043

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0043 10/31/2019 40.0 - 50.0 NM	MLPV-IW0043 03/18/2020 40.0 - 50.0 NM	MLPV-IW0043 09/15/2020 40.0 - 50.0 NM	MLPV-IW0043 03/16/2021 40.0 - 50.0 NM	MLPV-IW0043 03/16/2022 40.0 - 50.0 NM	MLPV-IW0043 03/14/2023 40.0 - 50.0 NM
Analyte						
TCE	0.86 U	**0.97 I**	NS	NS	NS	NS
cDCE	**149**	**193**	**73.2**	**249**	**98**	**170**
tDCE	**2.4 I**	**3.0**	**2.4**	**3.7 I**	**2.6**	3.7 U
VC	**155**	**131**	**146**	**180**	**88**	**280**

MLPV-SAMW0004I

Location ID / Date / Depth Interval (ft) / Sample Type	MLPV-SAMW0004I 10/31/2019 37.5 - 37.5 NM	MLPV-SAMW0004I 03/18/2020 37.5 - 37.5 NM	MLPV-SAMW0004I 03/15/2021 37.5 - 37.5 NM	MLPV-SAMW0004I 09/14/2021 37.5 - 37.5 NM	MLPV-SAMW0004I 03/15/2022 37.5 - 37.5 NM	MLPV-SAMW0004I 03/13/2023 37.5 - 37.5 NM
Analyte						
cDCE	**0.40 I**	0.28 U	**0.61 I**	0.28 U	**0.56 I**	**0.74 I**
tDCE	0.22 U	0.22 U	**0.41 I**	0.22 U	0.73 U	0.73 U
TCE	0.35 U	0.35 U	NS	NS	NS	NS
VC	**15.9**	**13.8**	**19.4**	**15.5**	**15**	**12**

MLPV-IW0040

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0040 03/18/2020 40.0 - 50.0 NM	MLPV-IW0040 03/15/2021 30.0 - 40.0 NM	MLPV-IW0040 04/21/2022 30.0 - 40.0 NM	MLPV-IW0040 03/09/2023 30.0 - 40.0 NM
Analyte				
TCE	0.35 U	NS	NS	NS
cDCE	**0.39 I**	**0.50 I**	**0.64 I**	**0.93 I**
tDCE	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	0.71 U	**0.72 I**

MLPV-SAMW0004D

Location ID / Date / Depth Interval (ft) / Sample Type	MLPV-SAMW0004D 10/31/2019 47.5 - 47.5 NM	MLPV-SAMW0004D 03/18/2020 47.5 - 47.5 NM	MLPV-SAMW0004D 03/15/2021 47.5 - 47.5 NM	MLPV-SAMW0004D 09/14/2021 47.5 - 47.5 NM	MLPV-SAMW0004D 03/16/2022 47.5 - 47.5 NM	MLPV-SAMW0004D 03/13/2023 47.5 - 47.5 NM
Analyte						
cDCE	**0.32 I**	**3.1**	**2.4**	**0.65 I**	**2.3**	**1.9**
tDCE	**0.37 I**	**0.58 I**	**0.59 I**	**0.67 I**	**0.94 I**	**1.2**
TCE	0.35 U	0.35 U	NS	NS	NS	NS
VC	**2.6**	**22.2**	**14.6**	**5.0**	**17**	**18**

MLPV-IW0041

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0041 10/31/2019 40.0 - 50.0 NM	MLPV-IW0041 03/18/2020 40.0 - 50.0 NM	MLPV-IW0041 09/15/2020 40.0 - 50.0 NM	MLPV-IW0041 03/16/2021 40.0 - 50.0 NM	MLPV-IW0041 09/14/2021 40.0 - 50.0 NM	MLPV-IW0041 03/15/2022 40.0 - 50.0 NM	MLPV-IW0041 03/09/2023 40.0 - 50.0 NM
Analyte							
TCE	**0.39 I**	0.35 U	NS	NS	NS	NS	NS
cDCE	**14.0**	**106**	**4.0**	**113**	**1.9 I**	**26**	**53**
tDCE	**2.3**	**3.3**	**1.4**	**3.3**	**0.92 I**	**2.2**	**1.4**
VC	**166**	**183**	**201 L**	**359**	**146**	**150**	**130**

MLPV-IW0036

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0036 10/31/2019 40.0 - 45.0 NM	MLPV-IW0036 03/18/2020 40.0 - 45.0 NM	MLPV-IW0036 09/15/2020 40.0 - 50.0 NM	MLPV-IW0036 03/15/2021 40.0 - 45.0 NM	MLPV-IW0036 09/14/2021 40.0 - 45.0 NM	MLPV-IW0036 03/16/2022 40.0 - 45.0 NM	MLPV-IW0036 04/26/2023 40.0 - 45.0 NM
Analyte							
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS
cDCE	0.28 U	**0.34 I**	0.28 U	**0.47 I**	**0.60 I**	**1.4**	**0.84 I**
tDCE	**0.33 I**	**0.33 I**	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**9.1**	**22.1**	**5.5**	**24.9**	**32.3**	**44**	**29**

MLPV-SAMW0003

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0003 10/03/2018 42.7 - 47.7 NM	MLPV-SAMW0003 06/03/2020 42.7 - 47.7 NM	MLPV-SAMW0003 03/16/2023 42.7 - 47.7 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**1.1**	0.28 U	**95**
tDCE	**3.9**	**2.9**	**6.1**
VC	**1.5**	**3.3**	**67**

MLPV-IW0087

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0087 03/13/2023 47.0 - 57.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. NS = Not sampled
5. L = Value exceeds calibration range" and renumber accordingly
6. U = The analyte was undetected
7. 2019 Aerial Source: FDOT
8. Results shown in micrograms per Liter (ug/L).
9. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
10. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
11. **Red** text indicates the analyte was detected at concentrations above its NADC.
12. IW0032, IW0038, IW0040 and IW0042 are sampled annually. Remaining wells are sampled semi-annually.
13. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2, MLPVAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
14. MLPV-IW0032, IW0033, and IW0044 were not accessible during the September 2020 sampling event. Therefore, wells were sampled in November 2020.
15. Wells IW0032, IW0035, IW0040, IW0044, and IW0045 were not located during the September 2021 sampling event due to construction activities in the sampling area. Wells IW0042 and IW0043 were submerged during the September 2021 sampling event.
16. Wells IW0032, IW0033, and IW0044 were not accessible during the September 2020 sampling event.
17. Monitoring well IW0053 is presumed destroyed and therefore not sampled in 2023.
18. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.
19. Monitoring wells IW0036, IW0038, IW0039 and SAMW0001 were resampled on April 26, 2023. Results from this event are presented in place of data collected in March 2023 for these wells only.

Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

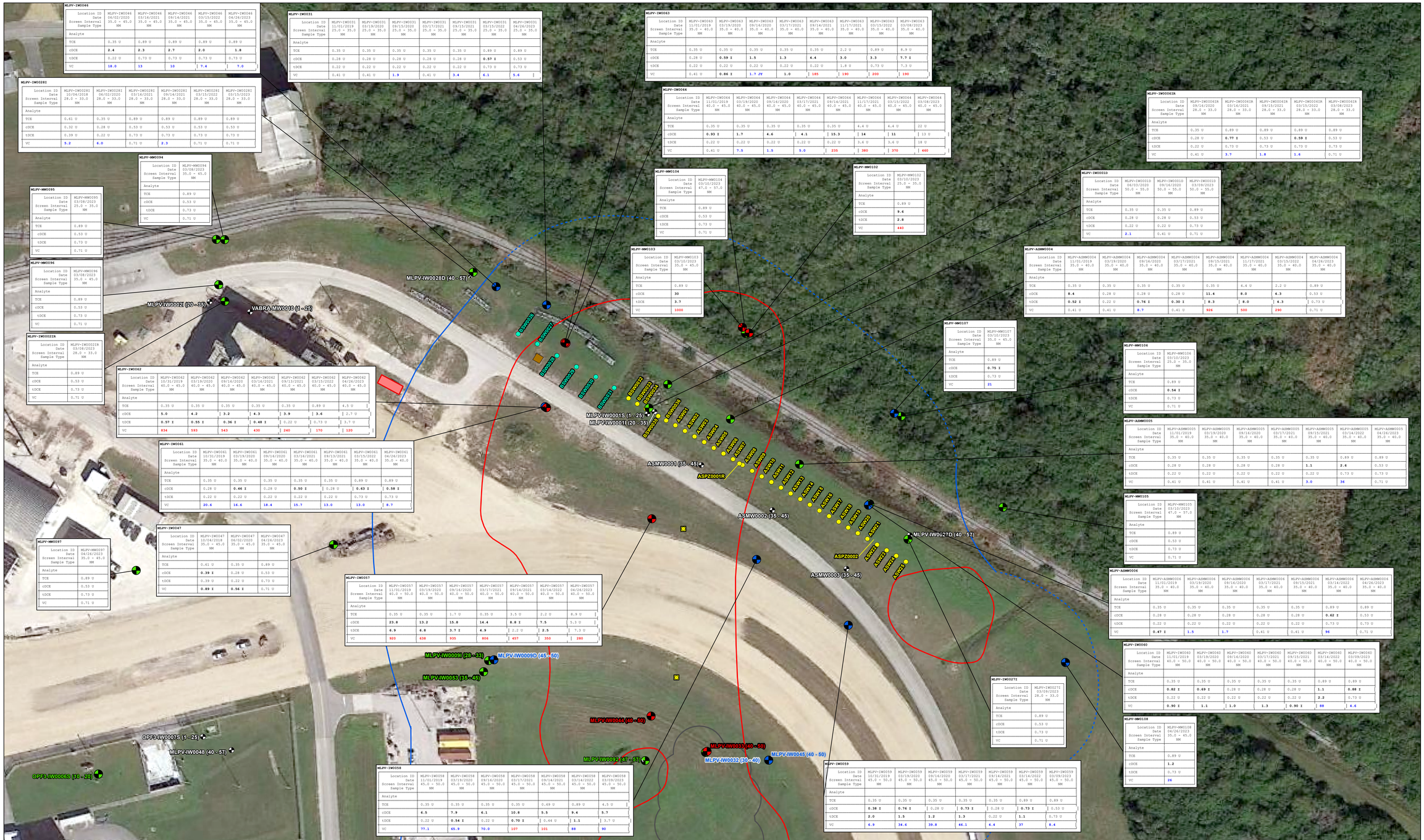
0 75 150 300 Feet

Map Scale: 1":80'

N

Figure 3-4
Groundwater Analytical Results
Composite CVOC
March and April 2023

Former Hot Spot 2
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

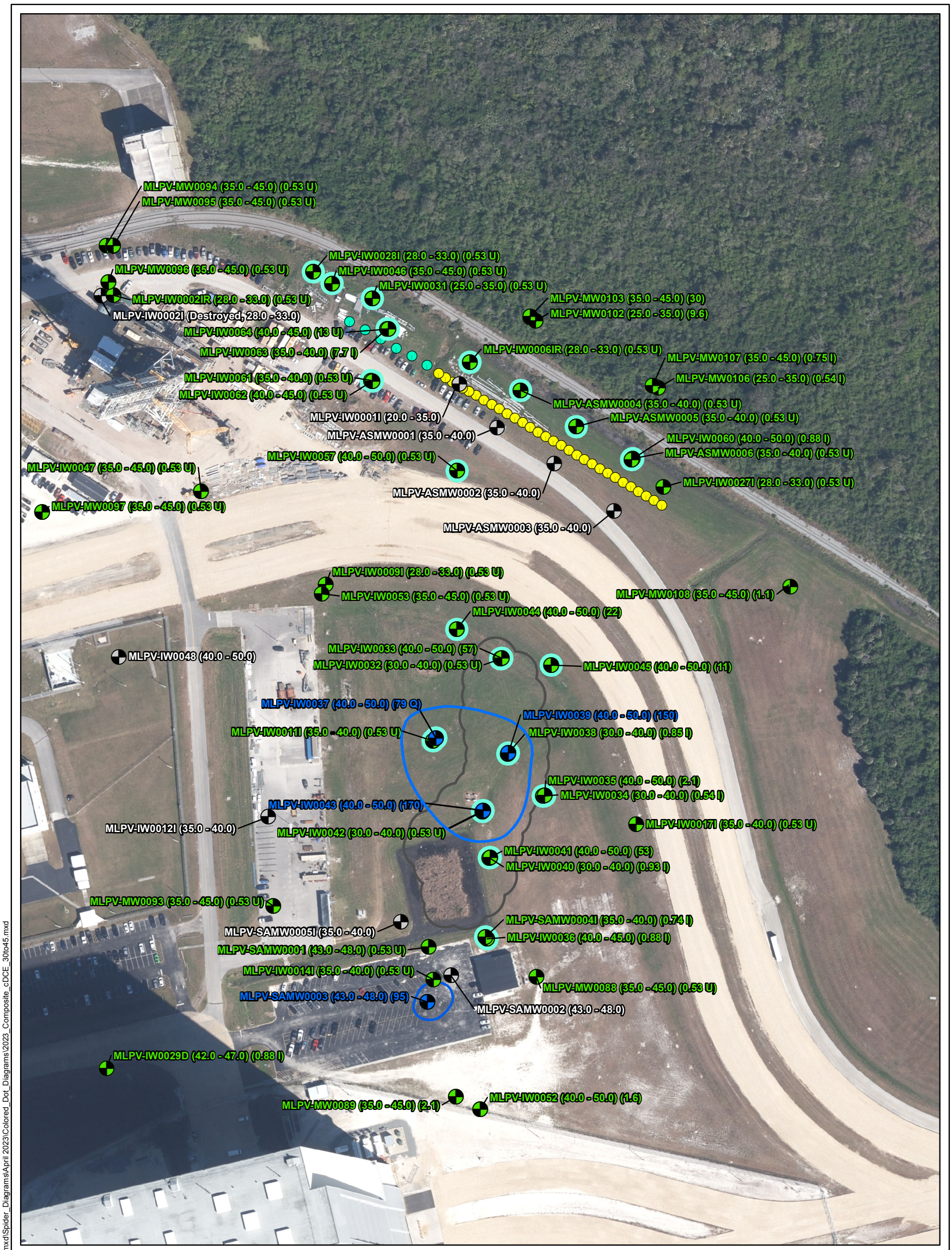
- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. NS = Not sampled
5. U = The analyte was undetected
6. 2019 Aerial Source: FDOT
7. Results shown in micrograms per Liter (µg/L).
8. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
9. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
10. **Red** text indicates the analyte was detected at concentrations above its NADC.
11. IW0032, IW0038, IW0040 and IW0042 are sampled annually. Remaining wells are sampled semi-annually.
12. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
13. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056
14. Monitoring wells IW0031, IW0046, IW0047, IW0057, IW0061, IW0062, MW0108, ASMW0004, ASMW0005, and ASMW0006 were resampled on April 26, 2023. Results from this event are presented in place of data collected in March 2023 for these wells only
16. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 - 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

Figure 3-5
Groundwater Analytical Results
Composite CVOC
March and April 2023

Biosparge Area
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- MW Sample Results Less Than GCTLs (70 µg/L)
- MW Sample Results Greater Than GCTLs (70 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of cDCE Isopleth Greater Than GCTL (>70 µg/L)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbol indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

N

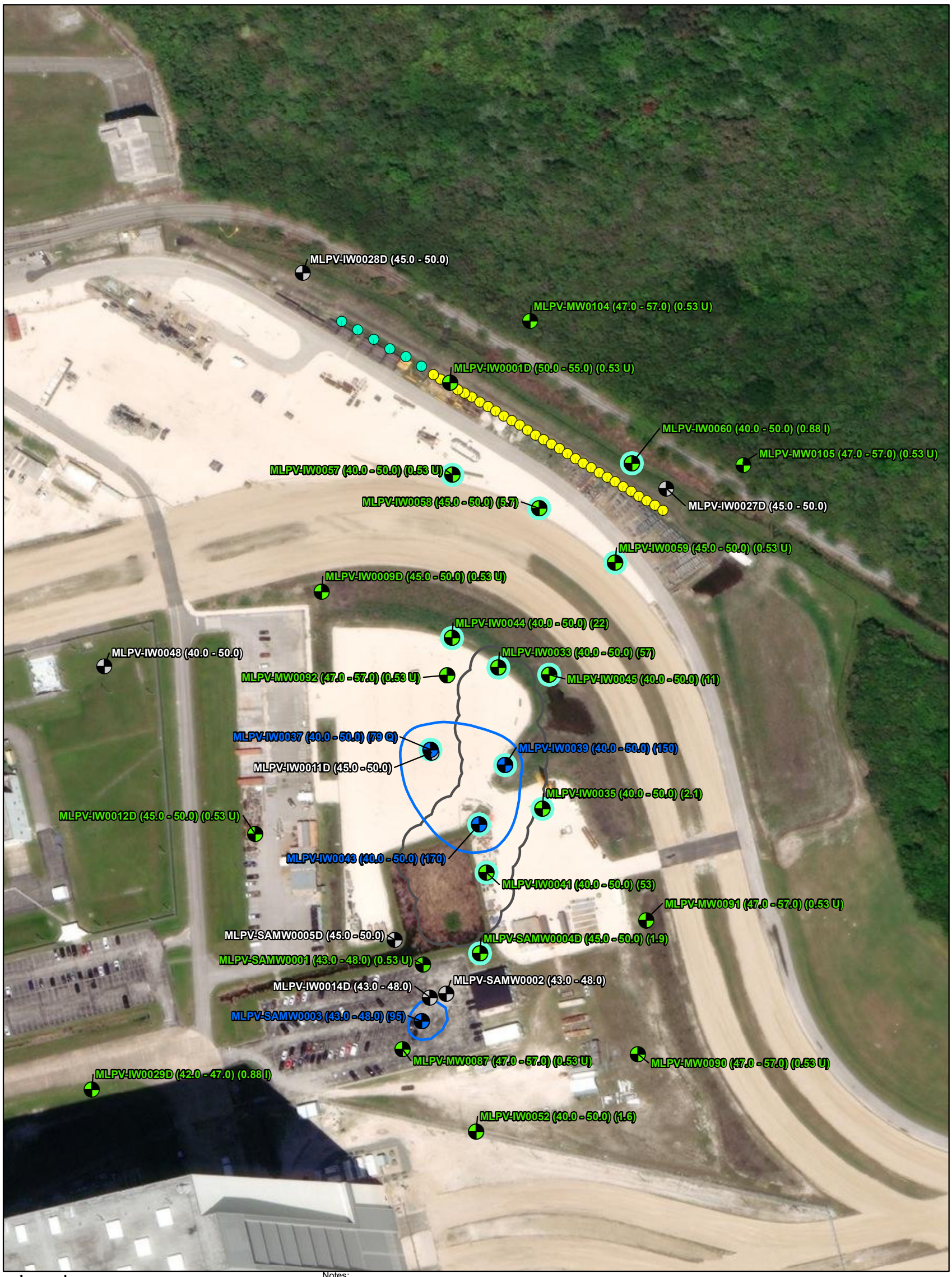
0 200 400 Feet

Map Scale: 1":157'

FIGURE 3-6
cis-1,2-Dichloroethene (cDCE) Plume Map
30 to 45 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\2023_Composite_cDCE_30to45.mxd



Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\2023_Composite_Plume_cDCE_45to50.mxd

Legend

- MW Sample Results Less Than GCTLs (70 µg/L)
- MW Sample Results Greater Than GCTLs (70 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of cDCE Isopleth Greater Than GCTL (>70 µg/L)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbol indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

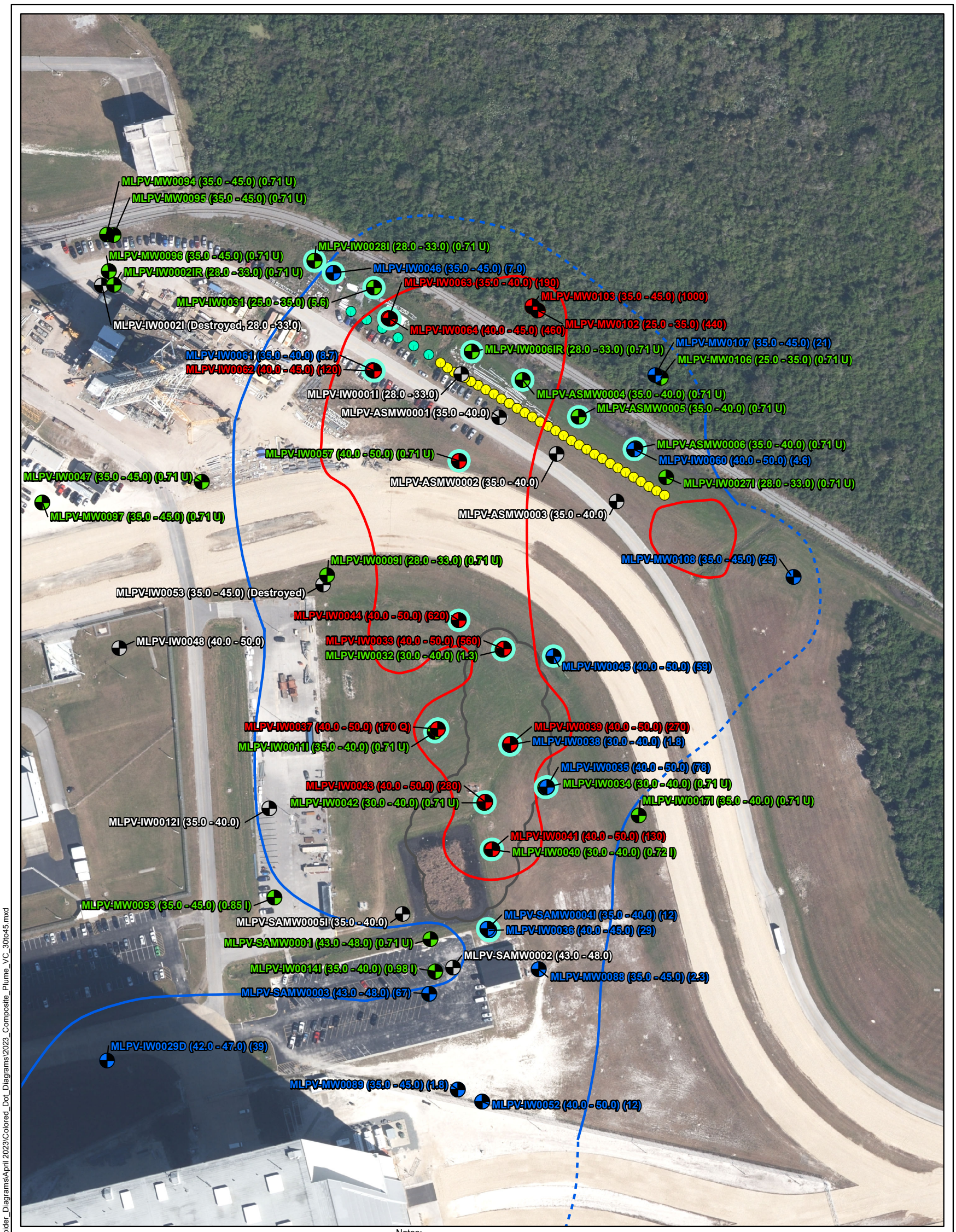
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0 200 400 Feet

Map Scale: 1":157'

FIGURE 3-7
cis-1,2-Dichloroethene (cDCE) Plume Map
45 to 50 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\2023_Composite_Plume_VC_30to45.mxd

Legend

- MW Sample Results Less Than GCTL (1 µg/L)
- MW Sample Results Greater Than GCTL (1 µg/L)
- MW Sample Results Greater Than NADC (100 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of VC Isopleth Greater Than GCTL (>1 µg/L)(Dashed Where Inferred)
- Approximate Extent of VC Isopleth Greater Than NADC (>100 µg/L)(Dashed Where Inferred)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbol indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.
16. Moitoring well IW0053 is presumed destoryed and therefore not sampled in 2023

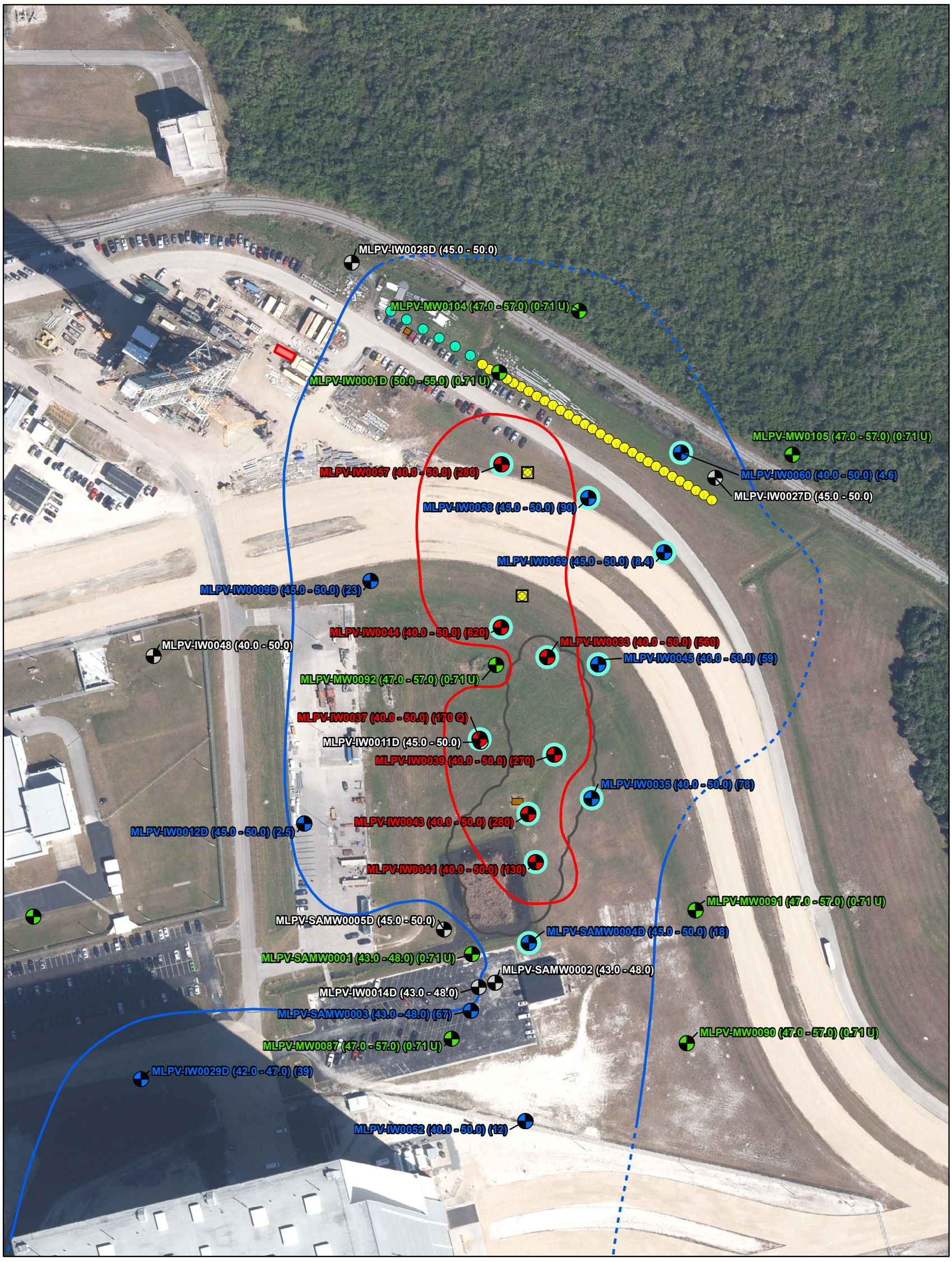
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0 200 400 Feet

Map Scale: 1":157'

FIGURE 3-8
Vinyl Chloride (VC) Plume Map
30 to 45 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\2023_Composite_Plume_VC_45to50.mxd

Legend

- MW Sample Results Less Than GCTL (1 µg/L)
- MW Sample Results Greater Than GCTL (1 µg/L)
- MW Sample Results Greater Than NADC (100 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold
- Approximate Extent of VC Isopleth Greater Than NADC (>100 µg/L)(Dashed Where Inferred)
- Approximate Extent of VC Isopleth Greater Than GCTL (>1 µg/L)(Dashed Where Inferred)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbol indicates MW was sampled as par t of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

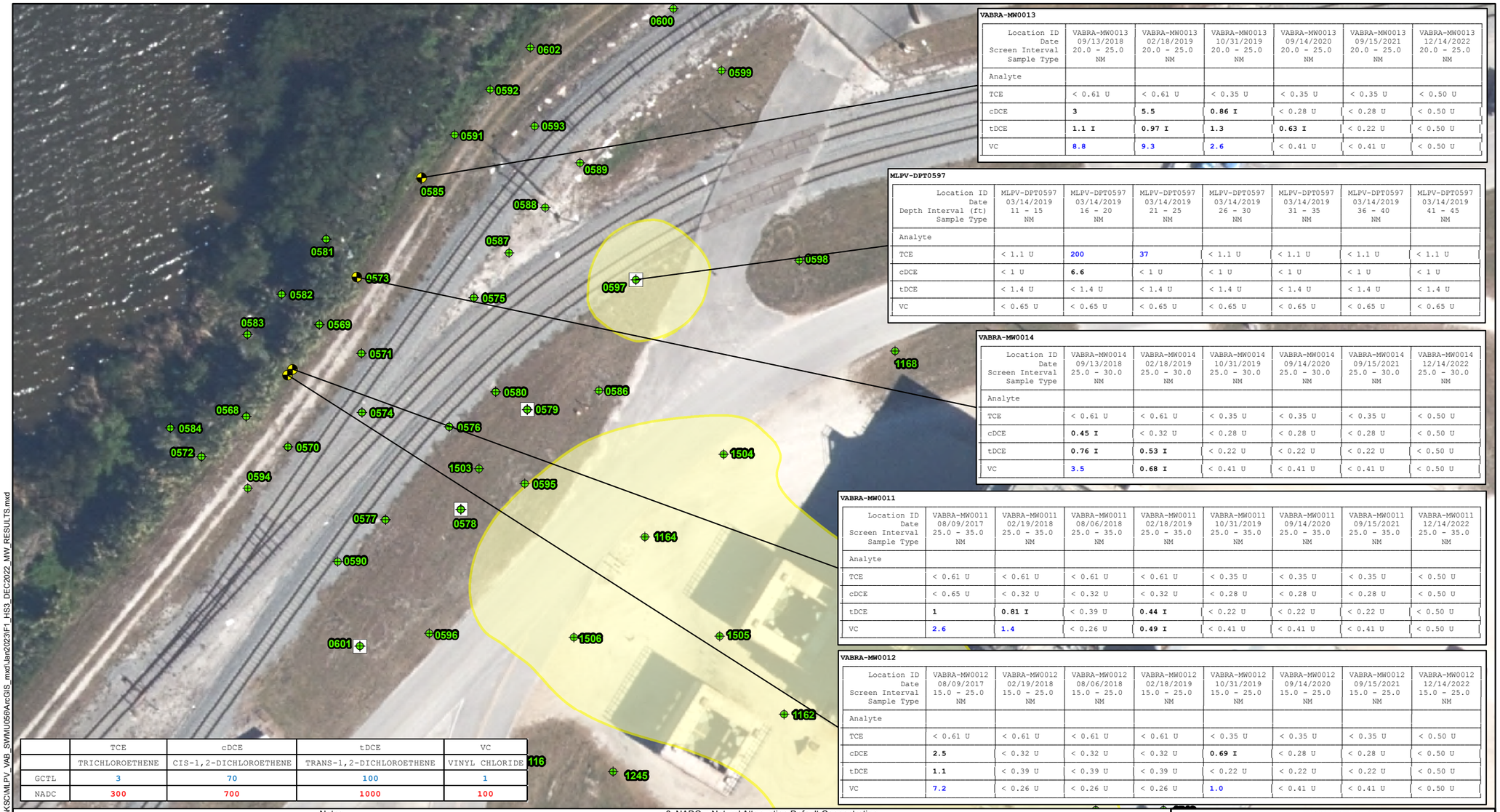
N

0 200 400 Feet

Map Scale: 1":157'

FIGURE 3-9
Vinyl Chloride (VC) Plume Map
45 to 50 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Jan2023\F1_HS3_DEC2022_MW_RESULTS.mxd

VABRA-MW0013

Location ID	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013
Date	09/13/2018	02/18/2019	10/31/2019	09/14/2020	09/15/2021	12/14/2022
Screen Interval	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TCE	< 0.61 U	< 0.61 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.50 U
cDCE	**3**	**5.5**	**0.86 I**	< 0.28 U	< 0.28 U	< 0.50 U
tDCE	**1.1 I**	**0.97 I**	**1.3**	**0.63 I**	< 0.22 U	< 0.50 U
VC	**8.8**	**9.3**	**2.6**	< 0.41 U	< 0.41 U	< 0.50 U

MLPV-DPT0597

Location ID	MLPV-DPT0597	MLPV-DPT0597	MLPV-DPT0597	MLPV-DPT0597	MLPV-DPT0597	MLPV-DPT0597	MLPV-DPT0597
Date	03/14/2019	03/14/2019	03/14/2019	03/14/2019	03/14/2019	03/14/2019	03/14/2019
Depth Interval (ft)	11 - 15	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
TCE	< 1.1 U	**200**	**37**	< 1.1 U	< 1.1 U	< 1.1 U	< 1.1 U
cDCE	< 1 U	**6.6**	< 1 U	< 1 U	< 1 U	< 1 U	< 1 U
tDCE	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U	< 1.4 U
VC	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U	< 0.65 U

VABRA-MW0014

Location ID	VABRA-MW0014	VABRA-MW0014	VABRA-MW0014	VABRA-MW0014	VABRA-MW0014	VABRA-MW0014	VABRA-MW0014
Date	09/13/2018	02/18/2019	10/31/2019	09/14/2020	09/15/2021	12/14/2022	
Screen Interval	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
TCE	< 0.61 U	< 0.61 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.50 U	
cDCE	**0.45 I**	< 0.32 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.50 U	
tDCE	**0.76 I**	**0.53 I**	< 0.22 U	< 0.22 U	< 0.22 U	< 0.50 U	
VC	**3.5**	**0.68 I**	< 0.41 U	< 0.41 U	< 0.41 U	< 0.50 U	

VABRA-MW0011

Location ID	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011
Date	08/09/2017	02/19/2018	08/06/2018	02/18/2019	10/31/2019	09/14/2020	09/15/2021	12/14/2022
Screen Interval	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0
Sample Type	NM	NM	NM	NM	NM	NM	NM	NM
Analyte								
TCE	< 0.61 U	< 0.61 U	< 0.61 U	< 0.61 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.50 U
cDCE	< 0.65 U	< 0.32 U	< 0.32 U	< 0.32 U	< 0.28 U	< 0.28 U	< 0.28 U	< 0.50 U
tDCE	**1**	**0.81 I**	< 0.39 U	**0.44 I**	< 0.22 U	< 0.22 U	< 0.22 U	< 0.50 U
VC	**2.6**	**1.4**	< 0.26 U	**0.49 I**	< 0.41 U	< 0.41 U	< 0.41 U	< 0.50 U

VABRA-MW0012

Location ID	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012
Date	08/09/2017	02/19/2018	08/06/2018	02/18/2019	10/31/2019	09/14/2020	09/15/2021	12/14/2022
Screen Interval	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0
Sample Type	NM	NM	NM	NM	NM	NM	NM	NM
Analyte								
TCE	< 0.61 U	< 0.61 U	< 0.61 U	< 0.61 U	< 0.35 U	< 0.35 U	< 0.35 U	< 0.50 U
cDCE	**2.5**	< 0.32 U	< 0.32 U	< 0.32 U	**0.69 I**	< 0.28 U	< 0.28 U	< 0.50 U
tDCE	**1.1**	< 0.39 U	< 0.39 U	< 0.39 U	< 0.22 U	< 0.22 U	< 0.22 U	< 0.50 U
VC	**7.2**	< 0.26 U	< 0.26 U	< 0.26 U	**1.0**	< 0.41 U	< 0.41 U	< 0.50 U

	TCE	cDCE	tDCE	VC
	TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
GCTL	3	70	100	1
NADC	300	700	1000	100

Legend

- Monitoring Well Location
- DPT Sampling Locations (2012, 2013, 2016 and 2017)
- DPT Location Sampled in 2019
- Composite GCTL Isocontour (2012-2019 Data)

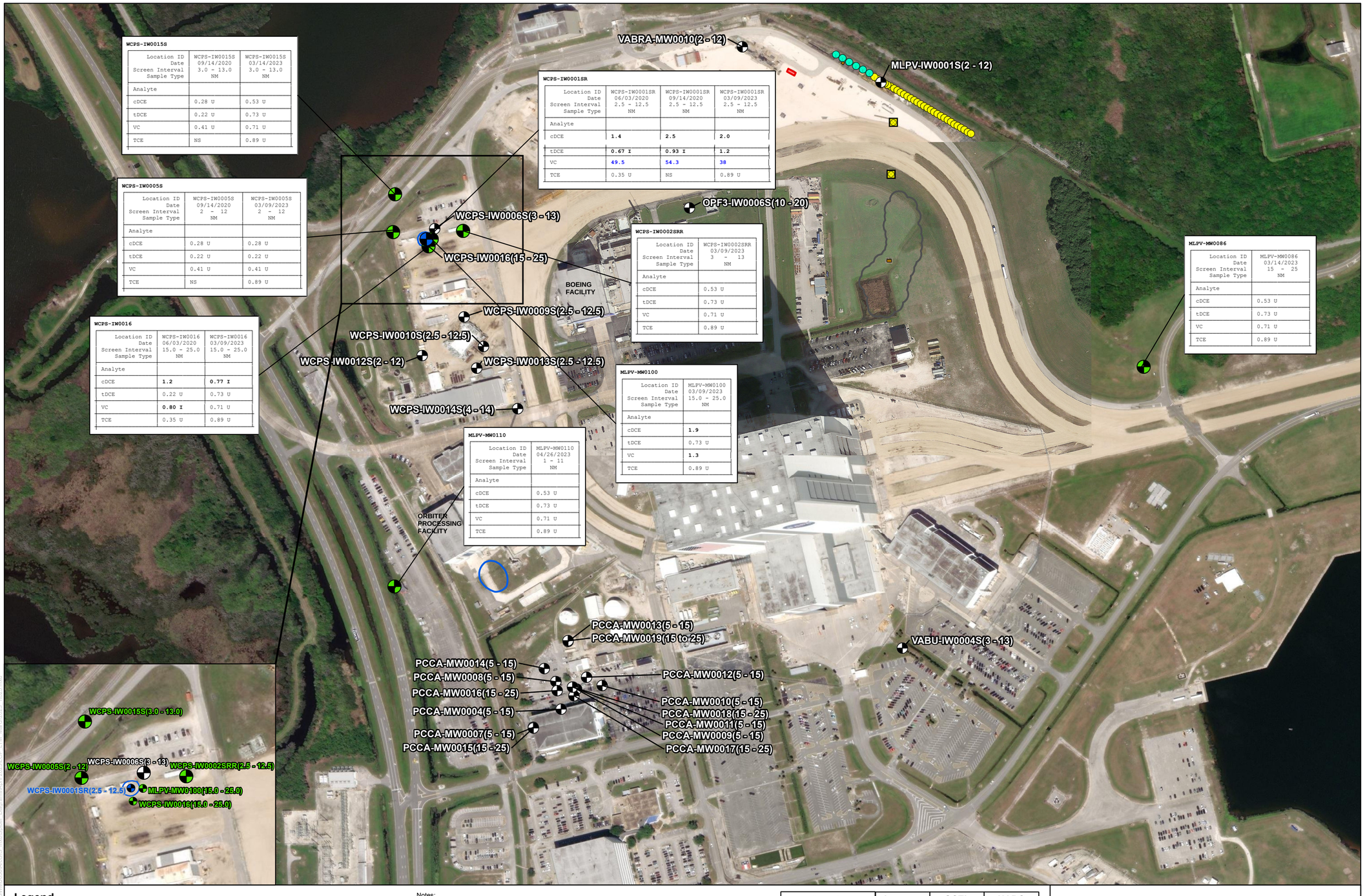
Notes:
1. **Bolded** results indicate the presence of an analyte at the specified concentration
2. **Blue** font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
3. bls = Below Land Surface
4. FDEP = Florida Department of Environmental Protection
5. GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
6. I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
7. MW = Monitoring Well
8. NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
9. SWMU = Solid Waste Management Unit
10. U = The analyte was not detected
11. µg/L = micrograms per liter
12. VABRA = prefix for Vehicle Assembly Building Reassessment monitoring well

N

0 40 80 Feet

FIGURE 3-10
Groundwater Analytical Results
Composite CVOC
December 2022

Hot Spot 3 (OFW)
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



WCPS-IW0015S

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0015S 09/14/2020 3.0 - 13.0 NM	WCPS-IW0015S 03/14/2023 3.0 - 13.0 NM
Analyte		
cDCE	0.28 U	0.53 U
tDCE	0.22 U	0.73 U
VC	0.41 U	0.71 U
TCE	NS	0.89 U

WCPS-IW0001SR

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0001SR 06/03/2020 2.5 - 12.5 NM	WCPS-IW0001SR 09/14/2020 2.5 - 12.5 NM	WCPS-IW0001SR 03/09/2023 2.5 - 12.5 NM
Analyte			
cDCE	**1.4**	**2.5**	**2.0**
tDCE	**0.67 I**	**0.93 I**	**1.2**
VC	**49.5**	**54.3**	**38**
TCE	0.35 U	NS	0.89 U

WCPS-IW0005S

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0005S 09/14/2020 2 - 12 NM	WCPS-IW0005S 03/09/2023 2 - 12 NM
Analyte		
cDCE	0.28 U	0.28 U
tDCE	0.22 U	0.22 U
VC	0.41 U	0.41 U
TCE	NS	0.89 U

WCPS-IW0002SRR

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0002SRR 03/09/2023 3 - 13 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0086

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0086 03/14/2023 15 - 25 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

WCPS-IW0016

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0016 06/03/2020 15.0 - 25.0 NM	WCPS-IW0016 03/09/2023 15.0 - 25.0 NM
Analyte		
cDCE	**1.2**	**0.77 I**
tDCE	0.22 U	0.73 U
VC	**0.80 I**	0.71 U
TCE	0.35 U	0.89 U

MLPV-MW0100

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0100 03/09/2023 15.0 - 25.0 NM
Analyte	
cDCE	**1.9**
tDCE	0.73 U
VC	**1.3**
TCE	0.89 U

MLPV-MW0110

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0110 04/26/2023 1 - 11 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VC Isopleth (Delineated) Greater Than GCTL (>1 µg/L)
- Approximate Extent of VC Isopleth (Inferred) Greater Than GCTL (>1 µg/L)

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
10. MLP / VAB Mobile Launch Platform Rehabilitation Sites (MLP) / Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
11. PCCA = Processing Control Center Area.
12. SWMU = Solid Waste Management Unit.
13. WCPS = West Crawler Park Site.
14. Monitoring well MLPV-MW0110 was resampled on April 26, 2023. Results from this event are presented in place of data collected in March 2023 for this well only.
15. Air sparge treatment wells are screened 40to 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

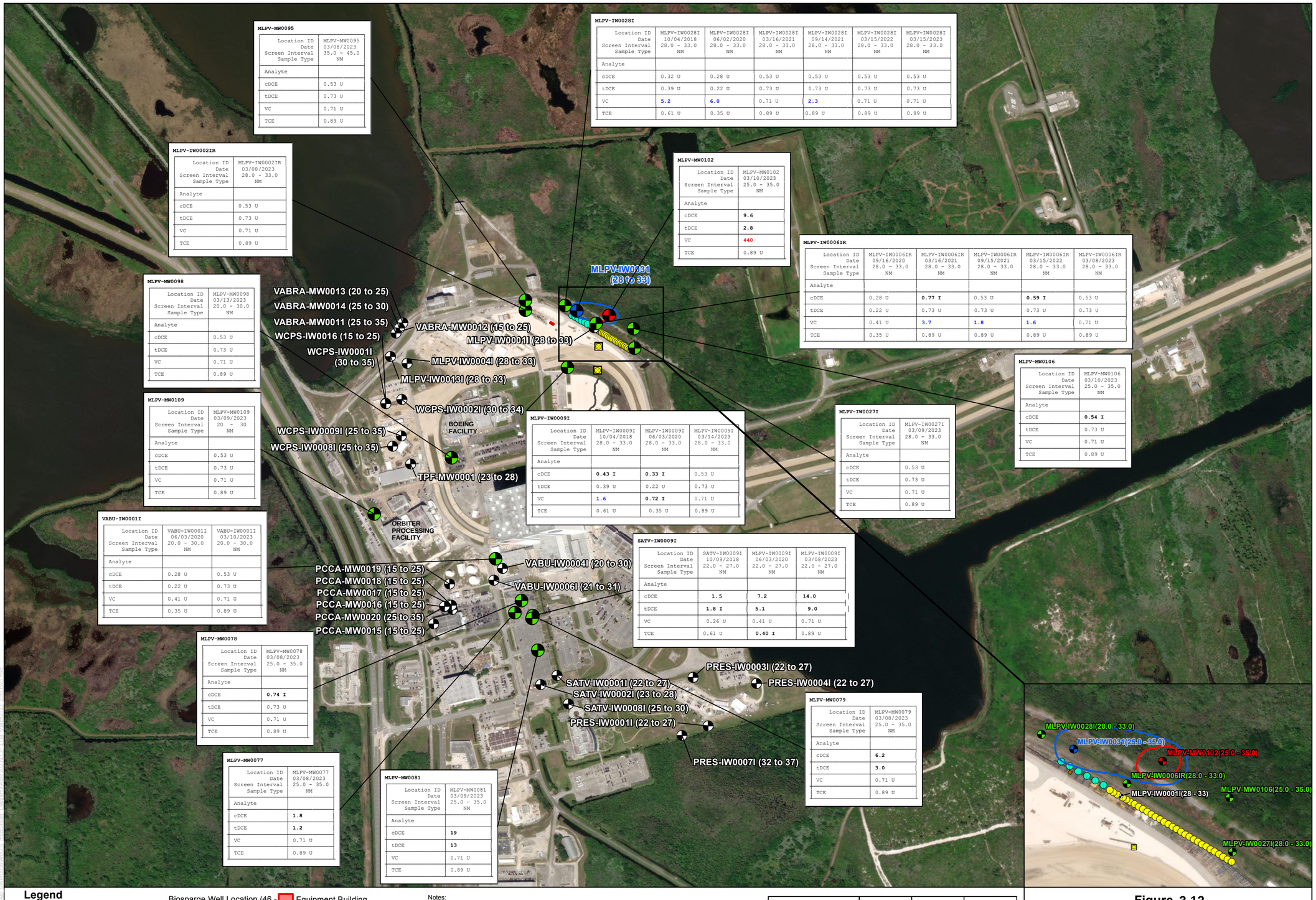
0 130 260 520 Feet

Reference Scale: 1":260'

N

Figure 3-11
Groundwater Analytical Results
Composite CVOC - 1 to 25 Feet bls
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

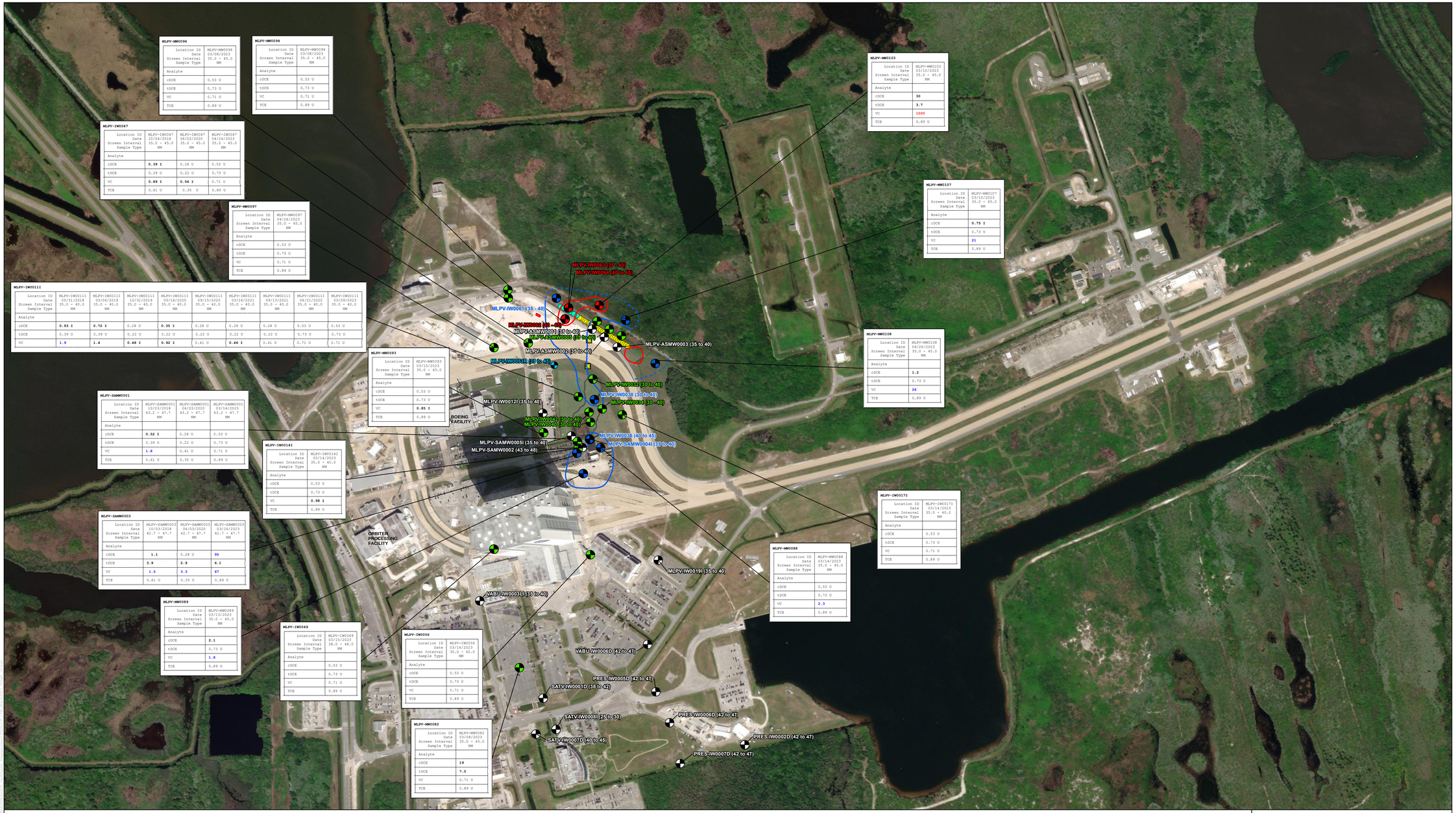
Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. **Red** text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Air sparge treatment wells are screened 40 to 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

0 250 500 1,000 Feet
Reference Scale: 1":550'
N

Figure 3-12
Groundwater Analytical Results
Composite CVOC - 20 to 35 Feet bls
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- Monitoring Well (MW) Results Less Than
- Monitoring Well (MW) Results Greater Than
- Monitoring Well (MW) Results Greater Than
- Monitoring Well (MW) Location Not
- Proposed Monitoring Well
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. **Red** text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Monitoring wells IW0047, MW0097 and MW0108 were resampled on April 26 2023. Results from this event are present in place of data collected in March 2023 for these wells only.
16. Monitoring well IW0053 is presumed destroyed and therefore not sampled in 2023.
17. Air sparge treatment wells are screened 40 to 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

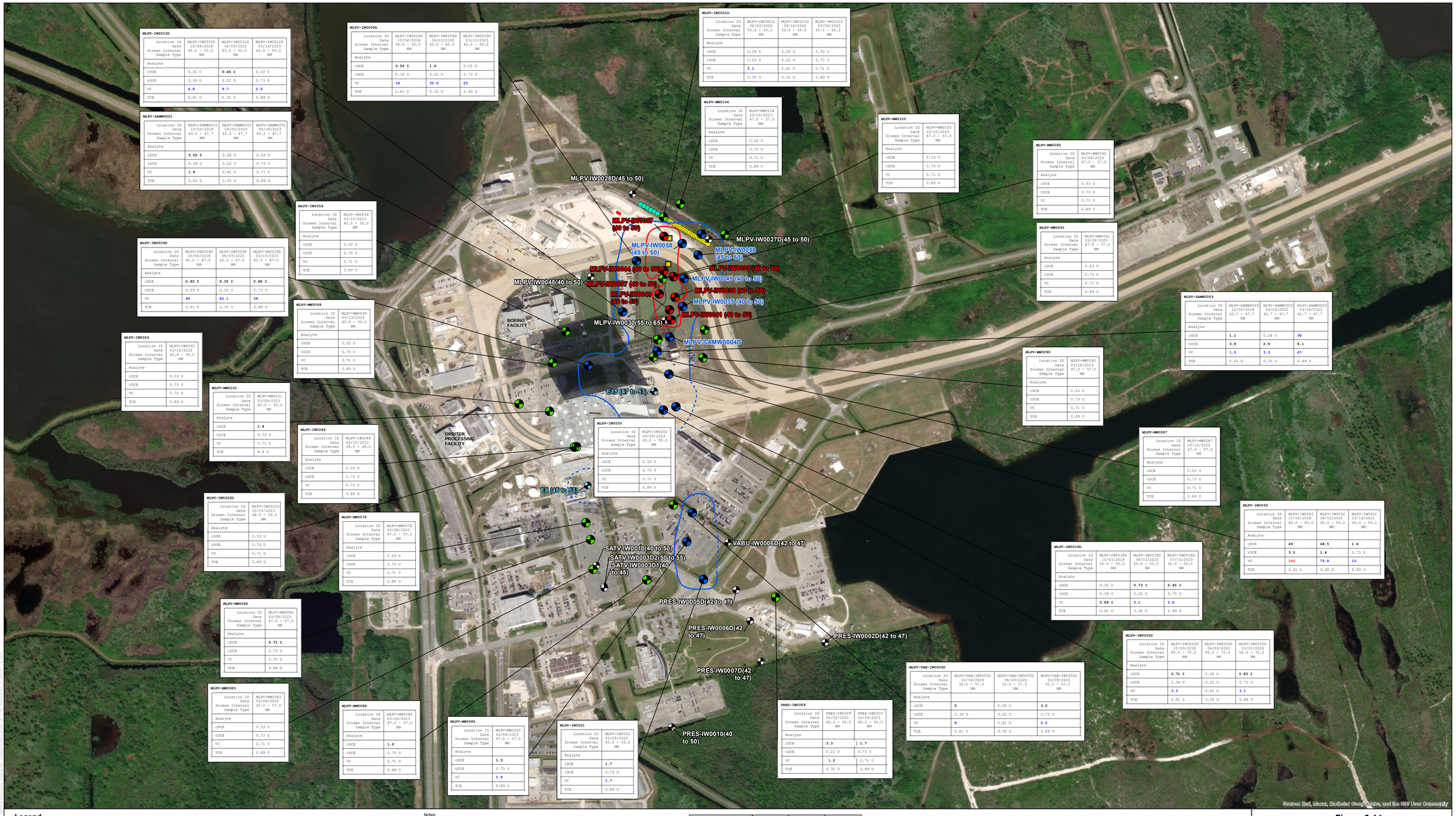
0 300 600 1,200 Feet

Reference Scale: 1":350'

N

Figure 3-13
Groundwater Analytical Results
Composite CVOC - 35 to 45 Feet bls
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



MLPV-IW0012D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0012D 10/04/2018 45.0 – 50.0 NM	MLPV-IW0012D 06/03/2020 45.0 – 50.0 NM	MLPV-IW0012D 03/14/2023 45.0 – 50.0 NM
Analyte			
cDCE	0.32 U	**0.44 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**4.8**	**9.7**	**2.5**
TCE	0.61 U	0.35 U	0.89 U

MLPV-SAMW0001

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0001 10/03/2018 43.2 – 47.7 NM	MLPV-SAMW0001 06/03/2020 43.2 – 47.7 NM	MLPV-SAMW0001 04/26/2023 43.2 – 47.7 NM
Analyte			
cDCE	**0.52 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.8**	0.41 U	0.71 U
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0029D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0029D 10/04/2018 42.0 – 47.0 NM	MLPV-IW0029D 06/03/2020 42.0 – 47.0 NM	MLPV-IW0029D 03/15/2023 42.0 – 47.0 NM
Analyte			
cDCE	**0.82 I**	**0.32 I**	**0.88 I**
tDCE	0.39 U	0.22 U	0.73 U
VC	**40**	**42.1**	**39**
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0055

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0055 03/14/2023 40.0 – 50.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0101

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0101 03/09/2023 40.0 – 50.0 NM
Analyte	
cDCE	**1.4**
tDCE	0.73 U
VC	0.71 U
TCE	8.9 U

MLPV-IW0049

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0049 03/15/2023 38.0 – 48.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0022D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0022D 03/15/2023 48.0 – 55.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0076

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0076 03/08/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0080

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0080 03/08/2023 47.0 – 57.0 NM
Analyte	
cDCE	**0.71 I**
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0083

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0083 03/08/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0084

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0084 03/09/2023 47.0 – 57.0 NM
Analyte	
cDCE	**1.0**
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0085

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0085 03/09/2023 47.0 – 57.0 NM
Analyte	
cDCE	**1.3**
tDCE	0.73 U
VC	**1.9**
TCE	0.89 U

MLPV-IW0051

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0051 03/09/2023 45.0 – 55.0 NM
Analyte	
cDCE	**1.7**
tDCE	0.73 U
VC	**1.7**
TCE	0.89 U

MLPV-IW0054

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0054 03/15/2023 40.0 – 50.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0099

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0099 03/13/2023 40.0 – 50.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0050

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0050 03/09/2023 40.0 – 50.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0009D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0009D 06/03/2020 45.0 – 50.0 NM	MLPV-IW0009D 03/13/2023 45.0 – 50.0 NM
Analyte		
cDCE	**0.50 I**	**1.4**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**16**	**32.6**	**23**
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0001D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0001D 06/03/2020 50.0 – 55.0 NM	MLPV-IW0001D 09/16/2020 50.0 – 55.0 NM	MLPV-IW0001D 03/09/2023 50.0 – 55.0 NM
Analyte			
cDCE	0.28 U	0.28 U	0.53 U
tDCE	0.22 U	0.22 U	0.73 U
VC	**2.1**	0.41 U	0.71 U
TCE	0.35 U	0.35 U	0.89 U

MLPV-MW0104

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0104 03/10/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0105

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0105 03/10/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0092

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0092 03/09/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0091

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0091 03/09/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-SAMW0003

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0003 10/03/2018 42.7 – 47.7 NM	MLPV-SAMW0003 04/03/2020 42.7 – 47.7 NM	MLPV-SAMW0003 03/14/2023 42.7 – 47.7 NM
Analyte			
cDCE	**1.1**	0.28 U	**95**
tDCE	**3.9**	**2.9**	**6.1**
VC	**1.5**	**3.3**	**67**
TCE	0.61 U	0.35 U	0.89 U

MLPV-MW0090

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0090 03/14/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0087

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0087 03/13/2023 47.0 – 57.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0052

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0052 10/04/2018 40.0 – 50.0 NM	MLPV-IW0052 06/03/2020 40.0 – 50.0 NM	MLPV-IW0052 03/14/2023 40.0 – 50.0 NM
Analyte			
cDCE	**49**	**48.5**	**1.6**
tDCE	**3.5**	**1.4**	0.73 U
VC	**160**	**73.8**	**12**
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0018D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0018D 10/03/2018 50.0 – 55.0 NM	MLPV-IW0018D 06/03/2020 50.0 – 55.0 NM	MLPV-IW0018D 03/15/2023 50.0 – 55.0 NM
Analyte			
cDCE	0.32 U	**0.73 I**	**0.95 I**
tDCE	0.39 U	0.22 U	0.73 U
VC	**0.69 I**	**3.1**	**3.6**
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0020D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0020D 10/03/2018 45.0 – 70.0 NM	MLPV-IW0020D 06/03/2020 45.0 – 70.0 NM	MLPV-IW0020D 03/21/2023 45.0 – 70.0 NM
Analyte			
cDCE	**0.71 I**	0.28 U	**0.83 I**
tDCE	0.39 U	0.22 U	0.73 U
VC	**3.3**	0.41 U	**3.1**
TCE	0.61 U	0.35 U	0.89 U

PRES-IW0009

Location ID / Date / Screen Interval / Sample Type	PRES-IW0009 06/02/2020 40.0 – 50.0 NM	PRES-IW0009 03/09/2023 40.0 – 50.0 NM
Analyte		
cDCE	**3.3**	**1.7**
tDCE	0.22 U	0.73 U
VC	**1.2**	0.71 U
TCE	0.35 U	0.89 U

MLPV-VAB-IW0005D

Location ID / Date / Screen Interval / Sample Type	MLPV-VAB-IW0005D 10/04/2018 52.0 – 57.0 NM	MLPV-VAB-IW0005D 06/03/2020 52.0 – 57.0 NM	MLPV-VAB-IW0005D 03/09/2023 52.0 – 57.0 NM
Analyte			
cDCE	**2**	0.28 U	**3.2**
tDCE	0.39 U	0.22 U	0.73 U
VC	**8**	0.41 U	**2.5**
TCE	0.61 U	0.35 U	0.89 U

Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Proposed MW Locations
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. **Red** text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Monitoring well SAMW0001 was resampled on April 26, 2023. Results from this event are presented in place of data collected in March 2023 for this well only.
16. Air sparge treatment wells are screened 40 to 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

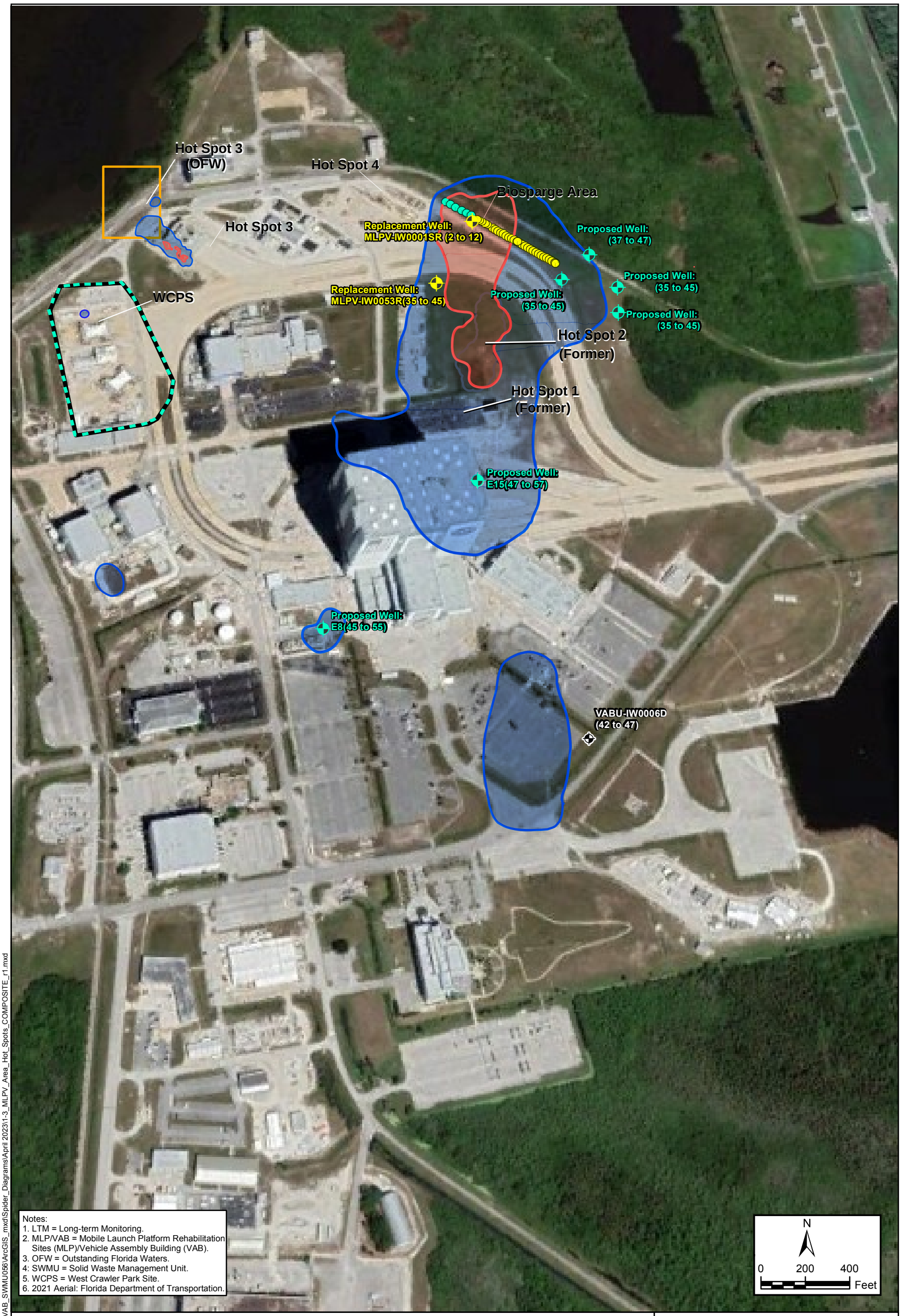
0 300 600 1,200 Feet

Reference Scale: 1":350'

N

Figure 3-14
Groundwater Analytical Results
Composite CVOC - Greater Than 45 Feet bls
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Document Path: N:\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\1-3_MLPV_Area_Hot_Spots_COMPOSITE_r1.mxd

Figure 3-15
Composite CVOC Plume Map and Proposed LCP LTM Monitoring Well Locations

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:	MLPV-IW0001S		MLPV-MW0086		MLPV-MW0100		MLPV-MW0110		VABU-IW0004S		OPF3-IW0006S		PRES-IW0001SR		PRES-IW0006S		PRES-IW0007S	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	2 - 12		15 - 25		15 - 25		1 - 11		3 - 13		10 - 20		6 - 16		3 - 13		1 - 11	
TOC Elevation (feet NAVD88):	4.78		ND		ND		ND		6.52		5.44		7.93		4.04		1.65	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	3.63	1.15	-	-	-	-	-	-	4.24	2.28	4.3*	1.14	6.82*	1.11	NM	NM	NM	NM
09/18-20/2018	5.27	-0.49	-	-	-	-	-	-	4.49	2.03	4.92	0.52	7.18	0.75	4.9	-0.86	NM	NM
5/11/2020	CNL	CNL	-	-	-	-	-	-	4.54	1.98	5.23	0.21	7.75	0.18	5.52	-1.48	3.17	-1.52
9/14/2020	NM	NM	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	4.18	0.6	-	-	-	-	-	-	4.30	2.22	4.45	0.99	6.91	1.02	4.60	-0.56	2.16	-0.51
3/7/2023	NM	NM	4.38		4.01		2.72		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-IW0002I		MLPV-IW0002IR		MLPV-IW0006IR		MLPV-IW0011I		MLPV-IW0009I		MLPV-IW0012I		MLPV-IW0014I		MLPV-IW0017I		MLPV-IW0027I	
Area:	VAB		VAB		VAB		Hot Spot 2/VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	28 - 33		28 - 33		28 - 33		35 - 40		28 - 33		35 - 40		35 - 40		35 - 40		28 - 33	
TOC Elevation (feet NAVD88):	5.58		NA		2.87		4.03		5.78		5.41		5.24		5.85		2.08	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	-	-	2.15	0.72	2.65	1.38	4.65	1.13	3.9	1.51	3.6	1.64	4.45	1.4	1.5	0.58
09/18-20/2018	NM	NM	-	-	3.52	-0.65	3.41	0.62	5.7	0.08	4.94	0.47	4.6	0.64	5.54	0.31	2.63	-0.55
10/30/2019	NM	NM	-	-	NM	NM	1.74	2.29	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	NM	NM	-	-	NM	NM	3.08	0.95	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	CNL	CNL	-	-	5.40	-2.53	3.80	0.23	5.91	-0.13	5.21	0.20	4.89	0.35	8.32	-2.47	2.60	-0.52
6/2/2020	NM	NM	-	-	NM	NM	NM	NM	4.29	1.49	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	-	-	3.45	-0.58	1.28	2.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	CNL	CNL	-	-	2.43	0.44	2.85	1.18	5.00	0.78	4.3	1.11	3.96	1.28	4.74	1.11	1.55	0.53
9/13/2021	NM	NM	-	-	1.35	1.52	0.92	3.11	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	NM	NM	-	-	1.73	1.14	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	-	-	NM	NM	2.33	1.70	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	NM	NM	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	NM	NM	5.69		2.20	0.67	5.75	-1.72	3.05	2.73			3.96	1.28	4.68	1.17	2.31	-0.23

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:	PCCA-MW0004		PCCA-MW0007		PCCA-MW0008		PCCA-MW0009		PCCA-MW0010		PCCA-MW0011		PCCA-MW0012		PCCA-MW0013		PCCA-MW0014	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15	
TOC Elevation (feet NAVD88):	7.96		8.22		7.22		7.6		7.86		7.59		7.89		6.99		7.25	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	5.23	2.73	5.56	2.66	4.22	3.00	4.72	2.88	4.74	3.12	4.54	3.05	4.73	3.16	3.36	3.53	4.42	2.83
09/18-20/2018	5.73	2.23	5.98	2.24	4.66	2.56	5.01	2.59	5.2	2.66	4.93	2.66	5.13	2.76	4.11	2.88	4.81	2.44
5/11/2020	5.96	2.00	6.25	1.97	5.08	2.14	5.19	2.41	5.35	2.51	5.10	2.49	5.35	2.54	4.30	2.69	4.98	2.27
9/14/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	7.27	0.69	5.58	2.64	4.52	2.70	4.61	2.99	4.58	3.28	4.40	3.19	4.63	3.26	4.61	2.38	4.30	2.95
3/7/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-IW0028I		MLPV-IW0031		MLPV-IW0032		MLPV-IW0034		MLPV-IW0038		MLPV-IW0040		MLPV-IW0042		MLPV-IW0046		MLPV-IW0047	
Area:	VAB		Biosparge Area		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		VAB		VAB	
Screened Interval (feet bls):	28 - 33		25 - 35		30 - 40		30 - 40		30 - 40		30 - 40		30 - 40		35 - 40		35 - 40	
TOC Elevation (feet NAVD88):	2.08		2.61		2.22		4.65		3.84		5.15		3.35		2.7		5.87	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	2.06	0.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	2.07	0.63	4.8	1.07
09/18-20/2018	3.12	-1.04	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	3.16	-0.46	5.75	0.12
10/30/2019	NM	NM	1.50	1.11	0.24	1.98	2.47	2.18	1.77	2.07	2.86	2.29	1.12	2.23	NM	NM	NM	NM
3/17/2020	NM	NM	2.38	0.23	1.47	0.75	3.81	0.84	3.1	0.74	4.28	0.87	2.53	0.82	NM	NM	NM	NM
5/11/2020	CNL	CNL	3.18	-0.57	2.20	0.02	4.56	0.09	3.80	0.04	4.97	0.18	3.22	0.13	3.20	-0.50	CNL	CNL
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	1.32	1.29	0.00	2.22	2	2.65	1.30	2.54	2.38	2.77	0.68	2.67	NM	NM	NM	NM
3/18/2021	2.29	-0.21	2.20	0.41	1.25	0.97	3.55	1.1	2.82	1.02	3.97	1.18	2.25	1.1	2.25	0.45	5.17	0.7
9/13/2021	1.28	0.8	1.26	1.35	CNL	CNL	1.58	3.07	0.88	2.96	CNL	CNL	UNDER WATER		1.21	1.49	NM	NM
3/14/2022	1.65	0.43	1.53	1.08	NM	NM	2.59	2.06	1.88	1.96	NM	NM	NM	NM	1.61	1.09	NM	NM
4/21/2022	NM	NM	NM	NM	0.92	1.30	NM	NM	NM	NM	3.62	1.53	NM	NM	NM	NM	NM	NM
12/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	CNL	CNL	2.00	0.61	CNL	CNL	4.61	0.04	2.51	1.33	4.64	0.51	2.11	1.24	2.86	-0.16	4.91	0.96

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:	WCPS-IW0001SR		WCPS-IW0002SR		WCPS-IW0002SRR		WCPS-IW0005S		WCPS-IW0006S		WCPS-IW0009S		WCPS-IW0010S		WCPS-IW0012S		WCPS-IW0013S	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	2.5 - 12.5		2.5 - 12.5		3 - 13		2 - 12		3 - 13		2.5 - 12.5		2.5 - 12.5		2 - 12		2.5 - 12.5	
TOC Elevation (feet NAVD88):	4.23		5.39		ND		4.48		4.88		5.3		5.83		4.77		5.79	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	3.02	1.21	NM	NM	-	-	3.45	1.03	3.81	1.07	4.02	1.28	NM	NM	NM	NM	4.12	1.67
09/18-20/2018	3.63	0.6	NM	NM	-	-	4.14	0.34	4.44	0.44	4.7	0.6	5.14	0.69	4.1	0.67	4.73	1.06
5/11/2020	3.85	0.38	CNL	CNL	-	-	4.45	0.03	4.75	0.13	5.02	0.28	5.49	0.34	8.94	-4.17	4.99	0.80
9/14/2020	2.14	2.09	NM	NM	-	-	2.73	1.75	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	3.33	0.9	CNL	CNL	-	-	3.87	0.61	4.17	0.71	4.39	0.91	4.83	1.00	NM	NM	5.27	0.52
3/7/2023	3.42	0.81	-	-	4.81		3.74	0.74	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-IW0053		MLPV-IW0056		MLPV-IW0061		MLPV-IW0063		MLPV-MW0077		MLPV-MW0078		MLPV-MW0079		MLPV-MW0081		MLPV-MW0082	
Area:	VAB		VAB		Biosparge Area		Biosparge Area		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	35 - 40		30 - 40		35 - 40		35 - 40		25 - 35		25 - 35		25 - 35		25 - 35		35 - 45	
TOC Elevation (feet NAVD88):	4.76		7.9		5.78		3.67		ND		ND		ND		ND		ND	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	3.6	1.16	6.09	1.81	NM	NM	NM	NM	-	-	-	-	-	-	-	-	-	-
09/18-20/2018	4.63	0.13	6.82	1.08	NM	NM	NM	NM	-	-	-	-	-	-	-	-	-	-
10/30/2019	NM	NM	NM	NM	4.60	1.18	2.64	1.03	-	-	-	-	-	-	-	-	-	-
3/17/2020	NM	NM	NM	NM	5.55	0.23	3.56	0.11	-	-	-	-	-	-	-	-	-	-
5/11/2020	4.86	-0.10	NM	NM	6.36	-0.58	4.34	-0.67	-	-	-	-	-	-	-	-	-	-
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	-	-	-	-	-	-	-	-	-	-
9/14/2020	NM	NM	NM	NM	4.32	1.46	2.42	1.25	-	-	-	-	-	-	-	-	-	-
3/18/2021	3.99	0.77	6.3	1.6	5.35	0.43	3.32	0.35	-	-	-	-	-	-	-	-	-	-
9/13/2021	NM	NM	NM	NM	4.20	1.58	CNL	CNL	-	-	-	-	-	-	-	-	-	-
3/14/2022	NM	NM	NM	NM	4.64	1.14	2.68	0.99	-	-	-	-	-	-	-	-	-	-
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	-	-	-	-	-	-	-	-	-	-
12/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	-	-	-	-	-	-	-	-	-	-
3/7/2023	CNL	CNL	NM	NM	5.16	0.62	3.11	0.56	5.43		5.51		5.60		5.57		5.64	

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:	WCPS-IW0014S		WCPS-IW0015S	
Area:	VAB		VAB	
Screened Interval (feet bls):	4 - 14		3 - 13	
TOC Elevation (feet NAVD88):	6.88		5.63	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	5.36	1.52	4.9	0.73
09/18-20/2018	6.02	0.86	5.43	0.2
5/11/2020	6.32	0.56	5.62	0.01
9/14/2020	NM	NM	4.45	1.18
3/18/2021	4.35	2.53	5.65	-0.02
3/7/2023	NM	NM	CNL	CNL

INTERMEDIATE WELL ID:	MLPV-MW0088		MLPV-MW0089		MLPV-MW0093		MLPV-MW0094		MLPV-MW0095	
Area:	Former Hot Spot 2		Former Hot Spot 2		Former Hot Spot 2		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	35 - 45		35 - 45		35 - 45		35 - 45		25 - 35	
TOC Elevation (feet NAVD88):	ND		ND		ND		ND		ND	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	-	-	-	-	-	-	-	-	-	-
09/18-20/2018	-	-	-	-	-	-	-	-	-	-
10/30/2019	-	-	-	-	-	-	-	-	-	-
3/17/2020	-	-	-	-	-	-	-	-	-	-
5/11/2020	-	-	-	-	-	-	-	-	-	-
6/2/2020	-	-	-	-	-	-	-	-	-	-
9/14/2020	-	-	-	-	-	-	-	-	-	-
3/18/2021	-	-	-	-	-	-	-	-	-	-
9/13/2021	-	-	-	-	-	-	-	-	-	-
3/14/2022	-	-	-	-	-	-	-	-	-	-
4/21/2022	-	-	-	-	-	-	-	-	-	-
12/14/2022	-	-	-	-	-	-	-	-	-	-
3/7/2023	4.06		6.84		COVERED		5.70		5.58	

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023

INTERMEDIATE WELL ID:	MLPV-MW0096		MLPV-MW0097		MLPV-MW0098		MLPV-MW0102		MLPV-MW0103		MLPV-MW0106		MLPV-MW0107		MLPV-MW0108	
Area:	Biosparge Area		Biosparge Area		VAB		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	35 - 45		35 - 45		20 - 30		25 - 35		35 - 45		25 - 35		35 - 45		35 - 45	
TOC Elevation (feet NAVD88):	ND		ND		ND		ND		ND		ND		ND		ND	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/18-20/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/30/2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/17/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/11/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6/2/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/14/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/18/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/13/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/14/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4/21/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12/14/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/7/2023	5.88		5.84		5.47		0.82		0.50		1.89		1.85		3.58	

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023

INTERMEDIATE WELL ID:	MLPV-MW0109		MLPV-SAMW0004I		MLPV-SAMW0005I		MLPV-ASMW0001		MLPV-ASMW0002		MLPV-ASMW0003		MLPV-ASMW0004		MLPV-ASMW0005	
Area:	VAB		Hot Spot 2		VAB		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	20 - 30		35 - 40		35 - 40		35 - 40		35 - 40		35 - 40		35 - 40		35 - 40	
TOC Elevation (feet NAVD88):	ND		ND		ND		5.22		5.19		5.24		5.00		5.00	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
09/18-20/2018	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/30/2019	-	-	3.14	-	NM	NM	NM	NM	NM	NM	NM	NM	0.96	4.04	1.54	3.46
3/17/2020	-	-	4.6	-	NM	NM	NM	NM	NM	NM	NM	NM	1.81	3.19	2.4	2.60
5/11/2020	-	-	5.27	-	5.55	-	6.51	-1.29	8.55	-3.36	7.05	-1.81	2.68	2.32	3.22	1.78
6/2/2020	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	-	-	2.7	-	NM	NM	NM	NM	NM	NM	NM	NM	0.71	4.29	1.22	3.78
3/18/2021	-	-	4.32	-	4.59	-	5.5	-0.28	5.49	-0.30	6.02	-0.78	1.65	3.35	2.18	2.82
9/13/2021	-	-	2.32	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.27	4.73	0.68	4.32
3/14/2022	-	-	3.34	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.91	4.09	1.48	3.52
4/21/2022	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	5.01		4.28	-	NM	NM	NM	NM	NM	NM	NM	NM	1.40	3.60	2.31	2.69

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023

INTERMEDIATE WELL ID:	MLPV-ASMW0006		PCCA-MW0015		PCCA-MW0016		PCCA-MW0017		PCCA-MW0018	
Area:	Biosparge Area		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	35 - 40		15 - 25		15 - 25		15 - 25		15 - 25	
TOC Elevation (feet NAVD88):	5.00		8.11		7.33		7.59		7.55	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	5.55	2.56	4.62	2.71	4.82	2.77	4.8	2.75
09/18-20/2018	NM	NM	6.03	2.08	5.15	2.18	5.37	2.22	5.33	2.22
10/30/2019	0.74	4.26	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	1.63	3.37	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	2.50	2.50	6.28	1.83	5.36	1.97	5.53	2.06	5.59	1.96
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	0.35	4.65	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	1.42	3.58	6.61	1.5	4.74	2.59	4.91	2.68	4.87	2.68
9/13/2021	0.21	4.79	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	0.73	4.27	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	1.24	3.76	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-IW0001D		MLPV-IW0009D		MLPV-IW0012D		MLPV-IW0018D		MLPV-IW0020D		MLPV-IW0022D		MLPV-IW0027D		MLPV-IW0028D		MLPV-IW0029D	
Area	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	50 - 55		45 - 50		45 - 50		50 - 55		65 - 70		48 - 53		45 - 50		45 - 50		42 - 47	
TOC Elevation (feet NAVD88):	4.51		5.77		5.40		8.78		8.33		8.26		1.99		3.03		6.84	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	3.85	0.66	4.61	1.16	3.85	1.55	7.25	1.53	NM	NM	6.48	1.78	1.48	0.51	2.38	0.65	5.06	1.78
09/18-20/2018	5.09	-0.58	5.58	0.19	4.85	0.55	7.97	0.81	7.48	0.85	7.18	1.08	2.56	-0.57	3.42	-0.39	5.95	0.89
10/30/2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	5.10	-0.59	5.84	-0.07	5.13	0.27	8.32	0.46	CNL	CNL	7.47	0.79	2.45	-0.46	CNL	CNL	6.23	0.61
6/2/2020	NM	NM	4.27	1.50	3.89	1.51	6.93	1.85	6.29	2.04	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	3.05	1.46	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	4.03	0.48	4.95	0.82	4.22	1.18	7.42	1.36	6.63	1.70	6.70	1.56	1.48	0.51	2.59	0.44	5.41	1.43
9/13/2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	3.82	0.69	3.00	2.77	3.88	1.52	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	4.55	2.29

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-IW0030		MLPV-IW0033		MLPV-IW0035		MLPV-IW0036		MLPV-IW0037		MLPV-IW0039		MLPV-IW0041		MLPV-IW0043		MLPV-IW0044	
Area	Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2		Hot Spot 2	
Screened Interval (feet bls):	55 - 65		40 - 50		40 - 50		40 - 45		40 - 50		40 - 50		40 - 50		40 - 50		40 - 50	
TOC Elevation (feet NAVD88):	ND		2.13		4.66		5.79		3.87		3.76		5.14		3.33		2.28	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
09/18-20/2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/30/2019	NM	NM	0.17	1.96	2.57	2.09	3.40	2.39	1.79	2.08	1.70	2.06	2.79	2.35	1.09	2.24	0.42	1.86
3/17/2020	NM	NM	1.34	0.79	3.88	0.78	4.84	0.95	3.1	0.77	2.93	0.83	4.18	0.96	2.46	0.87	1.65	0.63
5/11/2020	6.27	-	2.10	0.03	4.61	0.05	5.55	0.24	3.81	0.06	3.71	0.05	4.92	0.22	3.18	0.15	2.36	-0.08
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	0	2.13	2.08	2.58	2.95	2.84	1.32	2.55	1.2	2.56	2.31	2.83	0.62	2.71	0	2.28
3/18/2021	5.41	-	1.21	0.92	3.61	1.05	4.55	1.24	2.88	0.99	2.75	1.01	3.97	1.17	2.23	1.1	1.42	0.86
9/13/2021	NM	NM	NM	NM	CNL	CNL	2.61	3.18	0.95	2.92	0.78	2.98	1.44	3.70	UNDER WATER		CNL	CNL
3/14/2022	NM	NM	NM	NM	NM	NM	3.65	2.14	NM	NM	1.8	1.96	3.02	2.12	1.29	2.04	NM	NM
4/21/2022	NM	NM	0.61	1.52	3.29	1.37	NM	NM	2.55	1.32	NM	NM	NM	NM	NM	NM	1.05	1.23
3/7/2023	NM	NM	CNL	CNL	4.73	-0.07	4.55	1.24	5.11	-1.24	2.56	1.20	4.75	0.39	2.11	1.22	CNL	CNL

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-IW0045		MLPV-IW0048		MLPV-IW0049		MLPV-IW0050		MLPV-IW0051		MLPV-IW0052		MLPV-IW0054		MLPV-IW0055		MLPV-IW0057	
Area	Hot Spot 2		VAB		VAB		VAB		VAB		VAB		VAB		VAB		Biosparge Area	
Screened Interval (feet bls):	40 - 50		40 - 50		38 - 48		40 - 50		45 - 55		40 - 50		40 - 50		40 - 50		40 - 50	
TOC Elevation (feet NAVD88):	3.79		4.23		8.11		7.15		6.12		7.09		6.96		7.60		5.52	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	2.91	1.32	6.25	1.86	5.5	1.65	4.65	1.47	5.38	1.71	5.35	1.61	5.84	1.76	NM	NM
09/18-20/2018	NM	NM	3.81	0.42	6.93	1.18	6.11	1.04	5.18	0.94	6.28	0.81	6.29	0.67	6.68	0.92	NM	NM
10/30/2019	1.80	1.99	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	4.24	1.28
3/17/2020	3.00	0.79	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	5.22	0.30
5/11/2020	3.78	0.01	4.12	0.11	7.25	0.86	6.50	0.65	5.58	0.54	6.59	0.50	6.52	0.44	6.95	0.65	6.02	-0.50
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	1.4	2.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	3.95	1.57
3/18/2021	2.85	0.94	3.32	0.91	6.47	1.64	5.71	1.44	4.8	1.32	NM	NM	5.79	1.17	6.17	1.43	5.03	0.49
9/13/2021	CNL	CNL	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	WELL DAMAGED	
3/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	4.85	0.67
4/21/2022	WELL DAMAGED		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	2.1	1.69	NM	NM	NM	NM	5.81	1.34	4.83	1.29	6.13	0.96	NO ACCESS		6.28	1.32	3.58	1.94

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-IW0058		MLPV-IW0059		MLPV-IW0060		MLPV-IW0062		MLPV-IW0064	
Area	Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	45 - 50		45 - 50		40 - 50		40 - 45		40 - 45	
TOC Elevation (feet NAVD88):	5.54		6.18		1.88		5.84		3.64	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
09/18-20/2018	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/30/2019	4.28	1.26	4.79	1.39	0.86	1.02	4.71	1.13	2.65	0.99
3/17/2020	5.31	0.23	5.85	0.33	1.72	0.16	5.70	0.14	3.39	0.25
5/11/2020	6.10	-0.56	6.67	-0.49	2.61	-0.73	6.44	-0.60	4.22	-0.58
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	3.98	1.56	4.45	1.73	0.61	1.27	NM	NM	2.37	1.27
3/18/2021	5.01	0.53	5.58	0.6	1.52	0.36	5.41	0.43	3.3	0.34
9/13/2021	3.7	1.84	4.11	2.07	CNL	CNL	4.3	1.54	CNL	CNL
3/14/2022	4.32	1.22	4.85	1.33	0.75	1.13	4.75	1.09	2.57	1.07
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	4.8	0.74	5.39	0.79	1.42	0.46	5.18	0.66	3.04	0.60

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-MW0076		MLPV-MW0080		MLPV-MW0083		MLPV-MW0084		MLPV-MW0085		MLPV-MW0087		MLPV-MW0090		MLPV-MW0091	
Area	VAB		VAB		VAB		VAB		VAB		Former Hot Spot 2		Former Hot Spot 2		Former Hot Spot 2	
Screened Interval (feet bls):	47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		47 - 57	
TOC Elevation (feet NAVD88):	ND		ND		ND		ND		ND		ND		ND		ND	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09/18-20/2018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/30/2019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/17/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5/11/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6/2/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/14/2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/18/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/13/2021	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/14/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4/21/2022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/7/2023	5.71		5.69		5.69		6.2		6.39		4.72		COVERED		5.16	

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-MW0092		MLPV-MW0099		MLPV-MW0101		MLPV-MW0104		MLPV-MW0105		MLPV-SAMW0001		MLPV-SAMW0002		MLPV-SAMW0003	
Area	Former Hot Spot 2		VAB		VAB		Biosparge Area		Biosparge Area		VAB		VAB		VAB	
Screened Interval (feet bls):	47 - 57		40 - 50		40 - 50		47 - 57		47 - 57		43 - 48		43 - 48		43 - 48	
TOC Elevation (feet NAVD88):	ND		ND		ND		ND		ND		6.80		ND		6.80	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	-	-	-	-	-	-	-	-	-	-	3.48	3.32	NM	NM	4.03	2.77
09/18-20/2018	-	-	-	-	-	-	-	-	-	-	4.43	2.37	NM	NM	4.94	1.86
10/30/2019	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
3/17/2020	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
5/11/2020	-	-	-	-	-	-	-	-	-	-	4.62	2.18	5.12	-	5.10	1.70
6/2/2020	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
9/14/2020	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
3/18/2021	-	-	-	-	-	-	-	-	-	-	3.7	3.10	4.05	-	4.25	2.55
9/13/2021	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
3/14/2022	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
4/21/2022	-	-	-	-	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM
3/7/2023	4.54		5.05		7.14		0.91		1.47		3.81	2.99	NM	NM	4.15	2.65

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

DEEP WELL ID:	MLPV-SAMW0004D		VAB-IW0005D		VABU-IW0006D		PRES-IW0002D		PRES-IW0007D	
Area	Hot Spot 2		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	45 - 50		52 - 57		42 - 47		42 - 47		42 - 47	
TOC Elevation (feet NAVD88):	ND		7.41		6.29		5.11		4.63	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	NM	NM	NM	NM	4.84	1.45	NM	NM	3.84	0.79
09/18-20/2018	NM	NM	4.88	2.53	5.36	0.93	4.7	0.41	4.13	0.5
10/30/2019	3.10	-	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	4.51	-	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	5.24	-	5.24	2.17	5.73	0.56	5.38	-0.27	4.68	-0.05
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	2.66	-	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	4.28	-	4.51	2.90	4.98	1.31	4.42	0.69	3.82	0.81
9/13/2021	2.30	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	3.31	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	4.21	-	4.55	2.86	NM	NM	NM	NM	NM	NM

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

INTERMEDIATE WELL ID:	PCCA-MW0019		PCCA-MW0020		VABU-IW0001I		WCPS-IW0016		PRES-IW0007I		PRES-IW0008I		SATV-IW0009I		SATV-IW0010	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	15 - 25		25 - 35		20 - 30		15 - 25		32 - 37		38 - 42		22 - 27		35 - 45	
TOC Elevation (feet NAVD88):	7.01		7.38		8.36		4.57		4.62		6.18		6.93		6.85	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	4.18	2.83	4.62	2.76	NM	NM	2.52	2.05	3.78	0.84	NM	NM	5.25	1.68	5.25	1.6
09/18-20/2018	4.75	2.26	5.18	2.2	7.33	1.03	4.05	0.52	4.12	0.5	5.53	0.65	5.85	1.08	5.82	1.03
10/30/2019	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	4.97	2.04	5.51	1.87	7.58	0.78	4.45	0.12	4.68	-0.06	6.00	0.18	6.18	0.75	6.20	0.65
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	4.32	2.69	4.71	2.67	NM	NM	3.91	0.66	3.79	0.83	5.17	1.01	5.44	1.49	5.42	1.43
9/13/2021	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	NM	NM	NM	NM	NM	NM	3.91	0.66	NM	NM	NM	NM	5.52	1.41	NM	NM

DEEP WELL ID:	PRES-IW0009		PRES-IW0010	
Area	VAB		VAB	
Screened Interval (feet bls):	40 - 50		40 - 50	
TOC Elevation (feet NAVD88):	5.17		2.26	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	3.97	1.2	1.3	0.96
09/18-20/2018	4.46	0.71	1.68	0.58
10/30/2019	NM	NM	NM	NM
3/17/2020	NM	NM	NM	NM
5/11/2020	4.97	0.20	2.19	0.07
6/2/2020	NM	NM	NM	NM
9/14/2020	NM	NM	NM	NM
3/18/2021	4.14	1.03	1.31	0.95
9/13/2021	NM	NM	NM	NM
3/14/2022	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM
3/7/2023	4.12	1.05	NM	NM

Table 3-1
MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

INTERMEDIATE WELL ID:	TPF-MW0001		VABRA-MW0011		VABRA-MW0012		VABRA-MW0013		VABRA-MW0014	
Area:	VAB		Hot Spot 3 (OFW)		Hot Spot 3 (OFW)		Hot Spot 3 (OFW)		Hot Spot 3 (OFW)	
Screened Interval (feet bls):	23 - 28		25 - 35		15 - 25		20 - 25		25 - 30	
TOC Elevation (feet NAVD88):	7.62		3.15		3.21		2.91		3.53	
Date:	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)	Depth to Water (feet BTOC)	Water Elevation (feet NAVD88)
5/23/2016	6.2	1.42	NM	NM	NM	NM	NM	NM	NM	NM
09/18-20/2018	6.85	0.77	NM	NM	NM	NM	2.61	0.30	3.22	0.31
10/30/2019	NM	NM	2.20	0.95	2.21	1.00	1.78	1.13	2.33	1.20
3/17/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	7.12	0.50	3.48	-0.33	3.58	-0.37	3.05	-0.14	3.64	-0.11
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	2.20	0.95	2.2	1.01	1.76	1.15	2.32	1.21
3/18/2021	6.51	1.11	3.07	0.08	3.1	0.11	3.63	-0.72	3.21	0.32
9/13/2021	NM	NM	2.29	0.86	2.29	0.92	1.78	1.13	2.41	1.12
3/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	NM	NM	2.46	0.69	2.49	0.72	2.01	0.90	2.58	0.95
3/7/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

DEEP WELL ID:
Area
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
10/30/2019
3/17/2020
5/11/2020
6/2/2020
9/14/2020
3/18/2021
9/13/2021
3/14/2022
4/21/2022
3/7/2023

Notes:
bls = Below land surface
BTOC = Below top of casing
CNL = Could not locate
Blue shading indicates new TOC survey pending
Monitoring Results Report, (NASA, March 2019)
Historical data presented in this table reported from 2016 to present. Elevation data prior to 2016 are available in the VAB Area 2018 Biennial Groundwater

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0011I	35 to 40	12/15/1997	26 U	**180**	16 U	**2200**
		10/5/1998	20 U	24 U	34 U	**770**
		7/17/2000	2.8 U	**24 I,J**	4.4 U	**940**
		1/21/2002	2 U	**8.1**	**2**	**192**
		2/27/2003	10 U	**35.2**	**2.9 J**	**238**
		2/3/2004	2 U	**51.7**	**4.2**	**322**
		8/10/2004	20 U	**56.2**	**5.2 J**	**418**
		5/4/2005	5 U	**31.7**	**6.3 J**	**306**
		10/28/2005	2.5 U	**4.6 I**	**2.9 I**	**157**
		5/16/2006	0.5 U	**8.8**	**7.9**	**451**
		11/9/2006	0.5 U	**3.3**	**5.7**	**302**
		5/22/2007	0.5 U	**1.7**	**4.3**	**263**
		11/15/2007	1.9 U	**1.6 I**	**2.6 I**	**301**
		5/23/2008	0.32 U	**1.7**	**3.2**	**242**
		11/13/2008	0.32 U	**3.6**	**3**	**677**
		5/19/2009	0.32 U	**7.9**	**2.6**	**267**
		11/9/2009	0.15 U	**12**	**2**	**190**
		5/18/2010	0.12 U	**6.5**	**1.8**	**170**
		11/8/2010	0.16 U	**3.6**	**1.9**	**120**
		5/10/2011	0.16 U	**3.1**	**1.9**	**120**
		11/1/2011	0.16 U	0.36 U	0.12 U	**0.68 I**
		5/29/2012	0.26 U	**2.9**	**1.9**	**58.3**
		1/27/2014	0.3 U	**1.3**	**1.1**	**5.6**
		7/22/2014	0.5 U	0.65 U	**0.75 I**	**4.5**
		1/21/2015	0.48 U	0.41 U	**0.81 I**	**3.4**
		7/15/2015	0.61 U	0.65 U	**0.91 I**	**2.7**
		1/12/2016	0.61 U	0.65 U	0.67 U	**2.9**
		7/11/2016	0.61 U	**1.1**	0.67 U	**4.4**
		11/7/2017	0.61 U	**1.1**	0.67 U	0.26 U
		5/31/2018	0.61 U	**0.93 I**	0.39 U	**1.9**
		3/6/2019	0.61 U	**0.72 I**	0.39 U	**1.4**
		10/31/2019	0.35 U	0.28 U	0.22 U	**0.48 I**
		3/18/2020	0.35 U	**0.35 I**	0.22 U	**0.92 I**
		9/15/2020	NS	0.28 U	0.22 U	0.41 U
		3/16/2021	NS	0.28 U	0.22 U	**0.46 I**
		9/13/2021	NS	0.28 U	0.22 U	0.41 U
		4/21/2022	NS	0.53 U	0.73 U	0.71 U
		3/9/2023	NS	0.53 U	0.73 U	0.71 U
MLPV-IW0032	30 to 40	5/31/2012	0.26 U	**1.7**	**2.2**	**2.4**
		9/26/2012	**21**	**121**	**11.2**	**35.7**
		8/19/2013	**130**	**302**	**44.5**	**77.8**
		10/24/2013	**24.5**	**99**	**10.1**	**35**
		1/27/2014	**41.1**	**195**	**9.3**	**0.44 I**
		4/16/2014	**21.1**	**226**	**13.9**	**1.8 I**
		7/21/2014	**52**	**280**	**14**	**1**
		1/20/2015	**56**	**170**	**28**	0.5 U
		7/15/2015	**6.2**	**32**	**9.3**	**4.7**
		10/6/2015	**6.3**	**45**	**12**	0.71 U
		1/12/2016	0.61 U	**7.6**	**2.8**	0.71 U
		7/13/2016	0.61 U	**33**	**8**	0.71 U
		11/7/2017	0.61 U	0.65 U	0.67 U	0.26 U
		5/31/2018	0.61 U	**0.36 I**	0.39 U	0.26 U
		3/6/2019	0.61 U	**0.74 I**	0.39 U	0.26 U
		3/18/2020	0.35 U	**0.35 I**	0.22 U	0.41 U
		11/30/2020	NS	**0.68 I**	0.22 U	**0.49 I**
		3/16/2021	NS	**0.84 I**	0.22 U	**1.6**
		9/14/2021	Not Accessible			
		4/21/2022	NS	0.75 I	0.73 U	**3.1**
		3/14/2023	NS	0.53 U	0.73 U	**1.3**

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0033	40 to 50	5/31/2012	**521**	**8270**	**492**	**3300**
		9/26/2012	**863**	**8250**	**617**	**2990**
		8/19/2013	**1290**	**6720**	**471**	**2800**
		10/24/2013	**1570**	**7880**	**601**	**3320**
		1/27/2014	**33.7**	**1300**	**88.7**	**771**
		4/16/2014	**34.6**	**2190**	**116**	**770**
		7/21/2014	**170**	**3200**	**220**	**810**
		1/20/2015	**9.9**	**370**	**39**	**280**
		7/15/2015	**2.1**	**500**	**45**	**540**
		10/6/2015	**0.84 I**	**300**	**27**	**320**
		1/12/2016	0.61 U	**72**	**8.8**	**150**
		7/13/2016	**0.64 I**	**120**	**12**	**350**
		3/7/2017	0.61 U	**100**	**17**	**470**
		11/7/2017	0.61 U	**24**	**6.3**	**68**
		5/31/2018	0.61 U	**21**	**3**	**120**
		3/6/2019	1.2 U	**46**	**6**	**400**
		10/31/2019	1.7 U	**58.4**	1.1 U	**365**
		3/18/2020	**0.44 I**	**55.9**	**9.6**	**455**
		11/30/2020	NS	**82.3**	**7.7**	**497**
		3/16/2021	NS	**49.6**	**6.3**	**471**
		9/14/2021	Not Accessible			
		4/21/2022	NS	**100**	**9.8**	**950**
		3/14/2023	NS	**57**	18 U	**560**
MLPV-IW0034	30 to 40	5/29/2012	0.26 U	**1.4**	**4.9**	**80.4**
		1/27/2014	**33.2**	**133**	**9**	**468**
		7/22/2014	**4.6**	**130**	**9.8**	**120**
		1/21/2015	**13**	**200**	**35**	**600**
		7/15/2015	0.61 U	**5.8**	**2.8**	**94**
		1/11/2016	0.61 U	**5.9**	0.67 U	**27**
		7/13/2016	0.61 U	**2.8**	**0.80 I**	**37**
		11/7/2017	0.61 U	0.65 U	0.67 U	**13**
		5/31/2018	0.61 U	**0.40 I**	0.39 U	**5.5**
		3/6/2019	0.61 U	**1.4**	0.39 U	**2.4**
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2020	NS	0.28 U	0.22 U	0.41 U
		3/15/2021	NS	**0.41 I**	0.22 U	0.41 U
		9/14/2021	NS	0.28 U	0.22 U	0.41 U
		3/15/2022	NS	**0.62 I**	0.73 U	**0.92 I**
		3/9/2023	NS	**0.54 I**	0.73 U	0.71 U
MLPV-IW0035	40 to 50	5/29/2012	1.3 U	**573**	**38.7**	**900**
		1/27/2014	3 U	**173**	**28.9**	**1350**
		7/22/2014	**8.2**	**640**	**57**	**1200**
		1/21/2015	**7.4**	**690**	**49**	**960**
		7/15/2015	1.2 U	**130**	**33**	**960**
		1/11/2016	0.61 U	**1.6**	**7.3**	**260**
		7/13/2016	0.61 U	**0.82 I**	**9.3**	**400**
		11/7/2017	0.61 U	**1.8**	**5.4**	**220**
		5/31/2018	0.61 U	**1.2**	**6.9**	**330**
		3/6/2019	0.61 U	**2.3**	**3.3**	**150**
		10/31/2019	0.86 U	0.69 U	0.55 U	**152**
		3/18/2020	0.35 U	**3.2**	**4.0**	**192**
		9/15/2020	NS	0.28 U	**3.0**	**205 L**
		3/15/2021	NS	**3.2**	**2.5**	**124**
		9/14/2021	Not Accessible			
		4/21/2022	NS	0.53 U	0.73 U	0.71 U
		3/9/2023	NS	**2.1**	0.73 U	**78**

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
MLPV-IW0036	40 to 45	5/29/2012	0.26 U	0.26 U	0.35 U	0.22 U
		1/28/2014	0.3 U	0.33 U	0.34 U	5
		7/22/2014	0.5 U	0.65 U	0.44 U	4.5
		1/22/2015	0.48 U	0.47 I	0.37 U	6
		7/15/2015	0.61 U	0.65 U	0.67 U	42
		1/12/2016	0.61 U	0.65 U	0.67 U	42
		7/13/2016	0.61 U	0.65 U	0.67 U	170
		11/7/2017	0.61 U	0.65 U	0.67 U	87
		5/30/2018	0.61 U	0.32 U	0.63 I	80
		3/6/2019	0.61 U	0.41 I	0.39 U	32
		10/31/2019	0.35 U	0.28 U	0.33 I	9.1
		3/18/2020	0.35 U	0.34 I	0.33 I	22.1
		9/15/2020	NS	0.28 U	0.22 U	5.5
		3/15/2021	NS	0.47 I	0.22 U	24.9
		9/14/2021	NS	0.60 I	0.22 U	32.3
		3/16/2022	NS	1.4	0.73 U	44
		3/13/2023	NS	0.88 I	0.73 U	54
		4/26/2023	NS	0.84 I	0.73 U	29
MLPV-IW0037	40 to 50	5/29/2012	1.3 U	835	19.1	926
		1/27/2014	0.3 U	151	1.5	210
		7/22/2014	1 U	340	4	520
		1/21/2015	2.4 U	560	9.3	600
		7/15/2015	1.2 U	550	8.2	970
		1/12/2016	3.1 U	390	7	550
		7/11/2016	1.2 U	300	3.9	890
		11/7/2017	0.61 U	150	1.2	280
		5/31/2018	0.61 U	94	1.2 I	360
		3/6/2019	0.61 U	160	0.89 I	270
		10/31/2019	0.69 U	135	0.44 U	178
		3/18/2020	0.86 U	132	0.67 I	245
		9/15/2020	NS	55.4	0.52 I	208 L
		3/16/2021	NS	138	0.71 I	269
		9/13/2021	NS	25.1	0.47 I	99.3
		4/21/2022	NS	100	0.73 U	200
		3/9/2023	NS	79 Q	0.73 U	170 Q
MLPV-IW0038	30 to 40	5/29/2012	95.3	217	19.9	446
		9/26/2012	764	863	55.9	364
		8/19/2013	386	1010	55.8	263
		10/24/2013	121	617	34.2	93.1
		1/27/2014	45	235	27	42.3
		4/16/2014	30.3	136	6.9	1.6 I
		7/22/2014	5.3	29	5.7	0.5 U
		1/21/2015	0.48 U	3.6	0.93 I	4.6
		7/14/2015	0.61 U	2.9	0.67 U	0.71 U
		10/6/2015	0.61 U	2.3	0.67 U	0.71 U
		1/12/2016	0.61 U	1.2	0.67 U	0.71 U
		7/13/2016	0.61 U	2.8	0.67 U	0.71 U
		11/7/2017	0.61 U	0.78 I	0.67 U	0.26 U
		5/31/2018	0.61 U	0.48 I	0.39 U	0.26 U
		3/6/2019	0.61 U	0.94 I	0.39 U	1.1
		3/18/2020	0.35 U	0.54 I	0.22 U	0.41 U
		3/15/2021	NS	1.2	0.22 U	2.3
		3/16/2022	NS	0.63 I	0.73 U	1.1
		3/10/2023	NS	150 Q	4.4	270 Q
		4/26/2023	NS	0.85 I	0.73 U	1.8

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
MLPV-IW0039	40 to 50	5/29/2012	8980	13200	648	6200
		9/26/2012	6650	10000	502	3070
		8/19/2013	3720	6480	269	1520
		10/24/2013	2850	5880	278	1190
		1/27/2014	683	3470	147	841
		4/16/2014	549	3060	116	955
		7/22/2014	430	2200	130	640
		1/21/2015	5.8	270	17	220
		7/14/2015	3.3	180	13	250 J3
		10/6/2015	2.7	140	9.6	120
		1/12/2016	2.7	160	10	130
		7/13/2016	3.3	82	6.9	38
		3/7/2017	2.6	200	11	250
		11/7/2017	1.5	92	5.1	55
		5/31/2018	1.3 I	45	3.2	55
		3/6/2019	0.83 I	160	7.1	250
		10/31/2019	0.86 U	198	4.6	241
		3/18/2020	0.86 U	128	4.4	228
		9/15/2020	NS	92.1	3.9	276 L
		3/15/2021	NS	161	6.5	236
		9/14/2021	NS	76.9	3.3	191
		3/16/2022	NS	140	5.4	160
		3/10/2023	NS	0.53 U	0.73 U	0.71 U
		4/26/2023	NS	150	4.2 I	270
MLPV-IW0040	30 to 40	5/29/2012	1.9	90.9	59.7	3410
		9/26/2012	1300	2450	161	1210
		8/19/2013	157	643	44.8	464
		10/24/2013	5.5	88.2	6.1	331
		1/27/2014	68.3	189	4.2 I	18
		4/16/2014	20.1	78.2	7	56.7
		7/23/2014	13	9.3	1.6	8.2
		1/22/2015	0.89 I	5.6	0.37 U	0.5 U
		7/15/2015	0.61 U	0.68 I	0.67 U	0.71 U
		10/6/2015	0.61 U	0.65 U	0.67 U	0.71 U
		1/11/2016	0.61 U	0.91 I	0.67 U	0.71 U
		7/13/2016	0.61 U	0.65 U	0.67 U	0.71 U
		11/7/2017	0.61 U	0.65 U	0.67 U	0.26 U
		5/30/2018	0.61 U	0.58 I	0.39 U	0.36 I
		3/5/2019	0.61 U	0.32 U	0.39 U	0.26 U
		3/18/2020	0.35 U	0.39 I	0.22 U	0.41 U
		3/15/2021	NS	0.50 I	0.22 U	0.41 U
		9/14/2021	Not Accessible			
		4/21/2022	NS	0.64 I	0.73 U	0.71 U
		3/9/2023	NS	0.93 I	0.73 U	0.72 I
MLPV-IW0041	40 to 50	5/29/2012	15300	14600	737	5260
		9/26/2012	8500	11000	556	3880
		8/19/2013	1380	5380	277	4150
		10/24/2013	2610	9250	559	6370
		1/27/2014	19.3 I	1570	56.5	993
		4/16/2014	685	2660	114	2030
		7/23/2014	450	2400	120	1900
		1/22/2015	1	14	2.6	150
		7/15/2015	0.61 U	89	4.5	290
		10/6/2015	0.61 U	55	5.5	240
		1/11/2016	0.61 U	80	6.3	360
		7/13/2016	0.61 U	20	4.2	230
		3/7/2017	0.61 U	63	3.8	330
		11/7/2017	0.61 U	140	5.2	300
		5/30/2018	0.61 U	9.7	3.9	230
		3/5/2019	0.65 I	76	2.6	260
		10/31/2019	0.39 I	14.0	2.3	166
		3/18/2020	0.35 U	106	3.3	183

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
MLPV-IW0041 continued	40 to 50	9/15/2020	NS	**4.0**	**1.4**	**201 L**
		3/16/2021	NS	**113**	**3.3**	**259**
		9/14/2021	NS	**1.9 I**	**0.92 I**	**146**
		3/15/2022	NS	**26**	**2.2**	**150**
		3/9/2023	NS	**53**	**1.4**	**130**
MLPV-IW0042	30 to 40	5/29/2012	0.26 U	0.26 U	**0.92 I**	**571**
		9/26/2012	0.31 U	0.24 U	**0.63 I**	**97.9**
		8/19/2013	0.31 U	**1**	0.23 U	**5.9**
		10/24/2013	0.31 U	**1.9**	0.23 U	**6**
		1/28/2014	**1.5**	**2.4**	0.34 U	**2.2**
		4/16/2014	0.3 U	**1.1**	0.34 U	**5.6**
		7/22/2014	0.5 U	**4.5**	0.44 U	**7.9**
		1/20/2015	0.48 U	**20**	**0.45 I**	**4.4**
		7/14/2015	0.61 U	**6.4**	0.67 U	**1.7**
		10/6/2015	0.61 U	**6**	0.67 U	**0.81 I**
		1/11/2016	0.61 U	**11**	0.67 U	**1.4**
		7/13/2016	0.61 U	**2.4**	0.67 U	0.71 U
		11/7/2017	0.61 U	**0.86 I**	0.67 U	0.26 U
		5/30/2018	0.61 U	**0.32 I**	0.39 U	**0.34 I**
		3/6/2019	0.61 U	0.32 U	0.39 U	0.26 U
		3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/16/2021	NS	**1.2**	0.22 U	**0.42 I**
		9/14/2021	Well submerged			
		3/16/2022	NS	**0.63 I**	0.73 U	**1.2**
		3/14/2023	NS	0.53 U	0.73 U	0.71 U
MLPV-IW0043	40 to 50	5/29/2012	**6620**	**7320**	**348**	**2540**
		9/26/2012	**2900**	**2910**	**101**	**887**
		8/19/2013	**3400**	**2790**	**128**	**828**
		10/24/2013	**698**	**1310**	**41.6**	**248**
		1/28/2014	**274**	**531**	**24.4**	**190**
		4/16/2014	**56.2**	**289**	**9**	**117**
		7/22/2014	**11**	**1800**	**51**	**340**
		1/20/2015	4.8 U	**1400**	**52**	**360**
		7/14/2015	1.2 U	**190**	**7.6**	**200**
		10/6/2015	0.61 U	**140**	**6.5**	**180**
		1/11/2016	0.61 U	**50**	**2.7**	**140**
		7/13/2016	0.61 U	**150**	**2.4**	**180**
		3/7/2017	0.61 U	**190**	**4.9**	**330**
		11/7/2017	0.61 U	**42**	**1.9**	**120**
		5/30/2018	0.61 U	**31**	**0.96 I**	**140**
		3/6/2019	**0.77 I**	**100**	**2.7**	**150**
		10/31/2019	0.86 U	**149**	**2.4 I**	**155**
		3/18/2020	**0.97 I**	**193**	**3.0**	**131**
		9/15/2020	NS	**73.2**	**2.4**	**146**
		3/16/2021	NS	**249**	**3.7 I**	**180**
		9/14/2021	Well submerged			
		3/16/2022	NS	**98**	**2.6**	**88**
		3/14/2023	NS	**170**	3.7 U	**280**

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
MLPV-IW0044	40 to 50	7/6/2012	0.26 U	1240	90.2 I	4960
		1/28/2014	1.5 U	60.5	4 I	686
		7/23/2014	5 U	140	7.8 I	2300
		1/20/2015	12 U	67	14 I	1700
		7/15/2015	6.1 U	10	6.7 U	2100
		1/12/2016	1.2 U	4.3	3.3	600
		7/12/2016	3.1 U	39	18	1700
		11/7/2017	6.1 U	18	14	1500
		5/30/2018	1.2 U	7.5	6.4	810
		3/5/2019	1.2 U	3.7	2.9 I	510
		10/31/2019	0.35 U	2.9	1.8	458
		3/18/2020	0.35 U	6.9	2.2	325
		11/30/2020	NS	2.8	0.88 I	307
		3/16/2021	NS	3.4	1.0	249
		9/14/2021	Not Accessible			
		4/21/2022	NS	2.5	0.73 U	200
		3/14/2023	NS	22	7.3 U	620
MLPV-IW0045	40 to 50	7/6/2012	115	10300	520	7360
		1/27/2014	192	2360	164	2050
		7/22/2014	600	5200	330	4000
		1/20/2015	5.7	390	51	360
		7/15/2015	49	860	110	960
		1/12/2016	1.2 U	79	61	570
		7/12/2016	0.61 U	35	41	180
		11/7/2017	0.61 U	7.7	7.9	200
		5/30/2018	0.61 U	2.4	10	270
		3/6/2019	0.61 U	3.2	6.8	170
		10/31/2019	0.35 U	4.8	3.6	97.2
		3/18/2020	0.35 U	20.0	5.7	207
		9/15/2020	NS	6.4	4.2	205 L
		3/16/2021	NS	75.8	7.8	295
		9/14/2021	Not Accessible			
		4/21/2022	NS	6.3	0.95 I	92
		3/14/2023	NS	11	1.6	59
MLPV-SAMW0004D	45 to 50	5/29/2012	0.58 I	0.26 U	75.8	533
		1/28/2014	0.34 U	0.30 U	29.7	156
		7/22/2014	0.70 I	0.50 U	5.5	310
		1/22/2015	0.37 U	0.48 U	0.41 U	4.9
		7/15/2015	0.67 U	0.61 U	2.5	26.0
		1/12/2016	0.67 U	0.61 U	0.75 I	6.2
		7/13/2016	0.67 U	0.61 U	0.65 U	0.71 U
		11/7/2017	0.67 U	0.61 U	0.74 I	5.1
		5/30/2018	0.61 U	0.32 U	0.45 I	6.6
		3/6/2019	0.61 U	0.55 I	0.39 U	4.3
		10/31/2019	0.35 U	0.32 I	0.37 I	2.6
		3/18/2020	0.35 U	3.1	0.58 I	22.2
		9/15/2020	NS	0.28 U	0.60	4.2
		3/15/2021	NS	2.4	0.59	14.6
		9/14/2021	NS	0.65 I	0.67 I	5.0
		3/16/2022	NS	2.3	0.94 I	17
		3/13/2023	NS	1.9	1.2	18

Table 3-2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-SAMW0004I	35 to 40	5/29/2012	0.26 U	0.26 U	**0.65 I**	**6.8**
		1/28/2014	0.30 U	0.33 U	0.34 U	**4.0**
		7/22/2014	0.50 U	0.65 U	0.44 U	**4.4**
		1/22/2015	0.48 U	0.41 U	0.37 U	**5.7**
		7/15/2015	0.61 U	0.65 U	0.67 U	**9.7**
		1/12/2016	0.61 U	0.65 U	0.67 U	**14.0**
		7/13/2016	0.61 U	0.65 U	0.67 U	**25.0**
		11/7/2017	0.61 U	0.65 U	0.67 U	**21.0**
		5/30/2018	0.61 U	0.32 U	0.39 U	**1.6**
		3/6/2019	0.61 U	0.32 U	0.39 U	**5.6**
		10/31/2019	0.35 U	**0.40 I**	0.22 U	**15.9**
		3/18/2020	0.35 U	0.28 U	0.22 U	**13.8**
		9/15/2020	NS	0.28 U	0.22 U	**11.3**
		3/15/2021	NS	**0.61 I**	**0.41 I**	**19.4**
		9/14/2021	NS	0.28 U	0.22 U	**15.5**
		3/15/2022	NS	**0.56 I**	0.73 U	**15**
		3/13/2023	NS	**0.74 I**	0.73 U	**12**

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
bls = below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
J = An estimated value
L = Value exceeds calibration range
U = The analyte was not detected
µg/L = micrograms per liter
NS = Not sampled

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0006IR	28 to 33	2/25/2003	2 U	**12.8**	**5.1**	**65.7**
		2/4/2004	2 U	**11.9**	**4.5**	**53.7**
		8/10/2004	2 U	**7.9**	**2.6**	**62.8**
		5/4/2005	0.50 U	**6.3**	**2.4**	**44.3**
		11/1/2005	0.50 U	**2.9**	**1.2**	**35.0**
		5/16/2006	0.50 U	**1.1**	0.50 U	**15.3**
		11/8/2006	0.50 U	**2.7**	**0.55 I**	**31.0**
		5/16/2007	0.50 U	**3.8**	0.50 U	**34.8**
		11/13/2007	0.38 U	0.28 U	0.20 U	**9.5**
		5/27/2008	0.32 U	**2.8**	**0.48 I**	**32.1**
		11/13/2008	0.32 U	0.2 U	0.45 U	**8.9**
		5/19/2009	0.32 U	**1.5**	0.45 U	**23.3**
		11/10/2009	0.15 U	**0.67 I**	0.13 U	**9.8**
		5/10/2010	0.12 U	0.083 U	0.39 U	**4.1**
		11/8/2010	0.16 U	0.36 U	0.12 U	**3.2**
		5/11/2011	0.16 U	0.36 U	0.12 U	**4.7**
		11/11/2011	0.16 U	0.36 U	0.12 U	**2.0**
		11/28/2012	0.16 U	0.36 U	0.12 U	**1.1**
		5/13/2013	0.16 U,J	0.36 U,J	0.12 U,J	**0.76 I**
		11/17/2014	0.50 U	0.50 U	0.50 U	**0.99 I**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U
		9/16/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/16/2021	0.89 U	**0.77 I**	0.73 U	**3.7**
		9/15/2021	0.89 U	0.53 U	0.73 U	**1.8**
		3/15/2022	0.89 U	**0.59 I**	0.73 U	**1.6**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-IW0028I	28 to 33	2/25/2003	2 U	**5.9**	**1.4 J**	**53.5**
		2/4/2004	2 U	**6**	**1.4 J**	**34.3**
		8/10/2004	2 U	2 U	2 U	1 U
		5/4/2005	0.50 U	**3.2**	**1.3**	**25.3**
		10/28/2005	0.50 U	**6.1**	**1.3**	**30.5**
		5/16/2006	0.50 U	**2.6**	**1**	**31.5**
		11/8/2006	0.50 U	**3.1**	**1.1**	**33.3**
		5/16/2007	0.50 U	**2.0**	**1.0**	**18.9**
		11/13/2007	0.38 U	0.28 U	0.20 U	**24.1**
		5/27/2008	0.32 U	**2.9**	**0.84 I**	**28.8**
		11/12/2008	0.32 U	**1.3**	**0.77 I**	**25.6**
		5/18/2009	0.32 U	**1.5**	**0.79 I**	**22.0**
		11/6/2009	0.15 U	**0.39 I**	0.13 U	**16**
		5/18/2010	0.12 U	**0.45 I**	0.39 U	**16**
		11/8/2010	NS	NS	NS	NS
		5/11/2011	0.16 U	0.36 U	**0.32 I**	**14**
		11/11/2011	NS	NS	NS	NS
		11/28/2012	0.16 U	0.36 U	**0.25 I**	**11**
		5/13/2013	0.16 U	0.36 U	**0.19 I**	**9.0**
		11/17/2014	0.50 U	0.50 U	0.50 U	**10**
		5/26/2016	0.50 U	0.50 U	0.50 U	**4.0**
		10/4/2018	0.61 U	0.32 U	0.39 U	**5.2**
		6/2/2020	0.35 U	0.28 U	0.22 U	**6.0**
		3/16/2021	0.89 U	0.53 U	0.73 U	0.71 U
		9/15/2021	0.89 U	0.53 U	0.73 U	**2.3**
		3/15/2022	0.89 U	0.53 U	0.73 U	0.71 U
		3/15/2023	0.89 U	0.53 U	0.73 U	0.71 U

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0046	35 to 45	11/17/2014	0.50 U	0.50 U	0.50 U	**1.8**
		5/26/2016	0.50 U	0.50 U	0.50 U	**8.1**
		10/4/2018	0.61 U	**2.1**	0.39 U	**13**
		6/2/2020	0.35 U	**2.4**	0.22 U	**18.0**
		3/16/2021	0.89 U	**2.3**	0.73 U	**13.0**
		9/15/2021	0.89 U	**2.7**	0.73 U	**10.0**
		3/15/2022	0.89 U	**2.0**	0.73 U	**7.4**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	**1.8**	0.73 U	**7.0**
MLPV-ASMW0004	35 to 40	5/28/2007	0.5 U	**12.2**	0.5 U	0.5 U
		9/6/2007	0.38 U	**2.4**	0.2 U	0.34 U
		12/31/2007	0.38 U	**7.7**	0.2 U	**0.39 I**
		3/31/2008	0.38 U	**8**	0.2 U	**0.65 I**
		6/27/2008	0.32 U	**7.5**	0.45 U	0.3 U
		9/22/2008	0.32 U	**48.5**	**1.6**	**41.8**
		12/18/2008	0.32 U	**48.4**	**0.73 I**	**8.4**
		3/5/2009	0.32 U	**37.7**	**0.57 I**	**1.8**
		9/22/2009	0.32 U	**9.9**	0.45 U	0.3 U
		3/24/2010	0.24 U	**1**	0.34 U	0.28 U
		10/1/2010	0.24 U	**5**	0.34 U	0.28 U
		3/15/2011	0.26 U	**0.45 I**	0.35 U	0.22 U
		9/26/2011	0.26 U	**5.9**	0.35 U	0.22 U
		3/16/2012	0.26 U	**40.8**	0.35 U	0.22 U
		8/28/2012	0.26 U	**18.8**	0.35 U	0.22 U
		3/18/2013	0.31 U	**87.3**	**0.79 I**	0.44 U
		10/25/2013	0.31 U	**119**	**1.8**	**0.90 I**
		1/27/2014	0.3 U	**73.7**	**1.5**	**1.2**
		4/17/2014	0.3 U	**45**	**0.54 I**	**5.1**
		7/22/2014	0.5 U	**1.3**	0.44 U	0.5 U
		1/19/2015	0.48 U	**26**	0.37 U	**0.78 I**
		4/6/2015	0.61 U	**12**	0.67 U	0.71 U
		7/14/2015	0.61 U	**12**	0.67 U	0.71 U
		1/11/2016	0.61 U	**17**	0.67 U	0.71 U
		7/12/2016	0.61 U	**37**	**1.1**	0.71 U
		3/6/2017	1.2 U	**200**	**7.8**	**500**
		11/8/2017	0.61 U	**53**	**3.2**	**1.7**
		5/30/2018	0.61 U	**16**	**0.76 I**	**1.7**
		11/15/2018	0.61 U	**9.3**	0.39 U	**1.9**
		3/11/2019	0.61 U	**0.98 I**	0.39 U	**0.41 I**
		11/1/2019	0.35 U	**8.4**	**0.52 I**	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/16/2020	0.35 U	0.28 U	**0.76 I**	**8.7**
		3/17/2021	0.35 U	0.28 U	**0.30 I**	0.41 U
		9/15/2021	0.35 U	**11.4**	**8.3**	**926**
		11/17/2021	4.4 U	**8.0**	**8.0**	**500**
		3/15/2022	2.2 U	**4.3**	**4.3**	**290**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-ASMW0005	35 to 40	5/28/2007	0.5 U	0.5 U	0.5 U	0.5 U
		9/6/2007	0.38 U	**0.35 I**	0.2 U	0.34 U
		12/31/2007	0.38 U	0.28 U	0.2 U	0.34 U
		3/31/2008	0.38 U	**0.28 I**	0.2 U	0.34 U
		6/27/2008	0.32 U	**0.32 I**	0.45 U	0.3 U
		9/22/2008	0.32 U	**1.6**	0.45 U	0.30 U
		12/18/2008	0.32 U	**0.69 I**	0.45 U	**0.44 I**
		3/5/2009	0.32 U	0.2 U	0.45 U	0.3 U
		9/22/2009	0.32 U	**1.4**	0.45 U	0.3 U
		3/24/2010	0.24 U	**0.48 I**	0.34 U	0.28 U
		10/1/2010	0.24 U	**5.6**	0.34 U	0.28 U
		3/15/2011	0.26 U	**0.67 I**	0.35 U	0.22 U
		9/23/2011	0.26 U	**1.6**	0.35 U	0.22 U
		3/16/2012	0.26 U	**5.3**	0.35 U	0.22 U
		8/28/2012	0.26 U	**2.4**	0.35 U	0.22 U
		3/18/2013	0.31 U	**7.3**	0.23 U	0.44 U
		10/25/2013	0.31 U	**81.3**	**2.7**	**50.4**
		1/27/2014	0.3 U	**52.1**	**1.6**	**27.5**
		4/17/2014	0.3 U	**62.3**	**1.5**	**44.2**
		7/22/2014	0.5 U	**25**	**0.68 I**	**21**
		10/27/2014	0.50 U	**14**	0.44 U	0.50 U
		1/19/2015	0.48 U	**26**	**0.60 I**	0.5 U
		4/6/2015	0.61 U	**99**	**1.1**	0.71 U
		7/14/2015	0.61 U	**50**	**0.95 I**	0.71 U
		1/11/2016	0.61 U	**78**	**1.8**	0.71 U
		7/12/2016	0.61 U	**28**	**0.68 I**	0.71 U
		3/6/2017	0.61 U	**140**	**7.9**	**3.9**
		11/8/2017	0.61 U	**4.1**	0.67 U	**0.81 I**
		5/30/2018	0.61 U	**1.2**	0.39 U	0.26 U
		11/16/2018	0.61 U	0.32 U	0.39 U	0.26 U
		3/11/2019	0.61 U	0.32 U	0.39 U	0.26 U
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/16/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	**1.1**	0.22 U	**3.0**
		3/14/2022	0.89 U	**2.6**	0.73 U	**36**
		3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-ASMW0006	35 to 40	5/28/2007	0.5 U	0.5 U	0.5 U	0.5 U
		9/6/2007	0.38 U	**3.5**	0.2 U	**1.1**
		12/31/2007	0.38 U	**1.3**	0.2 U	**1**
		3/31/2008	0.38 U	**1**	0.2 U	**0.82 I**
		6/27/2008	0.32 U	**8.8**	0.45 U	**3.4**
		9/22/2008	0.32 U	**35.1**	**0.64**	**5.2**
		12/18/2008	0.32 U	**37.6**	**0.67 I**	**8.2**
		3/5/2009	0.32 U	**18.1**	**0.56 I**	**13.6**
		9/22/2009	0.32 U	**10.7**	0.45 U	**3.4**
		3/24/2010	0.24 U	**33**	**0.50 I**	**1.5**
		10/1/2010	0.24 U	**12.3**	0.34 U	**1.1**
		3/15/2011	0.26 U	**15.3**	**0.37 I**	**2**
		9/23/2011	0.26 U	**2.7**	0.35 U	0.22 U
		3/16/2012	0.26 U	**24.2**	**0.52 I**	**2.1**
		8/24/2012	0.26 U	**113**	**4.4**	**1.5**
		3/18/2013	0.63 U	**137**	**8.6**	**9.9**
		10/25/2013	0.63 U	**490**	**22.3**	**833**
		1/27/2014	3 U	**493**	**18.9**	**902**
		4/17/2014	3 U	**569**	**25.2**	**1350**
		6/20/2014	1.9 U	**380**	**18**	**820**
		7/22/2014	1 U	**290**	**10**	**690**
		10/27/2014	0.50 U	**1.1**	0.44 U	**2.1**
		1/19/2015	0.48 U	**0.85 I**	0.37 U	**2.2**

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-ASMW0006 (continued)	35 to 40	4/6/2015	0.61 U	**0.67 I**	0.67 U	**4.7**
		7/14/2015	0.61 U	**4.3**	0.67 U	**1.3**
		1/11/2016	0.61 U	0.65 U	0.67 U	**1.2**
		7/12/2016	0.61 U	**30**	**4.2**	**4.6**
		3/6/2017	0.61 U	**180**	**13**	**120**
		11/8/2017	**18**	**1100**	**64**	**210**
		2/20/2018	1.2 U	**100**	**5.5**	**67**
		5/29/2018	0.61 U	**8.7**	**3.6**	**28**
		11/16/2018	0.61 U	**0.69 I**	**1 I**	**5**
		3/11/2019	0.61 U	**0.59 I**	**1.6 I**	**1.9**
		11/1/2019	0.35 U	0.28 U	0.22 U	**0.47 I**
		3/19/2020	0.35 U	0.28 U	0.22 U	**1.5**
		9/16/2020	0.35 U	0.28 U	0.22 U	**1.7**
		3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		3/14/2022	0.89 U	**0.62 I**	0.73 U	**96**
		3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-IW0031	25 to 35	9/27/2011	0.26 U	**1.8**	**0.70 I**	**115**
		3/16/2012	0.26 U	**2**	**0.64 I**	**99.2**
		8/24/2012	0.26 U	**2.2**	**0.77 I**	**152**
		3/18/2013	0.31 U	**1.5**	**0.51 I**	**86.5**
		10/25/2013	0.31 U	**1.4**	**0.50 I**	**71**
		4/17/2014	0.3 U	**1.5**	**0.66 I**	**79.5**
		10/27/2014	0.50 U	**1.4**	**0.59 I**	**83**
		1/20/2015	0.48 U	**1.4**	**0.49 I**	**46**
		7/14/2015	0.61 U	**1.3**	0.67 U	**51**
		1/11/2016	0.61 U	**1.4**	0.67 U	**42**
		5/31/2016	0.61 U	**1.8**	0.67 U	**32**
		3/6/2017	0.61 U	0.65 U	0.67 U	**5.8**
		8/9/2017	0.61 U	0.65 U	0.67 U	**7.4**
		11/8/2017	0.61 U	0.65 U	0.67 U	**1.9**
		2/20/2018	0.61 U	0.32 U	0.39 U	0.26 U
		5/29/2018	0.61 U	**0.36 I**	0.39 U	**1.6**
		11/16/2018	0.61 U	0.32 U	0.39 U	0.26 U
		3/12/2019	0.61 U	0.32 U	0.39 U	0.26 U
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2020	0.35 U	0.28 U	0.22 U	**1.9**
		3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	**3.4**
		3/15/2022	0.89 U	**0.57 I**	0.73 U	**6.1**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	**5.6**
MLPV-IW0057	40 to 50	1/19/2015	2.4 U	**360**	**12**	**800**
		7/14/2015	1.2 U	**300**	**14**	**1100**
		1/11/2016	1.2 U	**250**	**13**	**960**
		7/11/2016	3.1 U	**220**	**12**	**720**
		3/6/2017	3.1 U	**110**	**10**	**1100**
		11/8/2017	1.2 U	**48**	**8.1**	**660**
		5/29/2018	1.2 U	**84**	**8.8**	**970**
		11/14/2018	6.1 U	**45**	**8.3 I**	**1000**
		3/12/2019	3.1 U	**61**	**6.2 I**	**950**
		11/1/2019	0.35 U	**23.8**	**6.9**	**920**
		3/19/2020	0.35 U	**13.2**	**6.8**	**638**
		9/16/2020	1.7 U	**15.8**	**3.7 I**	**935**
		3/17/2021	0.35 U	**14.4**	**4.9**	**806**
		9/14/2021	3.5 U	**8.8 I**	2.2 U	**457**
		3/14/2022	2.2 U	**7.5**	**2.5**	**350**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	8.9 U	5.3 U	7.3 U	**280**

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0058	45 to 50	1/19/2015	2.4 U	**440**	**20**	**420**
		7/17/2015	6.1 U	**880**	**52**	**940**
		1/11/2016	6.1 U	**1500**	**60**	**1700**
		7/11/2016	0.61 U	**210**	**15**	**570**
		3/6/2017	0.61 U	**44**	**2.2**	**150**
		11/8/2017	0.61 U	**12**	**0.77 I**	**86**
		5/29/2018	0.61 U	**21**	**1.1 I**	**140**
		11/14/2018	0.61 U	**12**	**0.82 I**	**120**
		3/12/2019	0.61 U	**9.7**	**0.60 I**	**110**
		11/1/2019	0.35 U	**6.5**	0.22 U	**77.1**
		3/19/2020	0.35 U	**7.9**	**0.54 I**	**65.9**
		9/16/2020	0.35 U	**6.1**	0.22 U	**70.0**
		3/17/2021	0.35 U	**10.8**	**0.70 I**	**107**
		9/14/2021	0.69 U	**5.5**	0.44 U	**101**
		3/14/2022	0.89 U	**9.4**	**1.1**	**88**
		3/9/2023	4.5 U	**5.7**	3.7 U	**90**
MLPV-IW0059	45 to 50	1/19/2015	0.48 U	**51**	**5.4**	**92**
		7/14/2015	0.61 U	**510**	**35**	**770**
		1/11/2016	0.61 U	**250**	**30**	**400**
		7/11/2016	6.1 U	**1400**	**96**	**2300**
		3/6/2017	6.1 U	**3000**	**200**	**4000**
		11/8/2017	1.2 U	**2.4**	**54**	**600**
		5/29/2018	3.1 U	**17**	**110**	**1200**
		11/16/2018	0.61 U	**0.74 I**	**45**	**170**
		3/12/2019	0.61 U	**2.5**	**6.8**	**45**
		10/31/2019	0.35 U	**0.38 I**	**2.0**	**6.9**
		3/19/2020	0.35 U	**0.76 I**	**1.5**	**34.6**
		9/16/2020	0.35 U	0.28 U	**1.2**	**39.8**
		3/17/2021	0.35 U	**0.73 I**	**1.3**	**46.1**
		9/14/2021	0.35 U	0.28 U	0.22 U	**4.4**
		3/14/2022	0.89 U	**0.73 I**	**1.1**	**37**
		3/9/2023	0.89 U	0.53 U	0.73 U	**8.4**
MLPV-IW0060	40 to 50	1/19/2015	0.48 U	**2.3**	**0.41 I**	0.5 U
		4/6/2015	0.61 U	**1.4**	0.67 U	0.71 U
		7/14/2015	0.61 U	**1.2**	0.67 U	**0.79 I**
		1/11/2016	0.61 U	**0.75 I**	0.67 U	0.71 U
		7/13/2016	0.61 U	**68**	**6.1**	0.71 U
		3/6/2017	0.61 U	**120**	**16**	**1.6**
		11/8/2017	**36**	**2500**	**190**	**740**
		2/20/2018	**3.1**	**240**	**15**	**9.4**
		5/29/2018	**8**	**420**	**43**	**4.8**
		11/15/2018	0.61 U	**18**	**9.3**	**2.8**
		3/11/2019	0.61 U	**3.8**	**2.4**	**2.5**
		11/1/2019	0.35 U	**0.82 I**	0.22 U	**0.90 I**
		3/19/2020	0.35 U	**0.69 I**	0.22 U	**1.1**
		9/16/2020	0.35 U	0.28 U	0.22 U	**1.0**
		3/17/2021	0.35 U	0.28 U	0.22 U	**1.3**
		9/15/2021	0.35 U	0.28 U	0.22 U	**0.90 I**
		3/14/2022	0.89 U	**1.1**	**2.2**	**88**
		3/9/2023	0.89 U	**0.88 I**	0.73 U	**4.6**

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0061	35 to 40	1/18/2016	0.61 U	**0.75 I**	0.67 U	**59**
		3/28/2016	0.61 U	0.65 U	0.67 U	**47**
		5/31/2016	0.61 U	0.65 U	0.67 U	**48**
		3/7/2017	0.61 U	0.65 U	0.67 U	**53**
		8/9/2017	0.61 U	0.65 U	0.67 U	**38**
		11/8/2017	0.61 U	0.65 U	0.67 U	**41**
		2/20/2018	0.61 U	**0.35 I**	0.39 U	**29**
		5/30/2018	0.61 U	**0.52 I**	0.39 U	**37**
		11/14/2018	0.61 U	0.32 U	0.39 U	**24**
		3/12/2019	0.61 U	**0.57 I**	0.39 U	**25**
		10/31/2019	0.35 U	0.28 U	0.22 U	**20.6**
		3/19/2020	0.35 U	**0.46 I**	0.22 U	**16.6**
		9/16/2020	0.35 U	0.28 U	0.22 U	**18.4**
		3/16/2021	0.35 U	**0.50 I**	0.22 U	**15.7**
		9/13/2021	0.35 U	0.28 U	0.22 U	**13.0**
		3/15/2022	0.89 U	**0.63 I**	0.73 U	**13.0**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	**0.58 I**	0.73 U	**8.7**
MLPV-IW0062	40 to 45	1/18/2016	1.2 U	**53**	1.3 U	**730**
		3/28/2016	0.61 U	**39**	**0.89 I**	**540**
		5/31/2016	0.61 U	**37**	**0.92 I**	**480**
		3/7/2017	1.2 U	**25**	1.3 U	**790**
		8/9/2017	3.1 U	**21**	3.4 U	**560**
		11/8/2017	1.2 U	**16**	1.3 U	**800**
		2/20/2018	3.1 U	**12**	1.9 U	**530**
		5/30/2018	1.2 U	**11**	0.78 U	**1100**
		11/14/2018	6.1 U	**7.3 I**	3.9 U	**920**
		3/12/2019	3.1 U	**7.8**	1.9 U	**1000**
		10/31/2019	0.35 U	**5.0**	**0.57 I**	**834**
		3/19/2020	0.35 U	**4.2**	**0.55 I**	**593**
		9/16/2020	0.35 U	**3.2**	**0.36 I**	**543**
		3/16/2021	0.35 U	**4.3**	**0.48 I**	**430**
		9/13/2021	0.35 U	**3.9**	0.22 U	**240**
		3/15/2022	0.89 U	**3.6**	0.73 U	**170**
		3/8/2023	0.89 U	0.53 U	0.73 U	**34**
		4/26/2023	4.5 U	2.7 U	3.7 U	**120**
MLPV-IW0063	35 to 40	1/18/2016	0.61 U	**18**	**0.99 I**	**260**
		3/28/2016	0.61 U	**4.3**	0.67 U	**38**
		5/31/2016	0.61 U	**15**	**1.1**	**180**
		3/7/2017	0.61 U	**6.9**	0.67 U	**150**
		8/9/2017	0.61 U	**12**	**0.82 I**	**180**
		11/8/2017	0.61 U	**3.1**	0.67 U	**2.3**
		2/20/2018	0.61 U	**2.9**	0.39 U	**4.7**
		5/29/2018	0.61 U	**1.2**	0.39 U	**6.1**
		11/14/2018	0.61 U	**1.6**	0.39 U	**3.8**
		3/11/2019	0.61 U	**0.96 I**	0.39 U	**0.59 I**
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	**0.59 I**	0.22 U	**0.86 I**
		9/16/2020	0.35 U	**1.5**	0.22 U	**1.7 JY**
		3/17/2021	0.35 U	**1.3**	0.22 U	**1.0**
		9/14/2021	0.35 U	**4.4**	022 U	**185**
		11/17/2021	2.2 U	**3.0**	1.8 U	**190**
		3/15/2022	0.89 U	**3.3**	0.73 U	**200**
		3/8/2023	8.9 U	**7.7 I**	7.3 U	**190**

Table 3-3
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (feet bls)**	**Sample Date**				
MLPV-IW0064	40 to 45	1/18/2016	0.61 U	**12**	0.67 U	**82**
		3/28/2016	0.61 U	**9.1**	0.67 U	**82**
		5/31/2016	0.61 U	**8.8**	0.67 U,J3	**59**
		3/7/2017	0.61 U	**7.8**	0.67 U	**70**
		8/9/2017	0.61 U	**13**	0.67 U	**93**
		11/8/2017	0.61 U	**1.4**	0.67 U	**2**
		2/20/2018	0.61 U	**2.6**	0.39 U	**7.9**
		5/29/2018	0.61 U	**2.4**	0.39 U	**12**
		11/14/2018	0.61 U	**3.5**	0.39 U	**8.8**
		3/11/2019	0.61 U	**1.5**	0.39 U	**0.70 I**
		11/1/2019	0.35 U	**0.93 I**	0.22 U	0.41 U
		3/19/2020	0.35 U	**1.7**	0.22 U	**7.5**
		9/16/2020	0.35 U	**4.6**	0.22 U	**1.5**
		3/17/2021	0.35 U	**4.1**	0.22 U	**5.0**
		9/14/2021	0.35 U	**15.3**	0.22 U	**235**
		11/17/2021	4.4 U	**14**	3.6 U	**380**
		3/15/2022	4.4 U	**11**	3.6 U	**370**
		3/8/2023	22 U	13 U	18 U	**460**

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
feet bls = feet below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)

I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
J = An estimated value
L = Value exceeds calibration range
U = The analyte was not detected
µg/L = micrograms per liter
Y = Incorrect pH readings from sample received/analyzed

Table 3-4
Hot Spot 3 (OFW Area) - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area SWMU 056

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
VABRA-MW0011	25 to 35	11/10/2015	0.61 U	**24**	**5.6**	**110**
		1/11/2016	0.61 U	**1.7**	**2.7**	**11**
		7/11/2016	0.61 U	**0.83 I**	**3.1**	**6.8**
		2/20/2017	0.61 U	0.65 U	**2.3**	**3.8**
		8/9/2017	0.61 U	0.65 U	**1**	**2.6**
		2/19/2018	0.61 U	0.32 U	**0.81 I**	**1.4**
		8/6/2018	0.61 U	0.32 U	0.39 U	0.26 U
		2/18/2019	0.61 U	0.32 U	**0.44 I**	**0.49 I**
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0012	15 to 25	11/10/2015	0.61 U	0.65 U	**0.67 I**	**4.2**
		1/11/2016	0.61 U	0.65 U	0.67 U	**1.6**
		7/11/2016	0.61 U	**7**	**1.9**	**20**
		2/20/2017	0.61 U	0.65 U	**0.81 I**	**1.7**
		8/9/2017	0.61 U	**2.5**	**1.1**	**7.2**
		2/19/2018	0.61 U	0.32 U	0.39 U	0.26 U
		8/6/2018	0.61 U	0.32 U	0.39 U	0.26 U
		2/18/2019	0.61 U	0.32 U	0.39 U	0.26 U
		10/31/2019	0.35 U	**0.69 I**	0.22 U	**1.0**
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0013	20 to 25	9/13/2018	0.61 U	**3**	**1.1 I**	**8.8**
		2/18/2019	0.61 U	**5.5**	**0.97 I**	**9.3**
		10/31/2019	0.35 U	**0.86 I**	**1.3**	**2.6**
		9/14/2020	0.35 U	0.28 U	**0.63**	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0014	25 to 30	9/13/2018	0.61 U	**0.45 I**	**0.76 I**	**3.5**
		2/18/2019	0.61 U	0.32 U	**0.53 I**	**0.68 I**
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
Blank cells indicate the analyte was not analyzed for that specific well and date
bls = Below land surface
FDEP = Florida Department of Environmental Protection
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
I = Analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
MW = Monitoring Well
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
SWMU = Solid Waste Management Unit
U = The analyte was not detected
µg/L = micrograms per liter
VABRA = prefix for Vehicle Assembly Building Reassessment monitoring well

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-IW0001D	50 to 55	3/19/1997	1 U	1 U	1 U	1 U	1 U
		12/18/1997	0.53 U	0.25 U	0.31 U	0.52 U	0.9 U
		10/6/1998	41 U	48 U	68 U	71 U	**88 U**
		7/17/2000	0.28 U	0.65 U	0.44 U	0.45 U	0.48 I,J
		1/21/2002	2 U	2 U	2 U	2 U	1 U
		2/25/2003	2 U	2 U	2 U	2 U	1 U
		2/4/2004	2 U	2 U	2 U	2 U	1 U
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/4/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		5/16/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		11/8/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		5/16/2007	NS	NS	NS	NS	NS
		11/13/2007	NS	NS	NS	NS	NS
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	**2.1**
		9/16/2020	0.35 U	0.28 U	0.22 U	NS	0.41 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0002IR	28 to 33	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0006IR	28 to 33	2/25/2003	2 U	**12.8**	**5.1**	2 U	**65.7**
		2/4/2004	2 U	**11.9**	**4.5**	2 U	**53.7**
		8/10/2004	2 U	**7.9**	**2.6**	2 U	**62.8**
		5/4/2005	0.50 U	**6.3**	**2.4**	0.50 U	**44.3**
		11/1/2005	0.50 U	**2.9**	**1.2**	0.50 U	**35.0**
		5/16/2006	0.50 U	**1.1**	0.50 U	0.50 U	**15.3**
		11/8/2006	0.50 U	**2.7**	**0.55 I**	0.50 U	**31.0**
		5/16/2007	0.50 U	**3.8**	0.50 U	0.50 U	**34.8**
		11/13/2007	0.38 U	0.28 U	0.20 U	0.23 U	**9.5**
		5/27/2008	0.32 U	**2.8**	**0.48 I**	0.54 U	**32.1**
		11/13/2008	0.32 U	0.2 U	0.45 U	0.54 U	**8.9**
		5/19/2009	0.32 U	**1.5**	0.45 U	0.54 U	**23.3**
		11/10/2009	0.15 U	**0.67 I**	0.13 U	0.16 U	**9.8**
		5/10/2010	0.12 U	0.083 U	0.39 U	0.41 U	**4.1**
		11/8/2010	0.16 U	0.36 U	0.12 U	0.16 U	**3.2**
		5/11/2011	0.16 U	0.36 U	0.12 U	0.13U	**4.7**
		11/11/2011	0.16 U	0.36 U	0.12 U	0.16 U	**2.0**
		11/28/2012	0.16 U	0.36 U	0.12 U	0.16 U	**1.1**
		5/13/2013	0.16 U,J	0.36 U,J	0.12 U,J	0.16 U,J	**0.76 I**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**0.99 I**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		9/16/2020	0.35 U	0.28 U	0.22 U	NS	0.41 U
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0009I	28 to 33	2/25/2003	2 U	2 U	**1.1 J**	2 U	**2.5**
		2/4/2004	2 U	**1.5 J**	**1.5 J**	2 U	**5.6**
		8/10/2004	2 U	**1.3 J**	**0.91 J**	2 U	**5.1**
		5/4/2005	2 U	**1.4 J**	**1.3 J**	2 U	**6.6**
		11/1/2005	0.50 U	**0.86 J**	**0.92 J**	0.50 U	**3.8**
		5/16/2006	0.50 U	**1.3**	**1.2**	0.50 U	**3.3**
		11/8/2006	0.50 U	**0.66 I**	**0.75 I**	0.50 U	**4.8**
		5/16/2007	0.50 U	**0.68 I**	**0.78 I**	0.50 U	**5.2**
		5/16/2007	0.50 U	**0.60 I**	**0.59 I**	0.50 U	**4.8**
		11/16/2007	0.38 U	**0.71 I**	**0.48 I**	0.23 U	**5.0**
		5/23/2008	0.32 U	0.2 U	0.45 U	0.54 U	**4.4**
		11/13/2008	0.32 U	**0.27 I**	0.45 U	0.54 U	**3.0**
		5/19/2009	0.32 U	0.2 U	0.45 U	0.54 U	**2.8**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**2.3**

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-IW0009I (continued)	28 to 33	5/17/2010	0.12 U	0.083 U	0.39 U	0.41 U	**1.8**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**0.4 I**	**0.22 I**	0.13 U	**2.3**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**0.41 I**	**0.16 I**	0.16 U	**1.7**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**1.6**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**2.1**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.43 I**	0.39 U	0.26 U	**1.6**
		6/3/2020	0.35 U	**0.33 I**	0.22 U	0.32 U	**0.72 I**
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0009D	45 to 50	2/25/2003	2 U	**16.8**	2 U	2 U	**35.4**
		2/4/2004	2 U	**15**	2 U	2 U	**46.7**
		8/10/2004	2 U	**16.3**	2 U	2 U	**62.9**
		5/4/2005	2 U	**229**	**1.1 J**	**1.9 J**	**1,550**
		11/1/2005	0.50 U	**5.5**	0.50 U	0.50 U	**21.0**
		5/16/2006	25 U	**255**	25 U	25 U	**1,580**
		11/8/2006	0.50 U	**2.3**	0.50 U	0.50 U	**14.6**
		5/16/2007	0.50 U	**9.1**	0.50 U	0.50 U	**105**
		5/16/2007	0.50 U	**5.2**	0.50 U	0.50 U	**36.4**
		11/16/2007	0.38 U	**13.3**	0.20 U	0.23 U	**199**
		5/23/2008	0.32 U	**4.6**	0.45 U	0.54 U	**56.2**
		11/13/2008	0.32 U	**1.7**	0.45 U	0.54 U	**115**
		5/19/2009	0.32 U	**2.4**	0.45 U	0.54 U	**46.9**
		11/9/2009	0.15 U	**1.8**	0.13 U	0.16 U	**35.0**
		5/17/2010	0.12 U	**0.86 I**	0.39 U	0.41 U	**35**
		11/8/2010	0.16 U	**0.93 I**	0.12 U	0.16 U	**9.4**
		5/11/2011	0.16 U	0.71 U	**0.12 I**	0.13 U	**11.0**
		11/11/2011	0.16 U	**11**	0.12 U	0.16 U	**260**
		11/28/2012	0.16 U	**1.0**	0.12 U	0.16 U	**15**
		5/13/2013	0.16 U	**1.6**	0.12 U	0.16 U	**21.0**
		11/17/2014	0.50 U	**0.77 I**	0.50 U	0.50 U	**10.0**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.50 I**	0.39 U	0.26 U	**16**
		6/3/2020	0.35 U	**1.4**	0.22 U	0.32 U	**32.6**
		3/13/2023	0.89 U	0.53 U	0.73 U	NS	**23**
MLPV-IW0012I	35 to 40	2/25/2003	2 U	**0.54 J**	2 U	2 U	**0.77 J**
		2/4/2004	2 U	**0.62 J**	2 U	2 U	**15.7 J**
		8/10/2004	2 U	**0.66 J**	2 U	2 U	**18.2**
		5/4/2005	2 U	**0.55 J**	2 U	2 U	**15.1**
		11/1/2005	0.50 U	0.50 U	0.50 U	0.50 U	**11.5**
		5/16/2006	0.50 U	**0.60 I**	0.50 U	0.50 U	**14**
		11/8/2006	0.50 U	0.50 U	0.50 U	0.50 U	**10.5**
		5/16/2007	0.50 U	**0.58 I**	0.50 U	0.50 U	**9.5**
		5/17/2007	0.50 U	**0.57 I**	0.50 U	0.50 U	**7.3**
		11/15/2007	0.38 U	**0.47 I**	0.20 U	0.23 U	**9.1**
		5/23/2008	0.32 U	**0.72 I**	0.45 U	0.54 U	**11.1**
		11/13/2008	0.32 U	**0.38 I**	0.45 U	0.54 U	**10.4**
		5/19/2009	0.32 U	**0.62 I**	0.45 U	0.54 U	**12.3**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**7.3**
		5/18/2010	0.12 U	**0.32 I**	0.39 U	0.41 U	**4.9**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**0.43 I**	**0.17 I**	0.13 U	**5.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**0.43 I**	0.12 U	0.16 U	**2.6**

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-IW0012I (Continued)	35 to 40	5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	0.22 U
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
MLPV-IW0012D	45 to 50	1/22/2002	2 U	**2.3**	2 U	2 U	**53.2**
		2/28/2003	2 U	**0.94 J**	2 U	2 U	**47.5**
		2/3/2004	2 U	**1 J**	2 U	2 U	**37.3**
		8/10/2004	4 U	**1.7 J**	4 U	4 U	**121**
		5/5/2005	0.50 U	0.50 U	0.50 U	0.50 U	**16.7**
		10/28/2005	0.50 U	**1.6**	**0.55 I**	0.50 U	**93.9**
		5/16/2006	0.50 U	0.50 U	0.50 U	0.50 U	**16.9**
		11/9/2006	0.50 U	**0.68 I**	0.50 U	0.50 U	**50.1**
		5/17/2007	0.50 U	0.50 U	0.50 U	0.50 U	**9.0**
		11/15/2007	0.38 U	**1.0**	0.20 U	0.23 U	**86.2**
		5/23/2008	0.32 U	0.2 U	0.45 U	0.54 U	**13.3**
		11/13/2008	0.32 U	0.2 U	0.45 U	0.54 U	**53.7**
		5/19/2009	0.32 U	0.2 U	0.45 U	0.54 U	**14.5**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**12.0**
		5/18/2010	0.12 U	**0.91 I**	0.39 U	0.41 U	**38**
		11/8/2010	0.16 U	0.36 U	0.12 U	0.16 U	**8.8**
		5/11/2011	0.16 U	0.36 U	0.12 U	0.13 U	**6.4**
		11/11/2011	0.16 U	**1.4**	0.12 U	0.16 U	**53**
		11/28/2012	0.16 U	0.36 U	0.12 U	0.16 U	**8.6**
		5/13/2013	0.16 U	**0.53 I**	0.12 U	0.16 U	**14**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**8.5**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**4.8**
		6/3/2020	0.35 U	**0.44 I**	0.22 U	0.32 U	**9.7**
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	**2.5**
MLPV-IW0014I	35 to 40	3/14/2023	0.89 U	0.53 U	0.73 U	NS	**0.98 I**
MLPV-IW0017I	35 to 40	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0018D	50 to 55	1/22/2002	2 U	**5.2**	2 U	2 U	**2.2**
		2/26/2003	2 U	**2**	2 U	2 U	**1.3**
		2/3/2004	2 U	**4**	2 U	2 U	**2.9**
		8/10/2004	2 U	**9.4**	2 U	2 U	**8.4**
		5/12/2005	0.50 U	**1.2**	0.50 U	0.50 U	**0.95 J**
		11/2/2005	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
		5/22/2006	0.50 U	**1.3**	0.50 U	0.50 U	**1.2**
		11/13/2006	0.50 U	**3.3**	0.50 U	0.50 U	**3.2**
		5/21/2007	0.50 U	**0.53 I**	0.50 U	0.50 U	0.50 U
		11/15/2007	0.38 U	**5.1**	0.20 U	0.23 U	**7.4**
		5/22/2008	0.32 U	**1.1**	0.45 U	0.54 U	**0.71 I**
		11/12/2008	0.32 U	**2.6**	0.45 U	0.54 U	**4.6**
		5/19/2009	0.32 U	**0.85 I**	0.45 U	0.54 U	**0.92 I**
		11/12/2009	0.15 U	**0.66 I**	0.13 U	0.16 U	**0.82 I**
		5/19/2010	0.12 U	**1.4**	0.39 U	0.41 U	**2.6**
		11/8/2010	0.16 U	**0.78 I**	0.12 U	0.16 U	**0.74 I**
		5/11/2011	0.16 U	**0.78 I**	0.12 U	0.13 U	**0.64 I**
		11/11/2011	0.16 U	**4.6**	**0.41 I**	0.16 U	**32.0**
		11/28/2012	0.16 U	**0.93 I**	0.12 U	0.16 U	**4.8**
		5/13/2013	0.16 U,J	**1.7 J**	**0.13 I**	0.16 U,J	**12 J**
		11/17/2014	0.50 U	**0.76 I**	0.50 U	0.50 U	**2.5**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**0.69 I**
		6/3/2020	0.35 U	**0.73 I**	0.22 U	0.32 U	**3.1**
		3/15/2023	0.89 U	**0.95 I**	0.73 U	NS	**3.6**

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-IW0020D	65 to 70	2/26/2003	2 U	**5.9**	**1.4 J**	2 U	**53.5**
		2/3/2004	2 U	**6**	**1.4 J**	2 U	**34.3**
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/12/2005	0.50 U	**3.2**	**1.3**	0.50 U	**25.3**
		11/2/2005	0.50 U	**6.1**	**1.3**	0.50 U	**30.5**
		5/22/2006	0.50 U	**2.6**	**1**	0.50 U	**31.5**
		11/13/2006	0.50 U	**3.1**	**1.1**	0.50 U	**33.3**
		10/3/2018	0.61 U	**0.71 I**	0.39 U	0.26 U	**3.3**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/21/2023	0.89 U	**0.83 I**	0.73 U	NS	**3.1**
MLPV-IW0022D	48 to 55	3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0027I	28 to 33	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0028I	28 to 33	2/25/2003	2 U	**5.9**	**1.4 J**	2 U	**53.5**
		2/4/2004	2 U	**6**	**1.4 J**	2 U	**34.3**
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/4/2005	0.50 U	**3.2**	**1.3**	0.50 U	**25.3**
		10/28/2005	0.50 U	**6.1**	**1.3**	0.50 U	**30.5**
		5/16/2006	0.50 U	**2.6**	**1**	0.50 U	**31.5**
		11/8/2006	0.50 U	**3.1**	**1.1**	0.50 U	**33.3**
		5/16/2007	0.50 U	**2.0**	**1.0**	0.50 U	**18.9**
		11/13/2007	0.38 U	0.28 U	0.20 U	0.23 U	**24.1**
		5/27/2008	0.32 U	**2.9**	**0.84 I**	0.54 U	**28.8**
		11/12/2008	0.32 U	**1.3**	**0.77 I**	0.54 U	**25.6**
		5/18/2009	0.32 U	**1.5**	**0.79 I**	0.54 U	**22.0**
		11/6/2009	0.15 U	**0.39 I**	0.13 U	0.16 U	**16**
		5/18/2010	0.12 U	**0.45 I**	0.39 U	0.41 U	**16**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	0.36 U	**0.32 I**	0.13 U	**14**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	0.36 U	**0.25 I**	0.16 U	**11**
		5/13/2013	0.16 U	0.36 U	**0.19 I**	0.16 U	**9.0**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**10**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**4.0**
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**5.2**
		6/2/2020	0.35 U	0.28 U	0.22 U	0.32 U	**6.0**
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0029D	42 to 47	2/28/2003	2 U	**1.2 J**	2 U	2 U	**84.7**
		2/4/2004	2 U	**0.99 J**	2 U	2 U	**83.1**
		8/11/2004	2 U	2 U	2 U	2 U	**71.8**
		5/5/2005	0.50 U	**0.74 J**	**0.54 J**	0.50 U	**55.8**
		10/28/2005	0.50 U	**0.89 I**	0.50 U	0.50 U	**52.2**
		5/16/2006	0.50 U	0.50 U	0.50 U	0.50 U	**56.2**
		11/9/2006	0.50 U	**0.70 I**	0.50 U	0.50 U	**43.0**
		5/17/2007	0.50 U	**0.69 I**	0.50 U	0.50 U	**34.2**
		11/15/2007	0.38 U	**0.53 I**	**0.36 I**	0.23 U	**38.2**
		5/27/2008	0.32 U	0.2 U	0.45 U	0.54 U	**59.4**
		11/12/2008	0.32 U	**1.0**	**0.53 I**	0.54 U	**54.8**
		5/18/2009	0.32 U	**0.86 I**	0.45 U	0.54 U	**55.1**
		11/10/2009	0.15 U	**0.61 I**	0.13 U	0.16 U	**43**
		5/18/2010	0.12 U	0.083 U	0.39 U	0.41 U	**33**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**1.1**	**0.37 I**	0.13 U	**51**
		11/11/2011	NS	NS	NS	NS	NS

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-IW0029D (continued)	42 to 47	11/28/2012	0.16 U	**1.2**	**0.32 I**	0.16 U	**42**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**33**
		11/17/2014	0.50 U	**0.77 I**	0.50 U	0.50 U	**43**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**27**
		10/4/2018	0.61 U	**0.82 I**	0.39 U	0.26 U	**40**
		6/3/2020	0.35 U	**0.32 I**	0.22 U	0.32 U	**42.1**
		3/15/2023	0.89 U	**0.88 I**	0.73 U	NS	**39**
MLPV-IW0046	35 to 45	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**1.8**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**8.1**
		10/4/2018	0.61 U	**2.1**	0.39 U	0.26 U	**13**
		6/2/2020	0.35 U	**2.4**	0.22 U	0.32 U	**18**
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0047	35 to 45	11/17/2014	0.50 U	**0.56 I**	0.50 U	0.50 U	**4.2**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.39 I**	0.39 U	0.26 U	**0.89 I**
		6/2/2020	0.35 U	0.28 U	0.22 U	0.32 U	**0.56 I**
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0048	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
MLPV-IW0049	38 to 48	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0050	40 to 50	11/17/2014	0.50 U	**0.64 I**	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0051	45 to 55	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/9/2023	0.89 U	**1.7**	0.73 U	NS	**1.7**
MLPV-IW0052	40 to 50	11/17/2014	0.50 U	**1.8**	0.50 U	0.50 U	**81**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**79**
		10/4/2018	0.61 U	**49**	**3.5**	0.26 U	**160**
		6/3/2020	0.35 U	**48.5**	**1.4**	0.32 U	**73.8**
		3/14/2023	0.89 U	**1.6**	0.73 U	NS	**12**
MLPV-IW0053	35 to 45	11/17/2014	0.50 U	**4.6**	0.50 U	0.50 U	**130**
		5/26/2016	0.50 U	**4.0**	**0.60 I**	0.50 U	**52**
		10/4/2018	0.61 U	**4.3**	0.39 U	0.26 U	**76**
		6/3/2020	0.35 U	**3.8**	0.22 U	0.32 U	**76**
		3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0054	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**1.1**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0055	40 to 50	11/17/2014	0.50 U	**0.57 I**	0.50 U	0.50 U	**1.1**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0056	30 to 40	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/16/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0076	47 to 57	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0077	25 to 35	3/8/2023	0.89 U	**1.8**	**1.2**	NS	0.71 U
MLPV-MW0078	25 to 35	3/8/2023	0.89 U	**0.74 I**	0.73 U	NS	0.71 U

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-MW0079	25 to 35	3/8/2023	0.89 U	**6.2**	**3.0**	NS	0.71 U
MLPV-MW0080	47 to 57	3/8/2023	0.89 U	**0.71 I**	0.73 U	NS	0.71 U
MLPV-MW0081	25 to 35	3/9/2023	0.89 U	**19.0**	**13.0**	NS	0.71 U
MLPV-MW0082	35 to 45	3/8/2023	0.89 U	**19.0**	**7.0**	NS	0.71 U
MLPV-MW0083	47 to 57	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0084	47 to 57	3/9/2023	0.89 U	**1.0**	0.73 U	NS	0.71 U
MLPV-MW0085	47 to 57	3/9/2023	0.89 U	**1.3**	0.73 U	NS	**1.9**
MLPV-MW0086	15 to 25	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0087	47 to 57	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0088	35 to 45	3/14/2023	0.89 U	0.53 U	0.73 U	NS	**2.3**
MLPV-MW0089	35 to 45	3/13/2023	0.89 U	**2.1**	0.73 U	NS	**1.8**
MLPV-MW0090	47 to 57	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0091	47 to 57	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0092	47 to 57	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0093	35 to 45	3/15/2023	0.89 U	0.53 U	0.73 U	NS	**0.85 I**
MLPV-MW0094	35 to 45	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0095	25 to 35	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0096	35 to 45	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0097	35 to 45	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0098	20 to 30	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0099	40 to 50	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0100	15 to 25	3/9/2023	0.89 U	**1.9**	0.73 U	NS	**1.3**
MLPV-MW0101	40 to 50	3/9/2023	8.9 U	**1.4**	0.73 U	NS	0.71 U
MLPV-MW0102	25 to 35	3/10/2023	0.89 U	**9.6**	**2.8**	NS	**440**
MLPV-MW0103	35 to 45	3/10/2023	0.89 U	**30.0**	**3.7**	NS	**1000**
MLPV-MW0104	47 to 57	3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0105	47 to 57	3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
MLPV-MW0106	25 to 35	3/10/2023	0.89 U	**0.54 I**	0.73 U	NS	0.71 U
MLPV-MW0107	35 to 45	3/10/2023	0.89 U	**0.75 I**	0.73 U	NS	**21**
MLPV-MW0108	35 to 45	3/9/2023	0.89 U	**1.1**	0.73 U	NS	**25**
		4/26/2023	0.89 U	**1.2**	0.73 U	NS	**26.0**
MLPV-MW0109	20 to 30	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0110	1 to 11	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-SAMW0001 (MLPV-MWS0001)	43 to 48	8/23/2012	0.26 U	**3.2**	0.35 U	0.23 U	**11.2**
		8/19/2014	0.50 U	0.65 U	0.44 U	0.45 U	**2.5**
		5/24/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/3/2018	0.61 U	**0.52 I**	0.39 U	0.26 U	**1.8**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-SAMW0002 (MLPV-MWS0002)	43 to 48	3/22/2010	0.24 U	0.32 U	0.34 U	ND	**5.4**
		10/1/2010	**0.55 I**	**0.58 I**	0.34 U	ND	**3.4**
		3/16/2011	**0.6 I**	**0.63 I**	0.35 U	ND	**4.7**
		9/23/2011	**0.76 I**	**0.55 I**	**0.41 I**	ND	**4.4**
		8/23/2012	**0.50 I**	**0.83 I**	0.35 U	ND	**2.3**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	**1.1**
MLPV-SAMW0003 (MLPV-MWS0003)	43 to 48	8/23/2012	0.26 U	**0.78 I**	0.35 U	0.23 U	**6.6**
		8/19/2014	0.50 U	**1.3**	0.44 U	0.45 U	**4.6**
		5/24/2016	0.50 U	**86**	**3.9**	0.50 U	**80**
		10/3/2018	0.61 U	**1.1**	**3.9**	0.26 U	**1.5**
		6/3/2020	0.35 U	0.28 U	**2.9**	0.32 U	**3.3**
		3/16/2023	0.89 U	**95**	**6.1**	NS	**67**
PCCA-MW0004	5 to 15	5/22/2008	0.32 U	**1.6**	0.45 U	0.54 U	**0.88 I**
		11/11/2008	0.32 U	**1.4**	0.45 U	0.54 U	**2.9**
		5/26/2009	0.32 U	**0.37 I**	0.45 U	0.54 U	**1.4**
		11/11/2009	0.15 U	**1.1**	0.13 U	0.16 U	**1.8**
		5/18/2010	0.12 U	**0.49 I**	0.39 U	0.41 U	**1.1**
		11/11/2010	0.16 U	**1.1**	0.12 U	0.16 U	**1.5**
		5/11/2011	0.16 U	**0.85 I**	0.12 U	0.13 U	**1.1**
		11/11/2011	0.16 U	**0.93 I**	0.12 U	0.16 U	**2.1**
		11/28/2012	0.16 U	**1.1**	**0.21 I**	0.16 U	**1.4**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	0.22 U
		11/17/2014	0.50 U	**0.72 I**	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
PCCA-MW0017	15 to 25	5/22/2008	0.32 U	**0.56 I**	**0.54 I**	0.54 U	**2.2**
		11/11/2008	0.32 U	**0.74 I**	**0.64 I**	0.54 U	**3.7**
		5/26/2009	0.32 U	0.2 U	0.45 U	0.54 U	**0.58 I**
		11/11/2009	0.15 U	0.12 U	0.13 U	0.16 U	**3.7**
		5/18/2010	0.12 U	0.083 U	0.39 U	0.41 U	0.16 U
		11/11/2010	0.16 U	0.36 U	**0.43 I**	0.16 U	**2.7**
		5/11/2011	0.16 U	0.36 U	**0.45 I**	0.13 U	**2.9**
		11/11/2011	0.16 U	0.36 U	**0.72 I**	0.16 U	**5.1**
		11/28/2012	0.16 U	0.36 U	**0.17 I**	0.16 U	**1.9**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**1.6**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
PRES-IW0007I	32 to 37	3/3/2003	2 U	**11.4**	**0.97 J**	2 U	**44.4**
		2/5/2004	2 U	2 U	2 U	2 U	**3.7**
		8/11/2004	2 U	**16.3**	2 U	2 U	**56.2**
		5/6/2005	0.50 U	**37.3**	**0.76 J**	0.50 U	**23.4**
		11/1/2005	0.50 U	**29.1**	**0.67 I**	0.50 U	**14.0**
		5/18/2006	0.50 U	**28.6**	**0.63 I**	0.50 U	**13.3**
		11/7/2006	0.50 U	**19.6**	**0.65 I**	0.50 U	**9.4**
		5/18/2007	0.50 U	**25.0**	**0.79 I**	0.50 U	**8.1**
		11/12/2007	0.38 U	**12.4**	0.20 U	0.23 U	0.34 U
		5/20/2008	0.32 U	**13.8**	**0.87 I**	0.54 U	**10.8**
		11/12/2008	0.32 U	**5.8**	**0.79 I**	0.54 U	**9.3**
		5/18/2009	0.32 U	**7.6**	**0.67 I**	0.54 U	**11.8**
		11/10/2009	0.15 U	**5.9**	0.13 U	0.16 U	**7.8**
		5/18/2010	0.12 U	**4.5**	**0.61 I**	0.41 U	**6.0**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**3.4**	**0.49 I**	0.13 U	**5.4**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**1.1**	**0.36 I**	0.16 U	**1.9**
		5/13/2013	0.16 U	**1.1**	**0.42 I**	0.16 U	**2.4**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**0.93 I**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
PRES-IW0009	40 to 50	11/17/2014	0.5 U	**4.3**	0.5 U	0.5 U	**2.9**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**11**	0.39 U	0.26 U	**2.7**
		6/2/2020	0.35 U	**3.3**	0.22 U	0.32 U	**1.2**
		3/9/2023	0.89 U	**1.7**	0.73 U	NS	0.71 U
PRES-IW0010	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
SATV-IW0009I	22 to 27	2/28/2003	**1.8 J**	**56.6**	**44.2**	2 U	**1.6**
		2/5/2004	**3.7**	**103.0**	**77.0**	**1.2 J**	**12.4**
		8/11/2004	**2.6**	**65.0**	**51.7**	0.59 J	**52.2**
		5/5/2005	**0.78 J**	**14.8**	**27.3**	0.50 U	**37.2**
		10/31/2005	**3.6**	**66.5**	**52.8**	**0.71 I**	**28.4**
		5/18/2006	**1.0**	**20.0**	**35.3**	0.50 U	**47.1**
		11/8/2006	**3.3**	**48.8**	**41.9**	**0.62 I**	**22.0**
		5/22/2007	**2.7**	**18.2**	**8.2**	0.50 U	0.50 U
		11/13/2007	**2.4**	**35.9**	**28.4**	0.23 U	**18.9**
		5/27/2008	**0.82 I**	**10.1**	**32.3**	0.54 U	**40.7**
		11/13/2008	**1.6**	**24.6**	**29.3**	0.54 U	**31.9**
		5/19/2009	0.32 U	**1.9**	**16.8**	0.54 U	**26.6**
		11/10/2009	**0.63 I**	**11.0**	**25.0**	0.16 U	**24.0**
		5/19/2010	**0.92 I**	**12.0**	**23.0**	0.41 U	0.16 U
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	**0.61 I**	**6.0**	**17.0**	0.13 U	**16.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	**0.98 I**	**16.0**	**19.0**	**0.26 I**	**10.0**
		5/13/2013	**1.2**	**34.0**	**31.0**	**0.45 I**	**15.0**
		11/17/2014	0.5 U	**1.2**	**1.9**	0.50 U	0.50 U
		5/25/2016	0.5 U	**2.7**	**2.7**	0.50 U	0.50 U
		10/9/2018	0.61 U	**1.5**	**1.8 I**	0.26 U	0.26 U
		6/3/2020	**0.40 I**	**7.2**	**5.1**	0.32 U	0.41 U
		3/8/2023	0.89 U	**14.0**	**9.0**	NS	0.71 U
SATV-IW0010	35 to 45	11/17/2014	**1.4**	**16.0**	**12.0**	0.5 U	0.5 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					
VAB-IW0005D (MLPV-VAB-IW0005D)	52 to 57	10/4/2018	0.61 U	**2.0**	0.39 U	0.26 U	**8.0**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/9/2023	0.89 U	**3.2**	0.73 U	NS	**2.5**
VABU-IW0001I	20 to 30	10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	0.26 U
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0001SR	2.5 to 12.5	9/29/2003	0.15 U	**16.0**	**1.5**	0.10 U	**21.0**
		3/4/2004	0.15 U	**12.0**	**1.2**	0.10 U	0.14 U
		11/3/2004	0.54 U	**130.0**	**5.9**	0.80 U	**14.0**
		5/9/2005	0.50 U	**58.6**	**2.6**	0.50 U	**13.4**
		10/31/2005	0.50 U	**47.3**	**2.1**	0.50 U	**9.2**
		5/18/2006	0.50 U	**36.4**	**3.4**	0.50 U	**79.8**
		11/7/2006	0.50 U	**62.8**	**3.2**	0.50 U	**20.5**
		5/18/2007	0.50 U	**62.7**	**3.0**	0.50 U	**14.5**
		11/14/2007	**0.40 I**	**45.8**	**2.2**	0.23 U	**12.2**
		5/22/2008	0.32 U	**65.1**	**4.2**	0.54 U	**24.5**
		11/12/2008	0.32 U	**40.9**	**2.3**	0.54 U	**16.3**
		5/19/2009	0.32 U	**63.3**	**3.3**	0.54 U	**25.7**
		11/6/2009	0.15 U	**55.0**	**3.2**	0.16 U	**19.0**
		5/18/2010	0.12 U	**28.0**	**1.8**	0.41 U	**10.0**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**36.0**	**2.1**	0.16 U	**21.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**46.0**	2.5	0.16 U	**20.0**
		5/13/2013	0.16 U	**15.0**	**0.63 I**	0.16 U	**3.3**
WCPS-IW0001SR (continued)	2.5 to 12.5	11/17/2014	0.50 U	**7.9**	0.50 U	0.50 U	**20**
		5/25/2016	0.50 U	**9.0**	0.50 U	0.50 U	**28**
		10/4/2018	0.61 U	**4.2**	**0.80 I**	0.26 U	**25**
		6/3/2020	0.35 U	**1.4**	**0.67 I**	0.32 U	**49.5**
		9/14/2020	NS	**2.5**	**0.93**	NS	**54.3**
		3/9/2023	0.89 U	**2.0**	**1.2**	NS	**38.0**
WCPS-IW0002SRR	3 to 13	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0006S	3 to 13	6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
WCPS-IW0005S	2 to 12	9/14/2020	NS	0.28 U	0.22 U	NS	0.41 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0015S	3 to 13	9/14/2020	NS	0.28 U	0.22 U	NS	0.41 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0016	15 to 25	11/17/2014	0.50 U	**1.8**	0.50 U	0.50 U	**1.9**
		5/25/2016	0.50 U	**6.0**	0.5 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**4.0**	0.39 U	0.26 U	**1.9**
		6/3/2020	0.35 U	**1.2**	0.22 U	0.32 U	**0.80 I**
		3/9/2023	0.89 U	**0.77 I**	0.73 U	NS	0.71 U

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
ft bls = feet below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
UIC = Underground Injection Control

Table 3-5
LCP LTM - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (feet bls)	Sample Date					

I = Indicates that the analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit

J = Indicates an estimated value

L = Indicates value exceeds calibration range

LCP = low concentration plume

LTM = long-term monitoring

U = Indicates the analyte was not detected

µg/L = micrograms per liter

June 2020: MLPV-IW0001D, MLPV-IW0002I (could not locate), MLPV-SAMW0002 and WCPS-IW0006S were added to 2020 sampling plan following analytical assessement of 2018 data.

September 2020: Samples collected outside of biennial sampling frequency to obtain additional data in order to complete August ADP action items. Monitoring wells IW-006IR and IW0001D were sampled to gain additional data from the biosparge treatment area, therefore data for these wells is illustrated in the Biosparge Area figure

Table 3-6
Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0011I	35 to 40	05/29/2012	24.3	6.99	1.21	2.1	46	0.55	0.61	0.8	clear yellow
		01/27/2014	24.2	7.41	6.78	7.8	-93	0.27	2.81	2.65	clear
		07/22/2014	26.2	7.76	1.76	6.8	-147	0.44	0.85	1.09	clear
		01/21/2015	24.1	7.6	1.47	5.4	54	0.23	0.74	0.96	clear
		07/15/2015	26	7.11	1.64	17.2	-76	0.13	0.82	1.06	clear
		01/12/2016	23.4	7.21	1.45	5.1	-147	0.24	0.73	0.94	clear
		07/11/2016	26.9	7.26	1.52	2.1	-147	0.24	0.8	1.02	clear
		11/07/2017	25.5	7.2	2.41 *	1.9	-249	0.15 *	0.23	1.56	clear
		05/31/2018	26.2	7.35	2.52	5.9	230	0.23	0.13	1.63	clear
		03/06/2019	21.6	7.06	20.2	1.4	-246	0.43 *	0.11	1.43	clear
		10/31/2019	25.98	7.23	2.15	4.03	-254.3	0.09	-	-	clear
		3/18/2020	24.68	6.68	0.88	2.97	-183.9	0.38	0.44	-	yellow
		9/15/2020	26.2	7.23	1.73	1.08	-152.6	0.22	0.85	-	clear
		3/16/2021	23.9	7.26	1.64	1.89	-126.1	0.14	0.83	-	clear
		9/13/2021	26.7	7.16	1.261	1.71	-171.25	0.08	0.64	-	clear
		4/21/2022	25.36	6.32	281.2	2.63	-12.0	2.22	0.14	-	clear
		3/9/2023	24.06	6.83	0.2186	2.05	-24.4	5.49	0.1	-	clear
IW0030	55 to 65	06/28/2010	29.2	7.19	2.97	11.1	-145	0.28	1.53	1.93	clear
		05/31/2012	27.1	7.47	3.65	13.8	-128	0.53	1.95	3.7	clear
		07/23/2014	26	7.55	3.31	11.4	-103	0.8	1.73	2.17	clear
		07/15/2015	25.9	7.49	3.14	14.3	-151	0.23	1.63	2.04	clear
		01/12/2016	20.3	7.53	3.33	2	-75	0.45	1.75	2.16	clear
		07/13/2016	29.2	7.49	3.2	5	-114	0.15	1.66	2.08	clear
		11/08/2017	24.5	7.56	3.41	0.7	-83	0.2	0.18	2.22	clear
		05/30/2018	27.5	7.54	3.6	13	375	0.09	0.19	2.34	clear
		03/05/2019	20.7	7.48	3.19	1.9	-16	0.28	0.17	20.07	clear
IW0032	30 to 40	05/31/2012	26.7	7.19	1.92	8.9	-252	0.28	0.97	1.25	clear
		09/26/2012	24.7	7.07	0.91	1.9	-105	0.95	0.45	0.59	clear
		08/19/2013	24.9	6.63	1.04	2.5	151	1.89	0.51	0.67	clear
		10/24/2013	24.2	6.91	1.05	7.7	-23	0.66	0.52	0.68	clear
		01/27/2014	24.2	7.25	1.01	8	32	0.69	0.52	0.66	clear
		04/16/2014	23.4	6.81	2.28	6	230	0.29	1.17	1.48	clear
		07/21/2014	25.4	7.38	3.88	14.7	-17	6.01	2.03	2.5	clear
		01/20/2015	24.7	7.28	2.4	10.1	35	4.63	1.23	1.56	clear
		07/15/2015	26.8	7.04	2.28	2.7	-17	1.11	1.17	1.48	clear
		10/06/2015	24.9	6.74	2.26	2.3	102	5.89	1.16	1.47	clear
		01/12/2016	23.2	7.19	1.97	2.5	94	5.49	1	1.28	clear
		07/13/2016	25.6	7.11	2.77	6.1	1	0.58	1.43	1.8	clear
		11/07/2017	26	8.61 *	2.23	0.86	160	5.10 *	0.11	1.45	clear
		05/31/2018	25.2	7.56	2.61	2.2	253	0.19	0.14	1.72	clear
		03/06/2019	21.1	7.08	2.46	0.39	-151	0.28 *	0.13	1.6	clear
		3/18/2020	23.81	7.08	4.44	2.32	-136.4	0.22	2.43	-	yellow
		11/30/2020	22.74	7.22	1.67	1.35	-52.7	0.45	0.26	-	clear
		3/16/2021	24.4	7.12	1.88	15.22	-119.4	0.13	0.98	-	clear
		4/21/2022	25.16	6.71	0.821	5.46	-233.1	0.08	0.53	-	clear
		3/14/2023	23	7.2	0.562	2.97	-117.9	0.15	0.31	-	clear
IW0033	40 to 50	05/31/2012	24.9	7.26	22.8	11.7	-152	0.23	13.75	14.82	clear
		09/26/2012	24.5	7.2	6.24	8.5	-89	0.79	3.42	4.11	clear
		08/19/2013	24.9	6.85	3.13	5.4	36	0.58	1.63	2.04	clear
		10/24/2013	24	7.01	7.4	4	-67	0.57	4.07	4.81	clear
		01/27/2014	23.6	7.25	5.3	9.9	10	0.2	2.81	3.7	clear
		04/16/2014	23.5	6.95	6.83	4	-62	0.21	3.74	4.43	clear
		07/21/2014	25.1	7.28	7.72	11.3	-108	0.91	4.21	4.98	clear
		01/20/2015	24.3	7.2	5.01	10.8	-47	1.59	2.69	3.25	clear
		07/15/2015	26	6.98	6.11	8.9	-80	0.4	3.31	4	clear
		10/06/2015	24.6	6.62	6.33	14.1	5	2.92	3.5	4.11	clear
		01/12/2016	23.4	7.06	4.6	3	-4	1.4	2.46	2.99	clear
		07/13/2016	25.8	6.94	6.65	12	-37	0.18	3.64	4.34	clear
		03/07/2017	24.2	7.31	6.42	13.5	-97	0.67	3.51	4.19	clear
		11/07/2017	25.1	8.79 *	5.63	30	165	1.83 *	0.3	3.65	clear
		05/31/2018	25.2	7.66	5.08	3.3	146	0.18	0.27	3.32	clear
		03/06/2019	20.6	6.96	5.29	4.2	-129	0.29 *	0.29	3.43	clear
		10/31/2019	25.81	7.22	6.52	2.09	-107.5	0.11	-	-	yellow
		3/18/2020	24.17	7.1	11.79	4.12	-137.8	0.12	6.84	-	clear
		11/30/2020	23.37	7.15	5.99	11.52	-66.1	0.41	0.72	-	clear
		3/16/2021	24.7	7.11	6.68	5.19	-118.5	0.11	3.67	-	clear
		4/21/2022	24.86	6.89	6.487	5.23	-239.2	0.07	3.59	-	clear
		3/14/2023	23.4	7.13	6.046	12.7	-124.2	0.01	3.41	-	clear

Table 3-6
Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0034	30 to 40	05/29/2012	25.5	6.96	5.48	13.1	-188	0.18	3.92	3.49	clear
		01/27/2014	24.6	7.03	5.53	10.9	-3	0.6	2.73	2.39	clear
		07/22/2014	26.2	7	2.8	5.3	-81	0.5	1.45	1.82	clear
		01/21/2015	24.7	6.86	2.4	16.3	-123	0.25	1.23	1.56	clear
		07/15/2015	26.2	6.98	2.34	2.3	-118	1.32	1.2	1.52	clear
		01/11/2016	24.2	7.08	1.8	5.1	-146	0.38	0.91	1.17	clear
		07/13/2016	26.1	7.05	2.48	16.3	-158	0.11	1.27	1.61	clear
		11/07/2017	26	8.69 *	1.77	17.1	185	2.20 *	0.09	1.13	clear
		05/31/2018	26.6	6.9	1.71	5.8	-26	0.75	0.09	1.12	clear
		03/06/2019	22.5	7.07	1.81	3.5	-63	0.31	0.09	1.18	clear
		10/31/2019	27.34	7.26	1.56	57.1	-85.5	0.22	-	-	brown
		3/18/2020	25.99	6.95	1.29	14.9	-71.9	0.17	0.64	-	yellow
		9/15/2020	27.4	7.08	1.22	3.96	-92.9	0.22	0.57	-	clear
		3/15/2021	24.6	7.11	1.04	1.22	-94.2	0.15	0.52	-	clear
		9/14/2021	26.72	6.99	0.832	8.38	-34.82	0.35	0.41	-	clear
		3/15/2022	24.49	7.20	0.829	10.42	-192.8	0.08	0.41	-	clear
		3/9/2023	23.96	7.17	0.6251	11.3	-231.9	0.1	0.31	-	clear
IW0035	40 to 50	05/29/2012	25.9	7	10.93	13.7	-154	0.17	6.27	7.24	clear
		01/27/2014	24.7	7.2	3.72	13.5	-19	0.16	1.6	1.54	clear
		07/22/2014	26.3	7.08	6.58	10.1	-88	0.62	3.59	4.28	clear
		01/21/2015	24.5	7.1	6.03	8.8	-88	0.22	3.28	3.92	clear
		07/15/2015	26.1	7.09	5.13	6.4	-90	1.29	2.75	3.33	clear
		01/11/2016	23.4	7.14	4.1	12.9	-82	0.34	2.18	2.67	clear
		07/13/2016	27	7.04	4.8	3.9	-70	0.14	2.56	3.12	clear
		11/07/2017	26	9.91 *	5.08	3.7	43	0.11 *	0.27	3.24	clear
		05/31/2018	26	7.02	4.66	4.2	-80	0.25	0.25	3.03	clear
		03/06/2019	22.6	7.11	4.92	2.4	-48	0.24	0.26	3.2	clear
		10/31/2019	27.19	7.14	5.01	21.4	-108.3	0.18	-	-	clear
		3/18/2020	26.03	7.09	4.89	8.18	-68	0.18	2.56	-	clear
		9/15/2020	27.2	7.13	3.94	2.66	-65.4	0.17	1.99	-	clear
		3/15/2021	25	7.14	4.65	1.42	-72.6	0.2	2.31	-	clear
		4/21/2022	24.66	6.91	3.04	12.34	-202.1	0.09	1.6	-	clear
		3/9/2023	24.2	7.17	2.9322	3.46	-175.6	0.11	1.54	-	clear
IW0036	40 to 45	05/29/2012	25.5	7.15	14.99	12.3	-326	0.39	8.69	9.73	clear
		01/28/2014	24.9	7.53	2.54	11.9	-81	0.28	1.3	1.63	clear
		07/22/2014	25.1	7.61	2.54	10.4	-71	0.95	1.31	1.62	clear
		01/22/2015	24.3	7.49	3.19	14.6	-216	0.19	1.66	2.07	clear
		07/15/2015	26.4	7.44	3	5	-250	1.11	1.55	1.95	clear
		01/12/2016	24	7.3	2.85	4.1	-193	0.42	1.48	1.85	clear
		07/13/2016	26.3	7.22	2.51	1.8	-168	0.1	1.2	1.63	clear
		11/07/2017	25.8	9.44 *	2.24	1.6	125	0.14 *	0.12	1.43	clear
		05/30/2018	25.9	7.3	2.08	1.2	438	0.01	0.11	1.36	clear
		03/06/2019	22.3	7.46	2.23	1.3	-85	0.32	0.11	1.45	clear
		10/31/2019	26.5	7.27	2.68	1.27	-203.7	0.28	-	-	clear
		3/18/2020	24.22	7.48	2.38	1.07	-109.4	0.17	1.24	-	clear
		9/18/2020	27.5	7.37	1.81	10.67	-264.7	0.12	0.88	-	clear
		3/15/2021	25.5	7.24	2.53	5.09	-195.4	0.35	1.29	-	clear
		9/14/2021	27.84	7.2	1.997	1.33	-158.39	0.13	1.03	-	clear
		3/16/2022	24.86	7.23	2.296	2.74	-306.2	0.17	1.19	-	clear
		3/13/2023	25.91	7.26	2.1956	2.11	-254.1	0.08	1.14	-	clear
IW0037	40 to 50	05/29/2012	24.2	7.13	6.25	18.7	-17	1.14	3.41	4.06	clear
		01/27/2014	23.8	7.37	4.66	7.2	-35	0.08	2.6	3.15	clear
		07/22/2014	25.7	7.21	7.95	16.9	-111	0.31	4.41	5.2	clear
		01/21/2015	23.9	7.09	8.11	17.5	-85	0.22	4.5	5.28	clear
		07/15/2015	25.5	7.11	7.9	18.9	-122	0.1	4.36	5.13	clear
		01/12/2016	23	7.26	5.74	12.9	-112	0.39	3.12	3.73	clear
		07/11/2016	26.4	7.67	6.23	15.7	-83	0.17	3.27	3.92	clear
		11/07/2017	25.7	7.19	6.19 *	12.2	-95	0.81 *	3.36	4.02	clear
		05/31/2018	25	7.24	6.97	3.9	234	0.2	0.38	4.54	clear
		10/31/2019	25.87	7.26	8.1	1.41	-78.8	0.16	-	-	clear
		03/06/2019	20.6	7.1	6.72	0.82	-112	0.23 *	0.37	4.37	clear
		03/06/2019	20.6	7.1	6.72	0.82	-112	0.23 *	0.37	4.37	clear
		3/18/2020	24.55	7.23	8.09	2.21	-77.9	0.18	4.53	-	clear
		9/15/2020	26.1	7.18	5.49	4.97	-83.6	0.18	2.88	-	yellow
		3/16/2021	24.4	7.26	8.06	2.84	-80.4	0.17	4.53	-	clear
		9/13/2021	26.71	7.12	3.854	7.69	-111.79	0.08	2.06	-	clear
		4/21/2022	25.39	6.95	527.7	17.53	-227.4	0.08	0.31	-	clear
		3/9/2023	24.39	7.09	5.2539	4.08	-169.6	0.1	2.87	-	clear

Table 3-6
Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0038	30 to 40	05/29/2012	24.1	7.13	0.74	11.1	-79	1.17	0.36	0.48	clear
		09/26/2012	25	7.03	1.49	6.2	-59	0.95	1.48	0.9	clear
		08/19/2013	26.5	6.62	1.92	8.1	96	1.38	0.97	1.24	clear
		10/24/2013	25	6.75	2.54	13.5	-44	0.63	1.31	1.65	clear
		01/27/2014	25.1	7.03	2.6	8.3	-40	0.32	1.31	1.66	clear
		04/16/2014	25.8	6.77	3.38	6.4	43	0.59	1.77	2.2	clear
		07/22/2014	26.4	6.92	4.3	5.9	5	4.97	2.28	2.79	clear
		01/21/2015	25.7	7.06	4.03	5.1	29	5.84	2.13	2.62	clear
		07/14/2015	27.6	7.61	3.97	0.81	-14	1.03	2.09	2.58	clear
		10/06/2015	27.2	6.82	4.02	1.2	102	9.73	2.12	2.62	clear
		01/12/2016	25.5	7.18	3.24	2.4	140	8.61	1.69	2.11	clear
		07/13/2016	28.4	7.04	4.23	6.2	20	0.29	2.24	2.75	clear
		11/07/2017	26.8	7.05	2.86 *	2.5	154	7.23 *	1.48	1.86	clear
		05/31/2018	26	6.99	3.3	0.42	9.8	0.85	0.17	2.15	clear
		03/06/2019	21.9	7.02	3.06	0.28	30	0.54 *	0.16	1.99	clear
		3/18/2020	25.2	7.1	2.39	0.88	-10.7	0.14	1.22	-	clear
		3/15/2021	25.5	7.19	1.59	0.72	-36.4	0.19	0.79	-	clear
		3/16/2022	23.87	6.99	0.976	1.92	-12.9	0.32	0.49	-	clear
		3/10/2023	23.6	7.14	4.1139	1.7	-139.1	0.13	2.21	-	clear
		4/26/2023									
IW0039	40 to 50	05/29/2012	23.7	7.13	6.82	14.4	-56	0.5	3.74	4.43	clear
		09/26/2012	25.1	7.1	7.34	8.9	-120	0.79	4.04	4.77	clear
		08/19/2013	26.7	6.9	2.67	7.6	-78	0.36	1.37	1.74	clear
		10/24/2013	24.8	6.98	7.55	6.9	-92	0.47	4.16	4.9	clear
		01/27/2014	25.2	7.19	4.34	3.2	-15	0.11	1.75	1.65	clear
		04/16/2014	25.1	6.92	7.48	13.1	-62	0.15	4.12	4.87	clear
		07/22/2014	26.4	7.51	5.74	15	-92	0.53	3.14	3.83	clear
		01/21/2015	25.3	6.88	5.15	7.5	-71	0.21	2.76	3.34	clear
		07/14/2015	27.2	7.29	5.1	6.2	-94	0.94	2.73	3.31	clear
		10/06/2015	26.7	6.64	4.64	7.2	-52	0.52	2.47	3.01	clear
		01/12/2016	25.4	7.02	3.91	3.7	-27	0.44	2.06	2.54	clear
		07/13/2016	27.2	6.9	4.91	3.7	-30	0.15	2.62	3.19	clear
		03/07/2017	24.3	7.13	6.27	15.1	-52	0.21	3.42	4.08	clear
		11/07/2017	26.4	6.95	4.30 *	2.6	0	0.45 *	2.27	2.79	clear
		05/31/2018	25.8	6.94	4.73	8.6	-41	0.3	0.25	3.08	clear
		03/06/2019	22.3	7.11	6.37	3.7	-68	0.86 *	0.35	4.14	clear
		10/31/2019	26.25	7.28	6.19	4	-76.3	0.16	-	-	clear
		3/18/2020	25.56	7.14	7.21	4.79	-77.2	0.18	3.91	-	clear
		9/15/2020	27.3	7.09	4.44	3.98	-54.3	0.25	2.23	-	clear
		3/15/2021	25.5	7.22	7.23	1.06	-75.1	0.17	3.93	-	clear
		9/14/2021	28.5	7.3	2.086	4.11	-200.4	0.29	-	-	clear
		3/16/2022	23.91	6.98	4.113	2.28	-25.6	0.12	2.76	-	clear
		3/10/2023	23.72	7.18	0.8083	1.55	-147.1	0.12	0.4	-	clear
		4/26/2023									
IW0040	30 to 40	05/29/2012	25.7	7.08	9.81	18.6	-175	0.13	4.27	5.92	clear
		09/26/2012	25.4	7.3	2.14	6.2	-118	0.41	1.09	1.39	clear
		08/19/2013	26.3	6.95	2.07	5	24	1.89	1.05	1.34	clear
		10/24/2013	24.9	7.03	1.85	5.8	-156	0.66	0.94	1.2	clear
		01/27/2014	24.8	7.35	1.87	9.1	-6	0.84	0.96	1.2	clear
		04/16/2014	25.3	6.81	2.49	10.2	-93	0.12	1.28	2.5	clear
		07/23/2014	25.6	7.3	4.36	15.4	-46	0.41	2.31	2.83	clear
		01/22/2015	24.6	7.24	4.25	2.9	6	2.65	2.25	2.76	clear
		07/15/2015	26.3	7.15	3.95	18.8	-41	1.2	2.08	2.57	clear
		10/06/2015	25.8	6.99	3.67	11.4	20	5.47	1.93	2.38	clear
		01/11/2016	22.3	7.23	3.19	2	96	5.5	1.67	2.07	clear
		07/13/2016	27.5	7.22	3.01	13.1	-11	0.3	1.56	1.96	clear
		11/07/2017	26.3	8.34 *	2.76	10.6	281	3.19 *	0.14	1.75	clear
		05/30/2018	25.9	7.18	2.39	11.8	-83	0.52	0.12	1.55	clear
		03/05/2019	22.4	7.06	2.44	19.7	-72	0.81	0.13	1.59	clear
		3/18/2020	28.28	7.31	3.17	13.16	-141	0.15	1.62	-	clear
		3/16/2021	24.9	7.1	1.42	5.09	-116.8	0.13	0.53	-	clear
		4/21/2022	23.44	7.1	0.795	16.85	-214.1	0.09	0.39	-	clear
		3/9/2023	26.75	7.38	0.7795	6.29	-214.5	0.1	0.39	-	clear

Table 3-6
Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0041	40 to 50	05/29/2012	25.2	7.11	19.21	78.4	-143	0.07	11.15	12.25	cloudy
		09/26/2012	25.4	7.32	8.5	11.5	-138	0.75	4.76	5.59	clear
		08/19/2013	26	6.87	2.95	16.4	-78	0.27	1.53	1.92	clear
		10/24/2013	24.6	6.93	8.21	12.8	-79	0.2	4.55	5.34	clear
		01/27/2014	24.3	7.23	1.85	15.4	-31	0.2	1	1.19	clear
		04/16/2014	24.8	6.83	8.12	13.6	-85	0.08	4.5	5.27	clear
		07/23/2014	24.3	7.52	2.12	10.2	-22	0.69	1.4	1.61	clear
		01/22/2015	24.4	7.39	4.48	10.3	-88	0.22	2.39	2.91	clear
		07/15/2015	26.4	7.08	4.9	15.8	-110	0.12	2.62	3.19	clear
		10/06/2015	26.3	6.9	4.18	10.5	-91	0.25	2.21	2.73	clear
		01/11/2016	23.3	7.19	4.3	16.2	-91	0.45	2.28	2.79	clear
		07/13/2016	27.2	7.02	4.34	7	-52	0.09	2.35	2.82	clear
		03/07/2017	24.5	7.19	5.63	10.7	-83	0.17	3.04	3.65	clear
		11/07/2017	25.9	8.54 *	4.87	1.9	279	0.12 *	0.26	3.11	clear
		05/30/2018	26.4	7.1	4.2	10.9	-60	0.4	0.22	2.73	clear
		03/05/2019	22.7	7.17	5.26	2.1	-56	0.26	0.28	3.42	clear
		10/31/2019	27.54	7.2	4.7	20.9	-134	0.16	-	-	clear
		3/18/2020	25.8	7.18	9.64	2.07	-130.1	0.16	5.24	-	clear
		9/18/2020	26.5	7.14	3.92	4.25	-70.2	0.12	2	-	clear
		3/16/2021	23.9	7.16	4.81	5.32	-111.1	0.42	2.92	-	clear
		9/14/2021	26.76	6.97	3.652	3.51	-10.52	0.1	1.95	-	clear
		3/15/2022	25.51	7.06	4.286	12.38	-211.4	0.04	2.31	-	clear
		3/9/2023	26.65	7.3	4.2135	1.92	-225	0.07	2.27	-	clear
IW0042	30 to 40	05/29/2012	23.8	7.3	0.91	47.6	-108	0.43	0.45	0.59	clear
		09/26/2012	25.3	7.3	0.79	17.9	-211	0.35	0.38	0.51	clear
		08/19/2013	26.1	6.88	0.9	16.2	-110	0.22	0.44	0.59	clear
		10/24/2013	24.8	6.94	1.26	15.1	-128	0.41	0.62	0.82	clear
		01/28/2014	24.8	7.11	1.2	10.5	-105	0.41	0.6	0.78	clear
		04/16/2014	25.2	6.69	1.87	15.2	-75	0.18	0.95	1.22	clear
		07/22/2014	25.7	7.1	1.83	12.3	-126	0.2	0.93	1.2	clear
		01/20/2015	25.2	7.13	3.17	12.1	-81	0.16	1.65	2.06	clear
		07/14/2015	26.8	6.69	3.88	18.3	-123	0.12	2.04	2.51	clear
		10/06/2015	26.3	6.52	3.53	4.7	-36	0.19	1.85	2.29	clear
		01/11/2016	23.3	6.88	2.58	11.3	-96	0.37	1.33	1.68	clear
		07/13/2016	27.8	6.75	3.41	5.9	31	0.1	1.78	2.22	clear
		11/07/2017	26.2	7.07	2.28 *	5	-17	0.17 *	1.16	1.48	clear
		05/30/2018	25	7.05	3.61	8.9	-64	0.3	0.19	2.35	clear
		03/06/2019	22.7	7.64	2.58	0.7	-46	0.29	0.13	1.68	clear
		3/18/2020	27.33	7.29	1.72	1.4	-63	0.13	0.83	-	clear
		3/16/2021	24.1	7.21	0.846	4.37	-99.3	0.22	0.38	-	clear
		3/16/2022	23.90	6.99	0.520	11.91	-110.2	0.11	0.25	-	clear
		3/14/2023	21.30	7.18	0.490	0.59	-72.6	0.19	0.26	-	clear
IW0043	40 to 50	05/29/2012	24.8	7.2	7.54	76.8	31	0.39	4.15	4.9	clear
		09/26/2012	25.2	7.39	7.27	10.9	-139	0.89	4.04	4.8	clear
		08/19/2013	25.6	6.94	2.36	6.8	-80	0.27	1.21	1.54	clear
		10/24/2013	24.7	7.1	8.98	9.7	-100	0.3	5.02	5.84	clear
		01/28/2014	25	7.13	4.86	8.8	-75	0.17	2.9	3.95	clear
		04/16/2014	24.7	6.97	8.71	12.9	-94	0.1	4.86	5.66	clear
		07/22/2014	25.7	7.22	7.08	8.7	-124	0.75	3.9	4.62	clear
		01/20/2015	24.9	7.29	6.01	9.2	-113	0.11	3.26	3.91	clear
		07/14/2015	26.6	6.95	6.48	12.9	-143	0.08	3.51	4.2	clear
		10/06/2015	26.4	6.7	5.45	6.2	-89	0.27	2.93	3.54	clear
		01/11/2016	22.6	7.17	5.73	2.6	-103	0.44	3.1	3.72	clear
		07/13/2016	27.8	7.05	4.84	17.3	-65	0.11	2.58	3.14	clear
		03/07/2017	24.5	7.14	7.64	17.5	-78	0.21	4.2	4.95	clear
		11/07/2017	26	7.09	5.13 *	1.6	-82	0.17 *	2.75	3.33	clear
		05/30/2018	25.1	7.15	4.43	14.7	-82	0.25	0.24	2.88	clear
		03/06/2019	21.6	7.52	6.97	2.1	-59	0.32	0.41	4.84	clear
		10/31/2019	27.96	7.38	6.11	0.61	-83.7	0.26	-	-	clear
		3/18/2020	25.9	7.38	7.18	3.94	-69.6	0.28	3.87	-	clear
		9/18/2020	27.4	7	3.53	6.38	-82.9	0.12	1.76	-	clear
		3/16/2021	24.3	7.13	6.78	5.19	-93.7	0.14	3.17	-	clear
		3/16/2022	24.33	7.13	3.863	7.42	-185.5	0.06	2.07	-	clear
		3/14/2023	21.9	7.16	4.626	0.54	-92.2	0.14	2.61	-	clear

Table 3-6
Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0044	40 to 50	07/06/2012	24.4	7.13	5.61	58.7	-119	0.37	3.03	3.64	clear
		01/28/2014	23.8	7.58	2.49	10	-61	0.24	1.26	1.6	clear
		07/23/2014	25	7.08	2.5	15.4	-54	1.1	1.31	1.63	clear
		01/20/2015	23.2	7.46	6.6	18	-116	0.12	3.61	4.29	clear
		07/15/2015	24.2	7.05	6.45	16.6	-109	0.53	3.52	4.19	clear
		01/12/2016	23.7	7	7.69	42	-124	0.28	4.25	5	clear
		07/12/2016	26.5	7.03	6.21	11.7	-113	0.1	3.37	4.03	clear
		11/07/2017	24.8	7.1	4.81 *	6.3	-130	0.70 *	2.57	3.12	clear
		05/30/2018	24.1	7.16	7.72	3.5	325	0.01	0.43	5.02	clear
		03/05/2019	23	7.18	6.16	2.3	-99	0.47	0.34	4	clear
		10/31/2019	25.45	7.17	5	5.33	-167.2	0.21	-	-	clear
		3/18/2020	24.69	7.07	12.36	7.98	-104.2	0.17	7.07	-	clear
		11/30/2020	22.83	7.16	4.97	15.36	-31.4	0.47	0.96	-	clear
		3/16/2021	23.5	7.06	5	2.98	-80.7	0.18	2.76	-	clear
		4/21/2022	25.27	6.79	3.475	4.33	-234	0.08	1.85	-	clear
		3/14/2023	22.8	7.15	6.228	3.31	-86.8	0.1	3.55	-	clear
IW0045	40 to 50	07/06/2012	24.1	7.04	3.47	64.5	-100	0.16	1.82	2.25	clear
		01/27/2014	23.4	7.17	3.25	9.7	6	0.32	1.7	2.1	clear
		07/22/2014	24.6	7.35	5.42	15.9	-81	0.75	2.9	3.48	clear
		01/20/2015	22.3	7.14	4.12	17.9	-91	0.27	2.19	2.68	clear
		07/15/2015	26.2	6.92	4.08	15.1	-80	0.69	2.16	2.65	clear
		01/12/2016	24.6	6.93	4.6	2.2	-145	0.28	2.45	2.99	clear
		07/12/2016	26.7	6.99	4.35	16.6	-131	0.09	2.3	2.83	clear
		11/07/2017	25.5	9.66 *	4.61	7.7	78	0.11 *	0.2	2.98	clear
		05/30/2018	25.1	7.62	4.85	1.2	358	0.01	0.26	3.16	clear
		03/06/2019	21.7	6.9	4.51	2.7	-84	0.33 *	0.24	2.94	clear
		10/31/2019	25.95	7.14	4.79	1.44	-107	0.13	-	-	clear
		3/18/2020	25.16	7.23	5.17	0.85	-83.8	0.15	2.77	-	clear
		9/15/2020	28.4	7	4.98	2.32	-77.9	0.15	2.49	-	clear
		3/16/2021	23.9	7.14	5.65	1.06	-69.6	0.25	3.12	-	clear
		4/21/2022	26.14	6.87	1.933	5.56	-305.6	0.07	1.66	-	clear
		3/14/2023	24.2	6.97	3.314	4.98	-119.8	0.02	1.76	-	clear
SAMW0004I	35 to 40	05/29/2012	25.3	7.03	9.01	12.5	-182	0.16	5.04	5.85	clear
		01/28/2014	24.4	7.38	2.21	8.8	-71	0.2	1.14	1.43	clear
		07/22/2014	25	7.43	6	14.3	-93	0.21	2.51	2.6	clear
		01/22/2015	24.3	7.48	1.08	3.3	-161	0.14	0.54	0.7	clear
		07/15/2015	27.5	7.4	1.12	1.3	-130	1.11	0.55	0.73	clear
		01/12/2016	24.2	7.23	1.11	4.5	-144	0.36	0.55	0.72	clear
		07/13/2016	28.2	7.17	1.04	3	-90	0.14	0.51	0.68	clear
		11/07/2017	26	7.18	1.01 *	2.2	-191	0.20 *	0.5	0.66	clear
		05/30/2018	25.4	7.12	1.36	0.86	363	0.08	0.07	0.89	clear
		03/06/2019	23	7.73	1.31	2.3	-67	0.33	0.07	0.85	clear
		10/31/2019	27.36	7.2	1.32	2.38	-168.6	0.18	-	-	clear
		3/18/2020	24.88	7.35	1.07	1.5	-87.6	0.16	0.53	-	clear
		9/18/2020	27.4	7.14	1.06	5.31	204.2	0.18	0.5	-	clear
		3/15/2021	26.5	7.1	1.12	2.1	-200.5	0.15	0.54	-	clear
		9/14/2021	29.03	7.13	0.813	1.44	-169.45	0.12	0.4	-	clear
		3/15/2022	24.98	7.14	0.984	1.22	-300.0	0.06	0.49	-	clear
		3/13/2023	26.6	7.17	0.571	7.74	-261.7	0.11	0.28	-	clear
SAMW0004D	45 to 50	05/29/2012	25.3	6.93	18.97	4.3	-102	0.13	11.28	12.36	clear
		01/28/2014	23.4	7.3	2.49	9.9	-87	0.21	1.3	1.62	clear
		07/22/2014	25.2	7.03	7.75	8.3	-100	0.98	3.95	4.64	clear
		01/22/2015	24.2	7.05	8.24	4.7	-157	0.16	4.57	5.36	clear
		07/15/2015	27.6	7.14	8.73	2.2	-146	0.98	4.85	5.68	clear
		01/12/2016	24.1	6.86	8.83	2.2	-194	0.3	4.93	5.74	clear
		07/13/2016	27.8	7.08	7.18	17.8	-276	0.05	3.91	4.66	clear
		11/07/2017	26.1	7.15	6.56 *	0.86	-252	0.21 *	3.59	4.29	clear
		05/30/2018	24.6	7.16	6.86	2.6	302	0.02	0.38	4.45	clear
		03/06/2019	22.6	7.33	8.61	1	-122	0.3	0.48	5.59	clear
		10/31/2019	27.15	7.12	8.33	2.43	-221.5	0.24	-	-	clear
		3/18/2020	25.35	7.3	8.48	3.96	-116.4	0.16	4.68	-	clear
		9/18/2020	27.3	7.16	6.59	3.08	-270.4	0.12	3.43	-	clear
		3/15/2021	25.6	7.09	8.17	8.11	-240.7	0.29	4.41	-	clear
		9/14/2021	29.04	7.14	5.004	1.4	-221.96	0.1	2.72	-	clear
		3/16/2022	23.97	7.17	6.481	0	-318.0	0.11	3.59	-	clear
		3/13/2023	26.06	7.16	5.8387	19.01	-312.8	0.11	3.21	-	clear

Notes:
- = Not recorded
% = Percent
* = Probe failed continuing calibration verification (CCV)
°C = Degrees Celsius
bls = Below land surface
g/L = Grams per liter
mg/L = Milligrams per liter
mS/cm = MilliSiemens per centimeter
mV = Millivolts
NTU = Nephelometric Turbidity Unit
pH = Negative log of hydrogen ion concentration
S.U. = Standard units
SWMU = Solid Waste Management Unit
Locations have prefix "MLPV-"

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
ASMW0001	35 to 40	09/22/2009	25.5	7.5	0.85	5.4	-275	0.87	0.41	0.55	clear
		03/23/2010	23.6	7.29	0.76	12.7	-184	0.62	0.37	0.49	clear
		10/01/2010	24.7	7.5	0.84	1.7	-80	0.32	0.41	0.55	clear
		03/15/2011	23.8	7.54	0.65	8.3	-151	1.46	0.32	0.43	clear
		09/26/2011	25.2	7.18	0.77	1.54	-128	0.26	0.37	0.5	clear
		03/16/2012	24.2	7.24	0.75	0.88	-141	0.27	0.37	0.49	clear
		08/24/2012	24.9	7.23	1.27	1.77	-146	8.59	0.63	0.83	clear
		03/18/2013	24.6	7.07	0.76	2.12	-106	0.15	0.37	0.5	clear
		10/25/2013	24.6	7.25	0.74	0.28	-133	0.66	0.36	0.48	clear
ASMW0002	35 to 40	09/22/2009	26.2	7.04	0.68	6.7	-314	0.74	0.32	0.43	clear
		03/23/2010	23.9	7.12	0.62	6.1	-278	0.46	0.3	0.4	clear
		10/01/2010	24.2	7.35	0.67	1.3	-176	0.14	0.33	0.44	clear
		03/15/2011	23.9	7.46	0.55	2.3	-225	0.96	0.27	0.36	clear
		09/23/2011	25	6.84	0.68	0.77	-202	1.64	0.33	0.44	clear
		03/16/2012	24.3	7.17	0.63	0.52	-198	0.29	0.31	0.41	clear
		08/23/2012	24.5	7.16	0.91	0.62	-293	1.5	0.44	0.59	clear
		03/18/2013	24.5	6.98	0.64	1.13	-206	0.17	0.31	0.41	clear
		10/25/2013	24.5	7.18	0.63	0.41	-217	1.17	0.3	0.41	clear
ASMW0003	35 to 40	09/22/2009	25.7	7.43	0.56	2.8	-318	0.59	0.27	0.36	clear
		03/23/2010	23.8	7.2	0.51	1.69	-271	0.43	0.25	0.33	clear
		10/01/2010	24.6	7.4	0.58	1.2	-166	0.11	0.28	0.38	clear
		03/15/2011	24	7.59	0.5	10.2	-223	0.51	0.24	0.33	clear
		09/23/2011	24.7	4.06	0.6	0.47	-247	0.72	0.29	0.39	clear
		03/16/2012	24.3	7.2	0.56	0.87	-212	0.26	0.27	0.37	clear
		08/23/2012	24.8	7.4	0.81	1.55	-207	6.69	0.39	0.53	clear
		03/18/2013	24.4	7	0.57	1.11	-190	0.16	0.27	0.37	clear
		10/25/2013	24.6	7.21	0.55	0.7	-178	0.84	0.26	0.36	clear
ASMW0004	35 to 40	09/22/2009	25.4	7.2	7.21	12	-38.2	0.18	3.97	4.7	clear
		03/24/2010	23	7.06	6.49	4.57	-94.9	0.41	3.54	4.22	clear
		10/01/2010	25.2	7.14	5.82	3	-108	0.31	3.15	3.78	clear
		03/15/2011	23.6	7.79	4.3	6.5	60.1	1.17	2.45	3.1	clear
		09/26/2011	24.7	7.15	6.33	3.49	-128	1.22	3.5	4.11	clear
		03/16/2012	24.1	7.29	4.54	1.26	-82.9	0.36	2.42	2.95	clear
		08/28/2012	25.1	7.08	7.09	2.12	-105	0.89	3.89	4.61	clear
		03/18/2013	23.8	7.04	4.14	2.08	-69.1	0.12	2.19	2.69	clear
		10/25/2013	24.4	7.05	4.26	2.26	-95.6	0.94	2.26	2.77	clear
		01/27/2014	23.8	7.1	4.31	6.31	35.8	0.51	1.4	2.52	clear
		04/17/2014	23.8	6.91	4.2	7.4	-62	0.21	2.23	2.73	clear
		07/22/2014	25.3	7.19	4.75	4.21	-131	0.64	2.54	3.11	clear
		10/27/2014	24.8	7.04	6.18	7.27	1	1.2	3.36	4.02	clear
		01/19/2015	23.7	7.42	5.04	9.39	-80	1.37	2.71	3.28	clear
		04/06/2015	24.7	7.13	3.8	3.1	195	1.29	2.01	2.45	clear
		07/14/2015	26.3	7.12	4.57	10.2	-61.2	0.38	2.43	2.97	clear
		01/11/2016	23.5	7.75	3.7	10.1	5.6	1.59	1.95	2.41	clear
		07/12/2016	26.3	7.42	3.11	3.09	-127	0.2	1.62	2.03	clear
		03/06/2017	23.9	7.39	2.31	4.8	-168	0.18	1.18	1.5	clear
		11/08/2017	25.2	9.23	3.37	1.75	-40.9	0.28 *	0.18	2.18	clear
		05/30/2018	25.8	7.2	3.51	7.96	-65.7	0.66	0.18	2.28	clear
		11/15/2018	24.2	7.21	4.01	5.45	-74	0.94	0.21	2.61	clear
		03/11/2019	25.3	6.78	4.26	7.24	15.8	1.45	-	-	clear
		11/1/2019	24.88	7.45	4.1	0.65	299.5	1.71	-	-	clear
		3/19/2020	24.72	7.4	3.54	1.27	15.2	0.24	1.87	-	clear
		9/16/2020	26.9	7.25	4.33	1.09	-41.3	1.17	2.19	-	clear
		3/17/2021	23.6	7.28	3.796	2.86	-25.6	0.21	2.06	-	clear
		9/15/2021	28.62	7.02	3.753	31.71	-149.72	0.13	2.01	-	clear
		11/17/2021	25.5	7.35	3.57	3.98	-193.8	0.3	-	-	clear
		3/15/2022	23.17	7.07	3.28	13.12	-111.7	0.09	1.74	-	clear
		3/8/2023	25.2	7.52	2.447	6.67	8.5	1.75	-	-	clear
		4/26/2023	25.28	7.32	2.103	15.02	-20	2.12	1.09	-	clear

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
ASMW0005	35 to 40	09/22/2009	26.7	7.46	32.7	0.45	-148	0.7	1.64	2.05	clear
		03/24/2010	23.3	7.27	2.49	3.16	9.5	1.3	1.28	1.62	clear
		10/01/2010	24.8	7.26	2.39	2.2	-96.3	0.89	1.22	1.56	clear
		03/15/2011	23.1	7.94	2.36	5.2	-7.5	2.19	1.26	1.51	clear
		09/23/2011	25.1	6.91	2.38	0.38	17.7	1.93	1.22	1.55	clear
		03/16/2012	23.9	7.33	1.41	0.37	-84.7	0.34	0.71	0.92	clear
		08/28/2012	25.2	7.11	3.01	0.78	-72.7	1.14	1.56	1.96	clear
		03/18/2013	23.8	7.03	1.71	0.8	-64.6	0.11	0.86	1.11	clear
		10/25/2013	24.4	6.97	2.26	0.36	-107	1.14	1.16	1.47	clear
		01/27/2014	23.7	7.17	2.22	3.79	1.8	0.34	1.21	1.15	clear
		04/17/2014	23.5	6.83	2.47	4.68	-39.3	0.15	1.27	1.6	clear
		07/22/2014	25.7	7.09	4.73	7.24	-135	0.46	2.5	3.06	clear
		10/27/2014	24.7	6.88	2.99	1.18	-40.4	0.79	1.55	1.94	clear
		01/19/2015	23.2	7.27	2.68	7.68	-71.6	0.44	1.39	1.74	clear
		04/06/2015	24.4	7.06	2.23	5.3	145	1.19	1.14	1.45	clear
		07/14/2015	25.1	7.17	2.34	2.17	119	0.94	1.2	1.52	clear
		01/11/2016	23.3	7.74	2.33	5.16	-26.4	0.66	1.2	1.51	clear
		07/12/2016	25.4	7.26	2.35	3.72	-28.2	0.65	1.2	1.53	clear
		03/06/2017	23.8	7.29	1.91	7.7	-109	0.17	0.97	1.24	clear
		11/08/2017	25.3	7.06	2.48	4.31	44.7	1.54	1.27	1.61	clear
		05/30/2018	25.1	7.14	2.78	1.86	7.4	1.87	0.14	1.81	clear
		11/16/2018	23.6	7.05	2.92	3.59	69.7	1.94	0.15	1.9	clear
		03/11/2019	25.2	6.6	3.27	3.13	58	2.63	-	-	clear
		11/1/2019	25.02	7.33	3.94	0.49	-244.2	4.28	-	-	clear
		3/19/2020	24.96	7.18	3.51	0.79	-15.4	0.61	1.84	-	clear
		9/16/2020	26.7	7.04	3.78	3.75	56.3	3.86	1.93	-	clear
		3/17/2021	24	7.17	3.43	4.76	60.9	1.72	1.83	-	clear
		9/15/2021	27.78	6.89	3.445	1.38	43.43	0.09	1.83	-	clear
		3/14/2022	23.74	6.86	2.898	3.88	8.9	0.08	1.41	-	clear
		3/9/2023	24	7.41	2.563	2.64	74.4	5.02	1.35	-	clear
		4/26/2023	25.33	7.29	1.911	16.74	31.6	5.56	0.98	-	clear
ASMW0006	35 to 40	09/22/2009	25.7	7.73	4.05	11	-363	0.69	2.11	2.6	clear
		03/24/2010	23.6	6.92	3.45	0.44	-124	0.28	1.81	2.24	clear
		10/01/2010	24.8	6.95	3.66	2.3	-110	0.29	1.93	2.38	clear
		03/15/2011	23.3	8.13	2.93	3.3	-88.9	1.95	1.56	1.96	clear
		09/23/2011	24.9	7.12	3.74	2.46	-131	1.03	1.97	2.43	clear
		03/16/2012	24.1	7.15	3.36	1.83	-84.7	0.34	1.76	2.18	clear
		08/24/2012	24.9	6.85	5.4	12.6	-128	0.56	2.91	5.4	clear
		03/18/2013	23.9	6.87	3.15	1.31	-95	0.12	1.64	2.05	clear
		10/25/2013	24.2	6.96	3.26	0.64	-88.3	1.15	1.7	2.12	clear
		01/27/2014	23.5	7.22	3.13	1.76	-1.8	0.2	1.73	2.03	clear
		04/17/2014	23.7	6.88	3.44	6.69	-51.1	0.18	1.8	2.24	clear
		06/20/2014	25	6.9	3.48	8.4	-80	0.16	1.82	2.26	clear
		07/22/2014	25.6	7.19	3.21	3.26	-113	0.27	1.68	2.1	clear
		10/27/2014	24.8	6.99	4.13	0.52	-69	0.45	2.19	2.69	clear
		01/19/2015	23.5	7.24	3.83	6.64	-106	0.22	2.02	2.49	clear
		04/06/2015	24.5	7.41	3.11	7.7	-82.1	0.73	1.62	2.02	clear
		07/14/2015	26	7.45	3.74	7.96	-119	1.01	1.97	2.43	clear
		01/11/2016	23.5	8.03	3.34	1.03	-106	0.34	1.75	2.17	clear
		07/12/2016	25.6	7.44	2.6	4.36	-134	0.07	1.34	1.69	clear
		03/06/2017	23.8	7.09	2.6	13.2	-65.3	0.18	1.34	1.69	clear
		11/08/2017	25.3	8.41	3.5	14.1	19.4	0.07 *	0.18	2.26	clear
		02/20/2018	24.5	7.04	3.33	4.04	-115	0.41	0.17	-	clear
		05/29/2018	26.6	6.91	3.16	1	-90.6	0.14 *	0.17	2.06	clear
		11/16/2018	23.9	7.03	3.02	10.2	-97.2	0.43	0.16	1.96	clear
		03/11/2019	25.2	6.86	3.19	0.95	-57.7	1.18	-	-	clear
		11/1/2019	25,19	7.33	3.98	0.61	-289.1	0.23	-	-	clear
		3/19/2020	24.89	7.1	3.91	6.77	-56	0.19	2.07	-	clear
		9/16/2020	26.6	6.99	3.93	1.08	-73.8	0.2	2	-	yellow tint
		3/17/2021	25.5	7.02	3.98	4.04	-68.2	0.14	2.08	-	clear
		9/15/2021	26.68	6.93	3.413	2.27	-99.34	0.13	1.81	-	clear
		3/14/2022	23.58	6.80	3.241	3.88	-61.4	0.10	1.72	-	clear
		3/9/2023	24	7.24	3.444	1.71	-85.2	0.4	1.87	-	clear
		4/26/2023	2.39	7.21	3.080	18.39	-223.2	0.09	1.63	-	clear

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0001D	50 to 55	6/3/2021	24.8	7.43	0.93	2.81	-212	0.77	-	-	clear
		9/16/2020	27.2	8.36	3.13	19.2	-182.6	0.1	1.67	-	yellow tint
IW0006IR	28 to 33	9/16/2020	28.8	7.07	5.99	5.22	-100.6	0.25	0.27	-	clear
		3/16/2021	25.7	7.45	1.197	2.13	-167.4	0.16	0.58	-	clear
		9/15/2021	26.57	7.17	0.85	26.32	-231.22	0.09	0.42	-	clear
		3/15/2022	23.14	7.28	1.069	1.97	-246.4	0.09	0.54	-	clear
		3/8/2023	25.3	7.66	1.28	8.59	37.7	8.96	0.63	-	clear
IW0028I	28 to 33	3/16/2021	24.9	7.55	2.76	1.44	-107.7	0.11	1.42	-	clear
		9/14/2021	27.64	7.3	2.639	20.44	-179.79	0.12	1.38	-	clear
		3/15/2022	25.50	7.30	2.580	3.42	-206.9	0.08	1.35	-	clear
		3/15/2023	20.45	6.98	0.9732	3.57	-324.4	0.3	0.49	-	clear
IW0031	25 to 35	09/27/2011	25.4	7.39	2.8	14.3	-137	0.85	1.45	1.82	clear
		08/24/2012	25.3	7.11	4.66	1.31	-177	1.43	2.49	3.03	clear
		03/18/2013	24.7	7.27	2.69	7.4	-75.8	0.15	1.39	1.75	clear
		10/25/2013	24.5	7.43	2.54	3.95	-117	0.96	1.31	1.65	clear
		04/17/2014	23.9	7.34	2.84	16.7	-100	0.08	1.47	1.85	yellow tint
		10/27/2014	25.2	7.38	2.71	10.6	-84.3	0.85	1.4	1.76	clear
		01/20/2015	24	7.7	2.67	6.94	-96.8	0.23	1.38	1.74	clear
		07/14/2015	26.3	7.36	2.32	7.68	-187	0.13	1.19	1.51	clear
		01/11/2016	23.8	7.9	2.33	1.4	-163	0.32	1.19	1.51	clear
		05/31/2016	25.5	7.58	2.17	4.31	-44.1	0.5	1.09	1.39	clear
		03/06/2017	24.6	7.49	2	7.2	-66.5	0.13	1.02	1.3	clear
		08/09/2017	26.3	7.61	1.77	2.7	-61.4	0.14	0.92	1.18	clear
		11/08/2017	25.7	6.69	1.98	3.55	-83.1	0.11	1	1.29	clear
		02/20/2018	24.7	7.22	2.03	3.17	-121	0.52	0.1	-	clear
		05/29/2018	25.6	7.14	2.14	6.08	431	0.1	0.11	1.39	clear
		11/16/2018	22.7	7.1	1.91	-	-96.2	0.5	0.1	1.24	clear
		03/12/2019	24.3	7.35	1.97	1.66	40	0.53	-	-	clear
		11/1/2019	25.17	7.14	2.04	1.18	-78.5	0.26	-	-	clear
		3/19/2020	26.66	7.18	3.83	2.62	-41.7	0.28	1.97	-	clear
		3/17/2021	23.1	7.19	1.78	7.65	-66.7	0.23	0.92	-	clear
		9/15/2021	28.5	7.52	1.809	13.29	-214.5	0.25	-	-	clear
		3/15/2022	25.69	7.13	1.581	8.93	-107.5	0.09	0.81	-	clear
		3/8/2023	24.8	7.76	1.611	1.37	-168.9	0.33	0.81	-	clear
		4/26/2023	26.05	6.98	1.471	12.46	-372.8	0.04	0.77	-	clear
IW0046	35 to 45	3/16/2021	25.7	7.28	13.79	3.26	-42	0.28	7.84	-	clear
		9/14/2021	28.78	7.13	11.542	6.75	-54.93	0.18	6.67	-	clear
		3/15/2022	25.39	7.02	13.156	2.55	-72.9	0.16	7.68	-	clear
		3/8/2023	25.7	7.92	1.136	1.53	-257.7	0.69	0.55	-	clear
		4/26/2023	25.53	7.64	10.093	12.44	-393.8	0.13	5.77	-	clear
IW0057	40 to 50	12/04/2014	23.9	7.14	0.75	14.3	-143	0.49	0.37	0.49	clear
		01/19/2015	24.2	7.46	6.02	18.6	-169	0.15	3.27	3.91	clear
		07/14/2015	25.1	7.09	5.19	15.3	-164	0.31	2.79	3.37	clear
		01/11/2016	23	7.85	5.36	5.39	-111	0.34	2.9	3.49	clear
		07/11/2016	26.5	7.69	4.26	2.96	-97.2	0.18	2.19	2.69	clear
		03/06/2017	24.3	7.24	5.46	15.5	-115	0.51	2.94	3.55	clear
		11/08/2017	25.3	7.27	5.25	3.7	-101	0.11	2.82	3.41	clear
		05/29/2018	26.5	7.07	5.52	5.54	-108	0.35 *	-	-	clear
		11/14/2018	25.5	7.05	5.33	2.86	-98.1	0.55	0.17	3.46	clear
		03/12/2019	24.4	7.09	5.59	9.15	-59.7	0.13	-	-	cloudy
		11/1/2019	24.5	7.19	5.34	0.59	-114	0.95	-	-	clear
		3/19/2020	26	7.21	5.29	1.08	-70.5	0.24	2.79	-	clear
		9/18/2020	27.1	7.18	5.66	2.47	-130.2	0.13	2.92	-	clear
		3/17/2021	23.4	7.25	5.78	4.36	-99.6	0.37	3.24		clear
		9/14/2021	26.8	7.36	4.088	14.21	-205.3	0.39	-	-	clear
		3/14/2022	23.57	7.21	6.085	17.69	-215.0	0.06	3.35	-	clear
		3/8/2023	24.46	8.25	0.1568	59.56	-118.9	4.8	0.07	-	clear
		4/26/2023	25.96	6.7	4.076	12.25	-169	0.08	2.19	-	clear

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0058	45 to 50	12/04/2014	23.8	7.25	1.78	18.6	-159	0.01	0.9	1.16	clear
		01/19/2015	24	7.47	2.13	18.2	-153	0.32	1.09	1.39	clear
		07/17/2015	24.7	7.09	2.66	12.7	-108	0.24	1.37	1.73	clear
		01/11/2016	22.9	8.02	3.32	11.2	-86.8	0.4	1.74	2.16	clear
		07/11/2016	26.9	7.51	2.04	4.1	-67.2	0.17	1	1.29	clear
		03/06/2017	24.1	7.26	3.14	15.3	-90.3	0.27	1.63	2.04	clear
		11/08/2017	25.2	9.40 *	3.51	5.54	117	0.07 *	0.18	2.27	clear
		05/29/2018	26.2	7.04	3.93	12.4	-99.2	0.18 *	0.21	2.56	clear
		11/14/2018	25.1	6.97	4	5.03	-91.5	0.69	0.21	2.6	clear
		03/12/2019	24.6	7.11	4.14	7.99	-52.5	-	-	-	cloudy
		11/1/2019	24.6	7.14	4.33	1.32	-117	0.66	-	-	clear
		3/19/2020	24.94	7.18	4.56	1.18	-58.4	0.37	2.44	-	clear
		9/18/2020	26.5	7.24	4.24	3.72	-125.9	0.25	2.18	-	clear
		3/17/2021	23.9	7.18	4.64	0.81	-93.9	0.25	2.54	-	clear
		9/14/2021	26.1	7.38	3.05	15.49	-205.6	0.25	-	-	clear
		3/14/2022	23.86	7.11	4.45	18.47	-192.4	0.06	2.40	-	clear
		3/9/2023	23.12	6.94	3.62	288.71	49.1	0.21	1.93	-	clear
IW0059	45 to 50	12/04/2014	23.7	7.27	5.63	13.1	-167	0.72	3.04	3.65	clear
		01/19/2015	23.3	7.55	0.72	13.9	-192	0.18	0.35	0.47	clear
		07/14/2015	24.8	7.02	0.86	13.4	-227	0.24	0.42	0.58	clear
		01/11/2016	23.2	7.85	1.23	2.99	-196	0.33	0.64	0.83	clear
		07/11/2016	25.5	6.99	1.19	15.5	-153	0.26	0.59	0.78	clear
		03/06/2017	24.2	7.07	2.7	7.9	-96.3	0.26	1.41	1.75	clear
		11/08/2017	25.8	7.1	3.14	0.99	-146	0.12	1.63	2.06	clear
		05/29/2018	27.6	6.91	3.7	41.1	-117	0.54 *	0.19	2.41	clear
		11/16/2018	22.9	7.06	3.29	8.68	-137	0.6	0.17	2.14	clear
		03/12/2019	24.5	7.04	3.34	8.98	-33.2	0.23	-	-	cloudy
		11/1/2019	27.5	7.07	3.07	0.38	-172	0.31	-	-	clear
		3/19/2020	25.24	7.17	3.16	1.64	-65.2	0.28	1.64	-	clear
		9/18/2020	27.2	7.18	3.02	1.37	-138.4	0.15	1.5	-	clear
		3/17/2021	24.5	7.18	2.9	12.36	-89.1	0.15	1.46	-	clear
		9/15/2021	26.5	7.4	1.476	6.12	-207.9	0.3	-	-	clear
		3/14/2022	24.22	7.11	3.024	6.19	-188.1	0.07	1.60	-	clear
		3/9/2023	24.17	7.02	1.6902	62.75	-155.6	0.17	0.86	-	clear
IW0060	40 to 50	12/04/2014	23.8	7.14	7.41	13.2	-155	0.02	4.08	4.81	clear
		01/19/2015	22.6	7.8	8.44	4.84	-246	0.16	4.69	5.46	clear
		04/06/2015	24.7	7.25	7.22	10.9	-231	0.25	3.99	4.72	clear
		07/14/2015	26	7.54	6.49	5.65	-124	1.1	3.53	4.21	clear
		01/11/2016	23.4	7.74	7.4	4.79	-137	0.29	4.08	4.8	clear
		07/13/2016	25.3	7.37	6.21	3.19	-91.8	0.1	3.35	4	clear
		03/06/2017	23.8	7.26	6.1	15.5	-74	0.17	3.25	3.96	clear
		11/08/2017	25.1	8.14	6.69	4.57	67.5	0.06 *	0.36	4.29	clear
		02/20/2018	24.5	7.07	7.55	4.89	-110	0.8	0.42	-	clear
		05/29/2018	25.8	7.04	6.69	18.2	-86.9	0.19 *	0.37	4.34	clear
		11/15/2018	24.5	7.14	6.38	4.28	-107	0.97	0.35	4.14	clear
		03/11/2019	25.3	7.02	5.71	5.12	-57	0.49	-	-	clear
		11/1/2019	25.28	7.56	6.71	5.57	-374.3	0.2	-	-	clear
		3/19/2020	25.22	7.25	6.5	1.64	-64.2	0.24	3.52	-	clear
		9/16/2020	26.5	7.25	6.74	1.02	-67.3	0.25	3.55	-	clear
		3/17/2021	25.3	7.11	6.8	5.32	-72.7	0.23	3.74	-	clear
		9/15/2021	26.89	7.1	5.787	1.63	-139.25	0.11	3.18	-	clear
		3/14/2022	23.57	6.94	5.592	2.99	-127.8	0.09	3.06	-	clear
		3/9/2023	24	7.41	6.781	5.12	-83.4	0.3	3.79	-	clear

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0061	35 to 40	01/18/2016	22.4	7.15	1.97	53.1	-192	0.25	1	1.28	light grey
		03/28/2016	24.8	8.83	2.2	155	-81.1	0.33	1.12	1.41	cloudy grey
		05/31/2016	24.3	7.88	2.04	6.91	-123	0.6	1.05	1.34	clear
		03/07/2017	24.6	7.63	2.08	16.2	-122	0.57	1.06	1.36	clear
		08/09/2017	25.9	7.31	1.81	3.73	-97.1	0.22	0.91	1.18	clear
		11/08/2017	25.5	10.6 *	2.08	0.98	17.7	0.05 *	0.11	1.34	clear
		02/20/2018	25.4	4.71	2.07	3.19	-172	0.22	0.1	-	clear
		05/30/2018	25.3	7.39	2.22	0.83	326	0.1	0.11	1.44	clear
		11/14/2018	25.4	7.25	2.05	0.68	-129	0.6	0.1	1.33	clear
		03/12/2019	24.2	7.28	2.04	11.6	-111	0.32	-	-	clear
		10/31/2019	27.5	7.44	2.16	0.51	-198	0.4	-	-	clear
		3/19/2020	25.97	7.48	3.74	2.18	-110.2	0.17	1.93	-	clear
		9/18/2020	26.6	7.45	1.92	2.25	-198.6	0.29	0.94	-	clear
		3/16/2021	26.4	7.46	2.07	5.32	-128.4	0.12	1.02	-	clear
		9/13/2021	27	7.62	1.397	11.52	-220.6	1.17	-	-	clear
		3/15/2022	24.23	7.40	2.192	2.94	-264.1	0.12	1.14	-	clear
		3/8/2023	27.8	7.78	0.0077	0	-269.3	7.88	0	-	clear
		4/26/2023	25.53	7.57	1.785	5.98	-298	0.05	0.92	-	clear
IW0062	40 to 45	01/18/2016	19.6	6.86	12	155	-422	0.16	6.86	7.83	grey
		03/28/2016	24.7	7.74	13.3	160	-68.2	0.25	7.62	8.62	cloudy grey
		05/31/2016	24.7	7.58	11.3	3.22	-124	0.62	6.48	7.41	clear
		03/07/2017	24.5	7.25	11.2	13.6	-126	0.26	6.33	7.25	clear
		08/09/2017	26	7.32	9.71	9.52	-96.8	0.19	5.45	6.31	clear
		11/08/2017	25.4	11.0 *	10.5	5.24	-49.6	0.07 *	0.59	6.81	clear
		02/20/2018	25.8	7.19	10.8	11.8	-118	0.27	0.61	-	clear
		05/30/2018	25	7.17	11	3.34	275	0	0.63	2.16	clear
		11/14/2018	25.5	7.15	9.59	2.67	-120	0.76	0.54	6.23	clear
		03/12/2019	24	7.36	9.89	14.4	-91	0.18	-	-	cloudy
		10/31/2019	28.6	7.18	9.84	2.65	-138	0.4	-	-	clear
		3/19/2020	25.86	7.26	17.74	2.29	-103.3	0.25	10.21	-	clear
		9/18/2020	27	7.18	9.04	1.62	-123.7	0.17	4.83	-	clear
		3/16/2021	26.7	7.19	9.42	15.32	-96.2	0.19	5.12	-	clear
		9/13/2021	26.9	7.44	6.051	16.2	-200.6	1.11	-	-	clear
		3/15/2022	24.44	7.23	8.772	12.62	-179.6	0.08	4.96	-	clear
		3/8/2023	25.12	7.33	6.6075	16.68	-279.6	0.17	3.66	-	clear
		4/26/2023	26.06	7.42	6.884	18.17	-241.4	0.07	3.83	-	clear
IW0063	35 to 40	01/18/2016	20.2	7.18	7.51	107	-484	0.17	4.17	4.9	grey
		03/28/2016	25	8.03	8.17	339	-78.7	0.21	4.53	5.32	cloudy grey
		05/31/2016	25.1	7.62	6.99	14.6	-130	0.5	3.82	4.53	clear
		03/07/2017	24.6	7.42	6.78	8.3	-117	0.15	3.71	4.41	clear
		08/09/2017	26	7.37	5.96	3.38	-88.4	0.14	3.23	3.87	clear
		11/08/2017	25.9	6.99	5.55	2.09	-121	0.11	2.99	3.6	clear
		02/20/2018	25	6.92	5.79	4.14	-117	0.35	0.31	-	clear
		05/29/2018	26	7.01	6.13	2.52	403	0.1	0.33	3.98	clear
		11/14/2018	26.2	6.72	5.92	2.51	-65.4	0.61	0.32	3.85	clear
		03/11/2019	25.9	6.21	6.2	13.2	-15.2	1.3	-	-	clear
		11/1/2019	25.6	6.95	5.75	0.79	-30.5	0.35	-	-	clear
		3/19/2020	25.57	7.02	11.33	2.57	-74.7	0.48	6.37	-	clear
		9/18/2020	28.2	7.14	5.62	4.15	-28.7	0.16	2.83	-	clear
		3/17/2021	23.6	7.02	4.7	4.64	-58.7	0.11	2.68	-	clear
		9/14/2021	27.2	7.41	3.089	6.21	-207.7	0.42	-	-	clear
		11/17/2021	26.3	7.37	4.45	2.79	-189.4	0.28	-	-	clear
		3/15/2022	25.03	7.07	3.843	6.85	-72.5	0.06	0.37	-	clear
		3/8/2023	25.8	7.6	4.452	14.44	-104.2	0.57	2.32	-	clear

Table 3-7
Biosparge Barrier Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0064	40 to 45	01/18/2016	24	6.95	16.4	115	-475	0.16	9.61	10.7	grey
		03/28/2016	24.9	7.77	18.5	14.2	-65.6	0.22	10.9	12	clear
		05/31/2016	24.9	7.39	15.7	10.6	-110	0.5	9.21	10.3	clear
		03/07/2017	24.7	7.24	16	16.6	-90.5	0.2	9.32	10.4	clear
		08/09/2017	26.1	7.18	13.9	12.3	-63.3	0.13	8	9	clear
		11/08/2017	25.9	7	14.5	15.6	-114	0.16	8.38	9.38	clear
		02/20/2018	24.9	6.88	14.9	4.21	-115	0.34	0.85	-	clear
		05/29/2018	26.2	6.94	15.4	0.78	437	0.09	0.89	9.95	clear
		11/14/2018	25.9	6.86	14.5	5.59	-97	0.48	0.84	9.4	clear
		03/11/2019	25.5	6.41	15.2	7.1	-54	0.2	-	-	clear
		11/1/2019	25.4	7.06	13.93	1.36	-103.9	0.23	-	-	clear
		3/19/2020	25.77	7.12	26.36	2.15	-84.9	0.27	15.96	-	clear
		9/18/2020	27.4	7.12	13.68	4.36	-125.7	0.08	7.41	-	clear
		3/17/2021	24.1	7.03	12.93	3.66	-69.1	0.11	7.58	-	clear
		9/14/2021	28.4	7.28	10.35	6.37	-200.7	0.93	-	-	clear
		11/17/2021	26.8	7.21	11.67	5.87	-185.4	0.25	-	-	clear
		3/15/2022	24.94	6.82	11.381	8.92	-86.2	0.04	6.57	-	clear
		3/8/2023	25.4	7.51	11.178	2.41	-109.4	0.97	6.29	-	clear

Notes:
- = Not recorded
% = Percent
* = Probe failed continuing calibration verification (CCV)
°C = Degrees Celsius
bls = Below land surface
g/L = Grams per liter
mg/L = Milligrams per liter
mS/cm = MilliSiemens per centimeter
mV = Millivolts
NTU = Nephelometric Turbidity Unit
pH = Negative log of hydrogen ion concentration
S.U. = Standard units
SWMU = Solid Waste Management Unit
ASMW0001 through ASMW0003 were removed from the sampling program in March 2014
Locations have prefix "MLPV-"
March 2023: IW0057 exhibited elevated DO and turbidity. These parameters will be monitored in the next sampling event.
April 2023: Observed elevated turbidity. Turbidity will be monitored in the next sampling event. Suspect silts from system operation.

Table 3-8
Hot Spot 3 (OFW Area) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
MW0011	25 to 35	11/10/2015	25.5	6.83	0.82	17.3	-299	0.38	0.4	0.53	clear
		01/11/2016	23.5	7.66	1.7	15.2	-236	0.29	0.86	1.11	clear
		07/11/2016	27.6	7.77	0.56	13.9	-250	0.21	0.26	0.35	clear
		02/20/2017	23.5	7.24	0.67	9	-336	0.13	0.34	0.45	clear
		08/09/2017	28	7.44	0.56	2.3	-233	0.13	0.27	0.36	clear
		02/19/2018	25.3	7.27	0.62	5.9	-261	0.05	0.03	-	clear
		08/06/2018	27.7	7.95	0.66	2.1	-329	0.1	0.03	0.43	clear
		02/18/2019	25.2	7.34	0.66	1.6	-325	0.50 *	0.03	0.43	clear
		10/31/2019	27.9	7.2	0.67	0.78	-311	0.79	-	-	clear
		9/18/2020	27.7	7.13	0.67	5.62	-308.7	0.14	0.31	-	clear
		9/15/2021	27.3	7.44	0.591	15.29	-208.8	0.18	-	-	clear
		12/14/2022	24.94	8.39	1.06	5.41	-312.5	0.17	-	-	clear
MW0012	15 to 25	11/10/2015	26.1	6.71	0.54	11.8	-238	0.13	0.26	0.35	clear
		01/11/2016	24.5	7.64	0.6	6.7	-267	0.22	0.29	0.39	clear
		07/11/2016	28.5	7.7	0.51	13.3	-234	0.17	0.23	0.31	clear
		02/20/2017	23.5	7.21	0.61	11.3	-344	0.09	0.3	0.41	clear
		08/09/2017	27.6	7.35	0.51	1.6	-237	0.1	0.24	0.33	clear
		02/19/2018	25.4	7.26	0.61	8.9	-294	0.07	0.03	-	clear
		08/06/2018	27	7.45	0.64	1.3	-341	0.01	0.03	0.42	clear
		02/18/2019	25	7.3	0.6	2	-313	0.57 *	0.03	0.39	clear
		10/31/2019	28	7.18	0.59	1.13	-322	0.78	-	-	clear
		9/18/2020	27.6	7.2	0.61	9.51	-306.5	0.13	0.28	-	clear
		9/15/2021	27.6	7.55	0.519	4.38	-212.7	0.13	-	-	clear
		12/14/2022	25.41	8.29	0.951	5.09	-314.2	0.25	-	-	clear
MW0013	20 to 25	09/13/2018	27.9	7.41	0.66	13.4	-312	0.4	0.32	0.43	clear
		02/18/2019	25	7.37	0.7	5	-224	0.51 *	0.03	0.45	clear
		10/31/2019	28.2	7.23	0.67	1.89	-319	0.36	-	-	clear
		9/18/2020	27.8	7.21	0.67	4.54	-242.3	0.21	0.31	-	clear
		9/15/2021	26.3	7.43	0.576	10.21	-209.7	0.22	-	-	clear
		12/14/2022	25.5	8.21	1.086	5.36	-302.7	0.39	-	-	clear
MW0014	25 to 30	09/13/2018	26.9	7.4	0.67	11.4	-315	0.51	0.32	0.44	clear
		02/18/2019	25.1	7.38	0.66	9.4	-317	0.45 *	0.03	0.43	clear
		10/31/2019	27.3	7.22	0.69	12.4	-474	0.08	-	-	clear
		9/18/2020	28.2	7.29	0.68	2.53	-306.7	0.12	0.31	-	clear
		9/15/2021	26.7	7.53	0.594	5.44	-214.9	1.02	-	-	clear
		12/14/2022	25.01	8.28	1.121	6.54	-322.7	0.37	-	-	clear

Notes:
- = Not recorded
% = Percent
* = Probe failed continuing calibration verification (CCV)
°C = Degrees Celsius
bls = Below land surface
g/L = Grams per liter
mg/L = Milligrams per liter
mS/cm = MilliSiemens per centimeter
mV = Millivolts
NTU = Nephelometric Turbidity Unit
OFW = Outstanding Florida Waters
pH = Negative log of hydrogen ion concentration
S.U. = Standard units
SWMU = Solid Waste Management Unit
Locations have prefix "VABRA-"

Table 3-9
Low Concentration Plume (LCP) Long-term Monitoring (LTM) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Cond-uctivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
IW0001D	50 to 55	6/8/2020	24.8	7.43	0.933	2.81	-212	0.77	0.46	-	clear
		3/9/2023	23.2	7.89	7.982	4.5	-167.9	0.46	4.59	-	clear
IW0002IR	28 to 33	3/8/2023	26.46	7.34	0.8242	0	-372.5	0.11	0.41	-	clear
IW0009I	28 to 33	3/14/2023	21.57	7.7	0.1744	9.13	-22.5	4.94	0.08	-	clear
IW0009D	45 to 50	3/13/2023	22.35	7.22	8.1533	10.95	-137.2	0.22	4.58	-	clear
IW0012D	45 to 50	3/14/2023	24.61	7.35	2.4205	1.96	-254.7	0.14	4.93	-	clear
IW0014I	35 to 40	3/14/2023	26.5	7.1	0.1803	8.13	15.3	0.37	0.09	-	clear
IW0017I	35 to 40	3/14/2023	22.6	7.53	0.3701	1.12	-49.4	0.65	0.23	-	clear
IW0018D	50 to 55	3/15/2023	19.3	7.38	6.179	1.58	-98.6	0.26	3.89	-	clear
IW0020D	65 to 70	6/3/2020	24.77	7.16	2.907	17.5	-116.7	0.33	1.52	-	clear
		3/21/2023	23.3	7.07	2.2432	2.11	-153.2	0.11	3.95	-	clear
IW0022D	48 to 55	3/15/2023	26.6	7.36	6.4238	5.1	-100.2	5.65	3.61	-	clear
IW0027I	28 to 33	3/9/2023	24.6	7.65	1.545	4.4	97.7	9.15	0.78	-	clear
IW0029D	42 to 47	3/15/2023	23.68	7.37	6.8119	2.85	-220.5	0.23	3.78	-	clear
IW0047	35 to 45	3/9/2023	24.81	7.16	1.3076	10.7	-229	0.42	0.66	-	clear
IW0049	38 to 48	3/15/2023	26.3	7.28	7.225	1.55	-99.3	4.01	4.52	-	clear
IW0050	40 to 50	3/9/2023	26.45	7.1	0.7929	2.18	-276.4	0.2	0.39	-	clear
IW0051	45 to 55	3/9/2023	26.61	7.1	5.8418	10.87	-195.5	0.19	3.21	-	clear
IW0052	40 to 50	3/14/2023	24.1	7.39	1.794	12.2	-101.3	0.12	0.93	-	clear
IW0053	35 to 45	3/13/2023	22.96	7.58	0.6658	2.26	-334.9	0.18	0.3	-	clear
IW0054	40 to 50	3/15/2023	24.18	7.43	0.5716	29.23	-366	0.18	0.28	-	clear
IW0055	40 to 50	3/14/2023	24.39	7.09	0.6824	2.26	-374.9	0.38	0.34	-	clear
IW0056	30 to 40	3/16/2023	24	7.2	0.776	13.01	-280.7	0.33	0.39	-	clear
MW0076	47 to 57	3/8/2023	27.91	7.46	7001.5	1.02	-223.5	0.31	3.95	-	clear
MW0077	25 to 35	3/8/2023	28.77	7.58	0.8	2.23	-440.7	0.1	-	-	clear
MW0078	25 to 35	3/8/2023	28.61	7.38	923.8	6.42	-279.6	0.61	0.49	-	clear
MW0079	25 to 35	3/8/2023	28.51	7.66	915.5	0.01	-274.4	0.36	0.48	-	clear
MW0080	47 to 57	3/8/2023	29.09	7.29	7.9	2.86	-292.5	0.12	-	-	clear
MW0081	25 to 35	3/9/2023	29.03	7.14	1329.6	0.58	-353.5	0.25	0.67	-	clear
MW0082	35 to 45	3/8/2023	28.64	7.58	1.8	27.14	-340.1	0.04	-	-	clear
MW0083	47 to 57	3/8/2023	28.13	7.61	9419.3	30.15	-269.7	0.34	5.14	-	clear
MW0084	47 to 57	3/9/2023	27.21	7.37	7017.9	6.88	-278	0.02	3.91	-	clear
MW0085	47 to 57	3/9/2023	28.11	7.3	4055.5	14.93	-230.6	0.07	2.18	-	clear

Table 3-9
Low Concentration Plume (LCP) Long-term Monitoring (LTM) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Cond-uctivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
MW0086	15 to 25	3/14/2023	23.61	6.89	589.1	15.52	-246.8	0.47	0.29	-	clear
MW0087	47 to 57	3/13/2023	25.36	7.27	3781.1	8.31	-266.7	0.2	1.41	-	clear
MW0088	35 to 45	3/14/2023	23.1	7.32	817.1	34.81	-255	0.11	0.42	-	clear
MW0089	35 to 45	3/14/2023	22.82	7.83	603.9	4.75	-299.3	0.19	0.34	-	clear
MW0090	47 to 57	3/13/2023	24.44	7.16	5557.2	2.13	-276.3	0.2	3.05	-	clear
MW0091	47 to 57	3/9/2023	26.02	7.6	4181.2	8.06	-235.7	0.15	2.25	-	clear
MW0092	47 to 57	3/9/2023	24.66	7.53	5188.2	2.42	-282	0.1	2.83	-	clear
MW0093	35 to 45	3/15/2023	23.87	8.45	1192.6	5.18	-351.5	0.16	0.65	-	clear
MW0094	35 to 45	3/8/2023	25.4	7.72	9265	1.7	-54.1	0.8	5.12	-	clear
MW0095	25 to 35	3/8/2023	25.5	7.68	649	1.73	-273.1	0.6	0.31	-	clear
MW0096	35 to 45	3/8/2023	26.52	7.77	8009.7	160.42	-306.9	0.29	4.5	-	clear
MW0097	35 to 45	3/9/2023	24.93	8.15	2746.8	2.1	-294.7	0.11	1.55	-	clear
MW0098	20 to 30	3/13/2023	26.5	6.87	0.1	4.78	82.3	6.9	0	-	clear
MW0099	40 to 50	3/13/2023	25.78	7.55	1190.5	9.15	-369.9	0.17	0.98	-	clear
MW0100	15 to 25	3/9/2023	24.78	6.77	720.3	6.75	-373.9	0.14	0.35	-	clear
MW0101	40 to 50	3/9/2023	26.1	7.35	917.2	11.98	-411.1	0.03	0.46	-	clear
MW0102	25 to 35	3/10/2023	24.52	7.38	2326	21.2	-202.5	0.12	1.21	-	clear
MW0103	35 to 45	3/10/2012	25.72	7.44	6119.9	95	-214.7	0.08	3.38	-	clear
MW0104	47 to 57	3/10/2023	24.55	7.6	3641.7	20.28	-380.8	0.09	1.94	-	clear
MW0105	47 to 57	3/10/2023	24.23	7.61	5011.8	42.5	-191.7	0.12	2.73	-	clear
MW0106	25 to 35	3/10/2023	24.84	7.26	1654.8	66.13	-276.3	0.09	0.85	-	clear
MW0107	35 to 45	3/10/2023	24.53	7.15	2044.2	62.97	-254.3	0.14	1.06	-	clear
MW0108	35 to 45	3/9/2023	23.93	7.39	1416.1	45.71	-314.4	0.11	0.72	-	clear
MW0109	20 to 30	3/9/2023	28.2	7.1	575.7	3.27	-382.9	0.17	0.29	-	clear
MW0110	1 to 11	3/9/2023	25.91	6.71	493.8	6.31	-328.3	0.2	0.24	-	clear
PRES-IW0009	40 to 50	3/9/2023	25.8	7.25	2.6959	12.29	-152.8	7.75	1.41	-	clear
WCPS-IW0001SR	2.5 to 12.5	9/14/2020	30.5	7.35	0.58	1.55	-99.2	0.39	0.25	-	clear
		3/9/2023	24.36	7.12	0.55	3.98	-356.2	2.19	0.27	-	clear
WCPS-IW0002SRR	3 to 13	3/9/2023	24.74	7.11	0.6665	2.44	-185.9	0.95	0.33	-	clear
WCPS-IW0005S	2 to 12	9/14/2020	29.9	7.69	0.34	1.65	-78.4	2.35	0.15	-	clear
		3/9/2023	25.99	7.33	0.5197	6.62	-270	2.06	0.25	-	clear
WCPS-IW0006S	3 to 13	6/3/2020	27.93	7.57	0.341	1.36	66.6	2.97	0.15	-	clear
WCPS-IW0015S	3 to 13	9/14/2020	30.7	7.4	0.41	1.65	-115.6	0.26	0.18	-	clear
		3/14/2023	23.49	7.41	0.5764	14.66	-255.8	0.21	0.28	-	clear
WCPS-IW0016	15 to 25	3/9/2023	24.81	6.87	0.6418	2.84	-400.5	0.13	0.32	-	clear

Table 3-9
Low Concentration Plume (LCP) Long-term Monitoring (LTM) Groundwater Geochemical Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area, SWMU 056

Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Cond-uctivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Total Dissolved Solids (g/L)	Color
VAB-IW0005D	52 to 57	6/8/2020	25.9	7.12	0.383	1.29	-212	0.49	0.18	-	clear
		3/9/2023	26.01	7.19	3.1262	5.4	-159.5	0.16	1.65	-	clear
VABU-IW0001I	22 to 30	6/8/2020	26.8	7.32	0.72	2.91	-146	0.4	0.34	-	clear
		3/10/2023	25.99	7.35	0.6363	0.52	-281.7	0.32	0.31	-	clear
SAMW0001	43.2 to 47.7	6/8/2020	27.3	6.64	5.89	5.99	-136	0.48	3.05	-	clear
		3/14/2023	25.07	7.14	3.1684	13.5	-247.9	0.13	1.9	-	clear
SAMW0002	43.2 to 47.7	6/8/2020	27.6	7	7.07	7.65	-100	0.3	3.67	-	clear
SAMW0003	43.2 to 47.7	6/8/2020	28.2	7.53	4	6.44	-163	0.45	1.51	-	clear
		3/16/2023	24.21	6.97	4.999	6.99	-234.8	0.3	2.72	-	clear
SATV-IW0009I	22 to 27	6/8/2020	27.6	7.38	0.897	1.92	-287	0.67	0.41	-	clear
		3/8/2023	29.51	7.34	0.001	8.43	-	0.1	-	-	clear

Notes:
1. ft bls = feet below land surface.
2. °C = degrees Celsius.
3. pH = negative log of hydrogen ion concentration.
4. S.U. = standard units.
5. mS/cm = milliSiemens per centimeter.
6. NTU = Nephelometric Turbidity Unit.
7. mV = millivolts.
8. mg/L = milligrams per liter.
9. % = percent.
10. g/L = grams per liter.
11. * = probe failed continuing calibration verification (CCV).
12. - = not recorded.
13. OFW = Outstanding Florida Waters.
14. Locations have prefix "VABRA-".
15. Thirteen additional monitoring wells were sampled using passive diffusion bags, therefore geochemical parameters are not present.

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
WCPS										
WCPS-IW0002 SRR	B1	3-13	New	WCPS	Replace IW0002SR, monitor E of 1SR	10/31/05 - 0.5 U (original IW002SR)	N/A	No	Original location was not located. Original well is below compacted gravel with debris fragments that interfere with metal detector readings. Installed replacement well based on coordinates.	2020 CMI Report, 2015 VABRA ECA Report
~~B2~~	~~B2~~	~~3-13~~	~~Proposed~~	~~WCPS~~	~~Tighten distance between downgradient well 15S and 1SR; may eliminate if 15S is determined sufficient~~	~~N/A~~	~~1105~~	~~N/A~~	Eliminated. 15S is sufficient	~~2020 CMI Report~~
MLPV-MW0100	B3	15-25	New	WCPS	Deeper interval well, downgradient of original source well IW0016	N/A	N/A	N/A		2020 CMI Report
WCPS-IW0001 SR		2.5-12.5	Existing	WCPS	Highest concentrations	9/14/20 - **54.3**	1475	VAB		2020 CMI Report
WCPS-IW0005 S		2-12	Existing	WCPS	Monitor to the W of 1SR	9/14/20 - 0.41U	N/A	No		2020 CMI Report
~~WCPS-IW0006 S~~		~~3-13~~	~~Existing~~	~~WCPS~~	~~Monitor to the NE of 1SR~~	~~6/3/20 - 0.41U~~	~~N/A~~	~~VAB~~	Eliminated. 5S is sufficient. Can be added later if groundwater flow variation determines necessary.	~~2020 CMI Report~~
WCPS-IW0015 S		3-13	Existing	WCPS	Downgradient - Eliminate from main sampling event since installing new well. Sample only if detections in new well.	9/14/20 - 0.41U	N/A	VAB	Currently used for water gauging only	2020 CMI Report
WCPS-IW0016		15-25	Existing	WCPS	Vertical evaluation	6/3/20 - 0.80 I	N/A	VAB		2020 CMI Report
1 to 25 Feet bls										
MLPV-MW0110	A1	1-10	New	South side of OPF	Recent data will determine if this isolated LCP is still present	N/A	1127 (**2.0** @ 6-10 ft bls)	N/A	Well installed west of proposed location due to access restrictions.	2015 VABRA ECA Report
WCPS-IW0002 SRR	B1	3-13	New	WCPS	Replace IW0002SR, monitor E of 1SR	10/31/05 - 0.5 U (original IW002SR)	N/A	N/A	Original location was not located. Original well is below compacted gravel with debris fragments that interfere with metal detector readings. Installed replacement well based on coordinates.	2020 CMI Report
~~B2~~	~~B2~~	~~3-13~~	~~Proposed~~	~~WCPS~~	~~Tighten distance between downgradient well 15S and 1SR; may eliminate if 15S is determined sufficient~~	~~N/A~~	~~1105~~	~~N/A~~	Eliminated. 15S is sufficient	~~2020 CMI Report~~
MLPV-MW0100	B3	15-25	New	WCPS	Deeper interval well, downgradient of original source well IW0016	N/A	N/A	N/A		2022 CMI Report
WCPS-IW0001 SR		2.5-12.5	Existing	WCPS	Highest concentrations	9/14/20 - **54.3**	1475	VAB		2023 CMI Report
WCPS-IW0005 S		2-12	Existing	WCPS	Monitor to the W of 1SR	9/14/20 - 0.41U	N/A	No		2024 CMI Report
~~WCPS-IW0006 S~~		~~3-13~~	~~Existing~~	~~WCPS~~	~~Monitor to the NE of 1SR~~	~~6/3/20 - 0.41U~~	~~N/A~~	~~VAB~~	Eliminated. 5S is sufficient. Can be added later if groundwater flow variation determines necessary.	~~2020 CMI Report~~
WCPS-IW0015 S		3-13	Existing	WCPS	Downgradient - Eliminate from main sampling event since installing new well. Sample only if detections in new well.	9/14/20 - 0.41U	N/A	VAB	Currently used for water gauging only	2026 CMI Report
WCPS-IW0016		15-25	Existing	WCPS	Vertical evaluation	6/3/20 - 0.80 I	N/A	VAB		2027 CMI Report
MLPV-MW0086	Z1	15-25	Existing	Launcher Road /Crawlerway	Confirm absence/presence of isolated low level TCE plume	N/A	1234 (TCE, **3.8**) 18-22	N/A	2023: TCE not detected.	2015 VABRA ECA Report

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
20 to 35 Feet bls										
MLPV-MW0095	C1	25-35	Existing	Outside NW corner of plume	Perimeter well to provide boundary/edge of NW corner of LCP since GCTL exceedance in nearby well - 28I screened 28-33 ft bls.	N/A	1207 (**2.7**), 1205 (1.0)	N/A	No detections in these DPT locations from 26-30 ft bls; however, detections and exceedances from 26-35 ft bls.	2015 VABRA ECA Report
MLPV-MW0102	C2	25-35	New	E side of rail road tracks	Verify absence or presence of VC downgradient in marsh/wetland area; downgradient of impacted well 6 IR screened 28-33 ft bls.	N/A	No DPT data in this area	N/A		2021 DPT Data, 2020 CMI Report
MLPV-MW0106	C3	25-35	New	E side of rail road tracks	Verify absence or presence of VC downgradient in marsh/wetland area, and downgradient of impacted well 6 IR screened 28-33 ft bls; provide boundary data.	N/A	No DPT data in this area	N/A		2021 DPT Data, 2020 CMI Report
MLPV-IW0002 IR	C4	28-33	New	Former Hot Spot 4	Replace IW0002 I screened 28-33, will provide data to determine absence or presence of LCP to the NW (in accompaniment to C1, C2, and C3).	5/17/2010 - 0.16 U (original well)	N/A	N/A		EGIS
MLPV-MW0109	C5	20-30	New	NW corner of OPF	Confirm presence/absence of isolated LCP NW of OPF.	N/A	1101 (1.5)	N/A		2015 VABRA ECA Report
MLPV-MW0078	C6	25-35	Existing	SW VAB paved lot	Last data from VAB RA (DPT). Recent data will determine whether this isolated LCP is still present. N end.	N/A	1257 (TCE **3.5**)	N/A	Groundwater flow in this area is SE 2023: TCE not detected	2015 VABRA ECA Report
MLPV-MW0077	C7	25-35	Existing	SW VAB paved lot	Last data from VAB RA (DPT). Recent data will determine whether this isolated LCP is still present. N and W sides.	N/A	1498 (TCE **3.8**)	N/A	Groundwater flow in this area is SE 2023: TCE not detected	2015 VABRA ECA Report
MLPV-MW0081	C8	25-35	Existing	SW VAB paved lot	Last data from VABRA (DPT). Recent data will determine whether this isolated LCP is still present. South/downgradient end. Verification not satisfied with SATV-IW0004I (25-30) because screened too shallow. TCE was detected at 31-35 ft intervals.	N/A	1523 (TCE **3.6**)	N/A	Groundwater flow in this area is SE 2023: TCE not detected	2015 VABRA ECA Report
MLPV-MW0079	C9	25-35	Existing	SW VAB paved lot	Last data from VAB RA (DPT). Recent data will determine whether this isolated LCP is still present. South/upgradient end. Located between DPT1526 and 1251 (centralized area of this plume. Also serves as downgradient well for plume to the NW). Verification not satisfied with SAT-IV0009 I(22-27) because screened too shallow.	N/A	1526 (DCE **90.3**), 1251 (DCE **94.8**)	N/A	Groundwater flow in this area is SE	2015 VABRA ECA Report
MLPV-MW0098	C10	20-30	New	SW of CCCPF	Confirm presence/absence of isolated LCP SW of Commercial Crew & Cargo Processing Facility.	N/A	1050 (TCE 9.2 @ 20-30 ft bls)	N/A	2023: TCE not detected	2015 VABRA ECA Report
MLPV-IW00006 IR		28-33	Existing	N edge of LCP	Monitor leading edge of LCP, N and center.	9/15/21 - **1.8**	N/A	BSA		2021 Data
MLPV-IW00027 I		28-33	Existing	N edge of LCP	Monitor leading edge of LCP, NE; 6 IR to the W had 1.8 VC in August 2021	11/8/16 - 0.50 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW00028 I		28-33	Existing	N edge of LCP	Monitor leading edge of LCP, NW	9/15/21 - **2.3**	N/A	BSA		2021 Data
MLPV-IW0009 I		28-33	Existing	N end Former Hot Spot 2	Obtain upgradient data for this interval. Want to monitor upgradient contamination at this interval. Evaluate whether detections at the edge of plume are residual, isolated, or being fed over time.	6/3/20 - 0.72 I	613 (**2.1**)	VAB	Likely residual	EGIS, 2018 CMI Report, 2020 CMI Report
VABU-IW0001 I		20-30	Existing	NW corner of Utility Annex	Part of existing LCP LTM plan and screened within interval	6/3/20 - 0.41 U	N/A	VAB		2020 CMI Report
SATV-IW0009 I		22-27	Existing	NW corner of Utility Annex	Part of existing LCP LTM plan and screened within interval	6/3/20 - 0.41 U	N/A	VAB		2020 CMI Report

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
35 to 45 Feet bls										
ASMW0004		35-40	Existing	N edge of LCP	Monitor leading edge of LCP, N and center	9/15/21 - 926	N/A	BSA		2021 Data
ASMW0006		35-40	Existing	N edge of LCP	Monitor leading edge of LCP, NE	9/15/21 - 0.41 U	N/A	BSA		2021 Data
MLPV-MW0096	D1	35-45	Existing	Former Hot Spot 4	Perimeter wells to provide boundary/edge of NW corner of LCP; no detections in DPT at the exact location; however, detections and exceedances to the E. Need recent data to determine extent of LCP in this direction otherwise open-ended. An area was brought up during previous ADP discussions.	N/A	1210 (**1.5, 1.6**) 36-45 ft bls	N/A	Non-detect below 45 ft bls	2015 VABRA ECA Report
MLPV-MW0094	D2	35-45	Existing	Outside of NW corner of plume	Perimeter well to provide more data at NW corner of LCP since GCTL exceedance in nearby well -46 screened 35-45 ft bls and exceedance in 2021 DPT samples (DPT0703)	N/A	1207 (**10.0**), 1205 (**1.6**), 703 (**25, 8**) 31-45 ft bls.	N/A	Highest detection at 36-40 ft bls, no recent data past 41-45 ft bls. Alternate location proposed: Other side of the railroad tracks.	2015 VABRA ECA Report
MLPV-MW0103	D3	35-45	New	E side of rail road tracks	Verify absence or presence of VC downgradient in marsh/wetland area; downgradient of impacted well -ASMW0004 screened 35-40 ft bls with concentrations exceeding NADCs.	N/A	no DPT data in this area, upgradient 631 (**37, 270**) 35-45 ft bls	N/A		2015 VABRA ECA Report
MLPV-MW0107	D4	35-45	New	E side of rail road tracks	Verify absence or presence of VC downgradient in marsh/wetland area, and downgradient of impacted wells -ASMW0004 and -ASMW0006 screened 35-40 ft bls; provide boundary data.	N/A	no DPT data in this area	N/A		2015 VABRA ECA Report
MLPV-MW0108	D5	35-45	New	NE edge of LCP	Monitor leading edge of LCP, NE, where 2021 DPT samples are located. No well currently exists to monitor this interval SE of the BS system.	N/A	707 (240), 708 (**9, 7**) 36-45 ft bls.	N/A		2015 VABRA ECA Report, 2021 Data
MLPV-MW0088	D6	35-45	Existing	SE edge of LCP	Provide perimeter data to the SE	N/A		N/A		2015 VABRA ECA Report
MLPV-MW0089	D7	35-45	Existing	NE of VAB	Latest data are from VAB RA (DPT). Recent data will provide current conditions south/upgradient of air sparge area. Verify whether the plume terminates here for 35-45	N/A	535 (**17.2**, **39.9**)	N/A	Detections were reported at shallower intervals at 535 (from 2010); however, downgradient locations 604, 623, and 617 were sampled in 2018 indicated no exceedances/detections at this interval. Assumed attenuated, therefore focused on 35-45 ft bls interval.	2015 VABRA ECA Report
MLPV-MW0093	D8	35-45	Existing	N of VAB	Confirm presence/absence of LCP at that distance to the W; nearby well IW0012 I is screened to 40 ft; however, DPT detections were from 41-45 ft bls. The one interval with no corresponding well in this area. Propose installing 75 ft S of IW0012I and 12D, closer to historical DPT location.	N/A	1058 (**29.4**) 41-45 ft bls	N/A	Non-detect below 45 ft bls	2015 VABRA ECA Report
MLPV-MW0097	D9	35-45	Existing	Center MLP	Recent data will determine whether this isolated LCP is still present.	N/A	1480 (**1.9**), 1220 (TCE **3.7**) 41-45 ft bls	N/A	Non-detect below 45 ft bls 2023: TCE not detected	2015 VABRA ECA Report
MLPV-MW0082	D10	35-45	Existing	SW VAB paved lot	Low-level TCE detected in historical DPT location at an interval where there is currently no well screened. Last data from VAB RA (DPT). Recent data will determine whether this isolated LCP is still present. South/upgradient end.	N/A	1267 (TCE 3.6, 4.6) 36-45 ft bls	N/A	2023: TCE not detected	2015 VABRA ECA Report

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
MLPV-IW0011 I		35-40	Existing	N of VAB	Central portion of both LCP and HCP	9/13/21 - 0.41 U	N/A	HS2		2021 Data
MLPV-IW0012 I		35-40	Existing	N of VAB	Monitor southern W edge of LCP	5/26/16 - 0.50 U	N/A	VAB		EGIS
MLPV-IW0014 I		35-40	Existing	NE VAB	Provide upgradient data from 35-40 intervals. Upgradient of the air sparge area.	8/19/14 - **3.2**	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW0017 I		35-40	Existing	E edge of LCP	Provide perimeter data to the E	10/28/05 - 0.50 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW0046		35-45	Existing	N edge of LCP	Monitor leading edge of LCP, NW	9/15/21 - **10**	N/A	BSA		2021 Data
MLPV-IW0047		35-40	Existing	N of VAB	Monitor northern W edge of LCP	6/2/20 - 0.56 I	N/A	VAB		
MLPV-IW0049		38-48	Existing	S of VAB	Recent data will provide current conditions. SW corner of VAB. May help tighten LCP boundary.	5/26/16 - 0.50 U	N/A	VAB	Currently used for water gauging. Sample if D7 (new well to the NE) returns noteworthy exceedances.	EGIS
MLPV-IW0056		30-40	Existing	S of VAB	Recent data will provide current conditions. SE corner of VAB. May help tighten LCP boundary.	5/25/16 - 0.50 U	N/A	VAB	Currently used for water gauging. Sample if D7 (new well to the N) returns noteworthy exceedances.	EGIS
MLPV-SAMW0001		43-48	Existing	NE of VAB	Part of existing LCP LTM plan and screened within interval	6/3/20 - 0.41 U	N/A	VAB		2020 CMI and IM Report
MLPV-SAMW0003		43-48	Existing	NE of VAB	Adjacent to IW0014I(35-40). SAMW0003 provides data from 43-48. Together, they provide data from 35-45. Eliminates need for a new well in this location	6/3/20 - **3.3**	N/A	VAB		2020 CMI and IM Report
MLPV-IW00053		35-45	Existing	N of VAB	Part of existing LCP LTM plan and screened within interval.	6/3/20 - **76**	N/A	VAB		2020 CMI and IM Report
Greater than 45 feet bls										
MLPV-MW0104	E1	47-57	New	N edge of LCP	Leading edge of LCP, downgradient HCP, N and center. Screen 47-57 based on 2013 cross-section. Upgradient detections at 45-50 in IW0009D and 50-55 in IW0001D (1D resampled in 2020 and not >GCTL). DPT is greater than NADC in 2021 from 41-49 ft bls.	N/A	631 (180) @45-49 ft bls	N/A	Also proposing to install D3 (35-45) adjacent to this one; Installation will depend on accessibility - clearing and dry conditions.	2021 DPT data
MLPV-MW0105	E2	47-57	New	NE edge of LCP	Monitor leading edge of LCP, NE, downgradient of 2021 DPT samples	N/A	708(200), 707(**15**), 706(850)	N/A		2021 DPT data
MLPV-MW0091	E3	47-57	Existing	N of VAB	Confirm presence or absence to the E. 2021 DPT data indicated low VC below 47 ft bls.	N/A	638(**48**)@45-49	N/A		2021 DPT data
MLPV-MW0087	E4	47-57	Existing	N of VAB	Last data from VAB RA (DPT). Recent data will provide current conditions. Southwest/upgradient of air sparge area.	N/A	623(**94.3**) in 2018, 640(320) in 2021	N/A		2019 CMI Report, 2021 DPT data
MLPV-MW0092	E5	47-57	New	N of AS area	In the location of 2021 DPT 642 with low-level VC at 51-55 ft bls.	N/A	642(**8**)	N/A	Shifted south of proposed location due to rig access.	2021 DPT data
MLPV-MW0099	E6	40-50	New	NW of VAB	Determine whether VC still extends to this reach considering groundwater flow and age of current data.	N/A	1484(**14.4, 6.2**), 1054(**537**), 1488 (**4.6, 10.4**) in 2013	N/A	Centralized within several historical DPT locations.	2015 VABRA ECA Report
MLPV-MW0101	E7	40-50	New	W of VAB	Determine extent of reduction or if LCP persists in this brand of the plume based on groundwater flow direction.	N/A	1126(**7.4**) in 2012	N/A		2015 VABRA ECA Report
Pending Installation	E8	45-55	New	S of VAB	Confirm absence/presence in this area. No data since VABRA DPT.	N/A		N/A	Pending installation in Fall 2023	2015 VABRA ECA Report

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
MLPV-MW0085	E9	47-57	Existing	S of VAB	Confirm absence/presence contamination to the SE	N/A	1272(**2.6**) in 2013	N/A	Located in a central location of the plume's bend. It appears wells IW0050 and IW005D have been installed in areas with higher concentrations detected during the VABRA DPT Event. Intervals 46-50 and 51-55 were impacted.	2015 VABRA ECA Report
MLPV-MW0084	E10	47-57	Existing	S of VAB	Confirm absence/presence contamination at the southern most end of the plume	N/A	1378(**2.6**) in 2013	N/A	Located in a central location of the plume's SW tip. Intervals 46-50 and 51-55 were impacted.	2015 VABRA ECA Report
MLPV-MW0076	E11	47-57	Existing	S of VAB	Confirm absence/presence of isolated plume to the SE; N end. Located in a centralized point where the sample had the highest concentration.	N/A	1501(**5.7**)	N/A		2015 VABRA ECA Report
MLPV-MW0080	E12	47-57	Existing	S of VAB	Confirm absence/presence of isolated plume to the SE; Mid-center of plume.	N/A	1251(**2.8**)	N/A		2015 VABRA ECA Report
MLPV-MW0083	E13	47-57	Existing	S of VAB	Confirm absence/presence of isolated plume to the SE; S end	N/A	1267(**1.7**)	N/A	SATV-IW0010 (40-50) is screened above the areas where VC was detected (51-55)	2015 VABRA ECA Report
MLPV-MW0090	E14	47-57	Existing	E side of VAB	Provide data in 'gap' E of E4 and South of E4.	N/A	N/A	N/A		
Pending Installation	E15	47-57	New	E side of VAB	Verify detections following NADC exceedances at 46 to 50 feet bls. GCTL exceedances from 31 to 55 feet bls.	N/A	1341 (**280**)	N/A	Pending installation in Fall 2023	2015 VABRA ECA Report
MLPV-IW0018D		50-55	Existing	E of VAB	Completes 47-57 interval when sampled together with MLPV-0020D	6/3/20 - **3.1**	N/A	VAB		2020 CMI Report
MLPV-IW0020D		45-50	Existing	E of VAB	Completes 47-57 interval when sampled together with MLPV-0018D	6/3/20 - 0.41 U	N/A	VAB		2020 CMI Report
MLPV-IW0001D		50-55	Existing	N edge of LCP	Vertical well at leading edge of LCP and HCP, N and center.	9/16/20 - 0.41 U	N/A	VAB	Deeper than 27D and 28D	2020 CMI Report
MLPV-IW0005D		52-57	Existing	SW of VAB	Provides complete 47-57 ft bls interval data when sampled with IW0050 (40-50). Dept data where these wells were installed indicated exceedances at 46-50 and 51-55 ft bls in 2013.	6/3/20 - 0.41 U	N/A	VAB	Alternate ID: MLPV-VAB-IW0005D; If abandoned, replace with new well screened from 47-57 ft bls.	2020 CMI Report
MLPV-IW0012D		45-50	Existing	SW of AS Area	Provide partial interval data SW area of LCP. Only well that shares 47-57 screen within this area of the LCP.	6/3/20 - **9.7**	N/A	VAB		2020 CMI Report
MLPV-IW0022D		48-55	Existing	SW of VAB	Verify border to the SW and concentrations close to the VAB facility	11/12/10 - 0.22 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW0029D		42-47	Existing	NW of VAB	Confirm presence/absence of LCP at center of first 'arm'	10/4/18 - **40**	N/A	VAB		EGIS
MLPV-IW0050		40-50	Existing	SE of VAB	N of E18 and 19, north/upgradient end of 'foot' (groundwater flow to ESE). Provides complete 47-57 ft bls interval data when sampled with IW0005D (52-57). DPT data where these wells were installed indicated exceedances at 46-50 and 51-55 ft bls in 2013.	5/25/16 - 0.50 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW0051		45-55	Existing	S of VAB, W of E17	Confirm absence/presence contamination at SE most end of plume	5/25/16 - 0.50 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW00052		40-50	Existing	NE of VAB	Part of existing LCP LTM plan and screened within interval	6/3/20 - **73.8**	N/A	VAB		2020 CMI Report
MLPV-IW0054		40-50	Existing	N of VAB	Confirm presence/absence of LCP at that distance to the W	5/26/20 - 0.50 U	N/A	VAB	Currently used for water gauging only	2020 CMI Report
MLPV-IW0055		40-50	Existing	NW of VAB	Confirm absence/presence of contamination at western most 'arm'	5/25/16 - 0.50 U	N/A	VAB	Currently used for water gauging only	EGIS
MLPV-IW0060		40-50	Existing	N edge of LCP	Monitor leading edge of LCP, NE	9/15/21 - **4.4**	N/A	BSA		2020 CMI Report
MLPV-IW009D		45-50	Existing	NW of AS area	Provide partial interval data W of E5 (47-57)	6/3/20 - **32.6**	N/A	VAB		2020 CMI Report
PRES-IW0009		40-50	Existing	Press Site	Part of existing LCP LTM plan and screened within interval.	6/2/20 - 1.2	N/A	VAB		2020 CMI Report

Table 3-10
Updated LCP LTM Monitoring Well Network Rationale
Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056

Well ID	Temporary Well ID	Screened Interval	Status	General Area	Purpose / Rationale	Date of Nearby Well Last Sampled - VC (µg/L)	Nearest Historic DPT Location: (VC in ug/L in proposed well screen interval)	Part of Existing Sampling Plan?	Comments	Source
Hot Spot 3 OFW/ Hot Spot 3 Area										
This area was not included in the LCP evaluation. The plume associated with these areas is evaluated in connection with the ongoing IM activities within Hot Spot 3.										

Notes:
Objective: Select existing wells and propose new locations for observing present LCP condition, not to delineate. May overlap with HCP footprint.
2013 Cross-section within Former Hot Spot 2 indicates low permeability soil layer beginning at 46 ft bls.
BSA DPT locations from Field Memo for March and April 2021 DPT sampling event.
HS2 DPT data from Table 4-10 of the MLPV CMI and IM - Section VI, August 2019, p.104 of the PDF.
HS2 DPT locations from Figure 3-1 "DPT Sampling Locations Around the Air Sparge System" of the MLPV CMI and IM - Section VI, August 2019, p.42 of the PDF.
HS3 OFW DPT data from Table 6-3 of the MLPV CMI and IM - Section VI, August 2019, p.180 of the PDF.
HS3 OFW DPT locations from Figure 6-2 "Hot Spot 3 OFW Summary of Sampling Results" of the MLPV CMI and IM - Section VI, August 2019, p.185 of the PDF.
Unknown pockets of confining layers (clay). Soil will be examined during well installation, and the screen depth adjusted as needed.
VAB Area DPT data from Table 4-3 of the VABRA ECA, May 2015, p.165 of the PDF and Figure 4-23 "Summary of CVOC Exceedances in Groundwater" p.264 of PDF.
VAB Area DPT locations from Figure 3-4 "DPT Groundwater Sampling Locations" of the VABRA ECA, May 2015, p.145 of the PDF.
* = Recommendation to install concurrently with a future event
ADP = Advance data package
bls = Below land
BSA = Biosparge Area
CCCPF = COMMERCIAL CREW & CARGO PROCESSING FACILITY (K6-0696)
CMI = Corrective Measures Implementation
CVOC = Chlorinated Volatile Organic Compounds
DPT = Direct Push Technology
DCE = Dichloroethene
ECA = Environmental Conditions Assessments
EGIS = Environmental Geographic Information System (for Kennedy Space Center)
ft = Feet
GCTLs = Groundwater Cleanup Target Levels
HCP = High Concentration Plume
HS2 = Former Hot Spot 2
HS3 = Hot Spot 3
ID = Identification
IM = Interim Measures
LCP = Low Concentration Plume
LTM = Long Term Monitoring
ug/L = micrograms per liter
MLPV = Mobile Launch Platform Rehabilitation Sites and VAB Area
NADC = Natural Attenuation Default Concentration
N/A = Not Applicable
OFW = Outstanding Florida Waters

Bold = Exceeds GCTLs
Red text = Exceeds NADC
blue text = Updated information
OPF = Orbiter Processing Facility
PDF = Portable Document Format
TCE = Trichloroethene
U = Anayte was not detected above the laboratory method detection limit
VAB = Vehicle Assembly Building
VABRA = Vehicle Assembly Building Re-Assessment
VC = Vinyl chloride
WCPS = West Crawler Park Site

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4. FORMER HOT SPOT 2 REMEDIAL ALTERNATIVES EVALUATION

A remedial alternatives evaluation (RAE) was completed for the Former Hot Spot 2 area where an air sparge treatment system operated from 2012 to 2018 (**Appendix U**). The air sparge wells were installed in sand lithology to approximately 45 feet bls, where the lithology transitions to deeper finer-grained clayey sands. The air sparge system targeted groundwater above 45 feet bls and achieved the CAO to decrease CVOC concentrations to less than NADCs within the treatment area. Following shutdown of the air sparge system in 2018, interim groundwater monitoring has consistently shown VC concentrations greater than their NADCs in deeper groundwater (below 45 feet bls). The RAE developed and compared remedial alternatives to meet a CAO to reduce VC mass flux from the Former Hot Spot 2 area and achieve GCTLs upgradient of the biosparge barrier to eliminate the need for continued operation of the system. The biosparge barrier system (screened 46 to 48 and 48 to 50 feet bls), when operating, prevents the downgradient migration of CVOC concentrations greater than their GCTLs.

4.1 SITE CHARACTERIZATION SUMMARY

To support development of the RAE, a DPT groundwater sampling event was completed in 2021 to evaluate groundwater quality that included deeper (below 45 feet bls) groundwater (NASA 2022). In 2022, five soil cores were collected to include characterization of deeper lithology to support evaluation of remedial alternatives (**Section 2.1**). In addition, interim groundwater monitoring through 2023 in the monitoring well network throughout the Former Hot Spot 2 area and the Biosparge Area provided groundwater quality data used to assess site conditions.

Within the Former Hot Spot 2 area, sands are the primary lithology to approximately 45 feet bls, which was targeted by the air sparge system from 2012 to 2018. From approximately 45 to 55 feet bls, clayey or silty sand was observed. Lean clay with sand was observed from 55 to 60 feet bls. To evaluate the feasibility of air sparging to remediate deeper (below 45 feet bls) groundwater, soil cores from the clayey and silty sands (50 to 55 feet bls) were analyzed for fines content and hydraulic conductivity (**Section 2.1**). The fines content (soil grain sizes equal to or less than silt) ranged from 17% to 95% resulting in hydraulic conductivities of the soil cores that ranged from 3.5E-8 centimeters per second (cm/s) to 8.7E-5 cm/s. The hydraulic conductivities of the soil cores are one or more orders of magnitude less than the practical limits of air sparging, which is 1E-3 to 1E-4 cm/s. Thus, air sparging is not expected to be effective in the Former Hot Spot 2 area below 45 feet bls and was not retained in a remedial alternative.

Based on a review of site conditions, remediation history, and interim groundwater monitoring; the conceptual site model is summarized as follows:

- Most CVOC mass in the Former Hot Spot 2 area was present in groundwater and the sand lithology above 45 feet bls and migrating north towards the biosparge barrier area prior to

implementation of air sparging. CVOCs diffused from the sands into clayey sand (below 45 feet bls) within the footprint of the CVOC plume in the sand.

- During air sparging from 2012 to 2018, CVOCs were removed from the sand above 45 feet bls, which enhanced diffusion and removal of CVOCs from the clayey sand below 45 feet bls. Thus, operation of the air sparge system decreased mass flux of CVOCs to the biosparge barrier.
- After air sparging stopped (post 2018), the mass of CVOCs, primarily VC, in sand above 45 ft bls is attenuating and the VC mass flux towards the biosparge barrier is decreasing. The 2021 DPT investigation showed that cDCE and VC mass remains in clayey sand (below 45 ft bls) and is the source of VC in the sand above 45 ft bls via matrix diffusion from the clayey sand.
- Although natural attenuation of VC in the sand appears to be greater than the rate of matrix diffusion to the sand from the clayey sand, concentration trends indicate that VC concentrations are expected to remain greater than its NADC and GCTL and require operation of the biosparge barrier for many years.

4.2 DEVELOPMENT OF ALTERNATIVES

Given the current understanding of the conceptual site model, remedial technologies were screened based on effectiveness, implementability, and relative cost. Technologies that were retained to be included in remedial alternatives are:

- Institutional Controls
- Natural Attenuation
- Bioaugmentation
- In Situ Chemical Reduction (ISCR)
- Permeable Reactive Barrier (PRB)

Institutional Controls in the form of a Land Use Control Implementation Plan (LUCIP) is currently in place. The LUCIP prohibits groundwater use until cleanup objectives and site closure are achieved. Analysis of plumes and concentration trends shows natural attenuation is actively occurring in the Former Hot Spot 2 area. Thus, natural attenuation is retained as a separate remedial alternative and is combined with other remedial technologies to achieve the CAO.

ISCR is the remedial technology retained to actively destroy CVOCs in situ by abiotic and biotic processes. Abiotic destruction of CVOCs occurs via beta elimination and hydrogenolysis through direct contact of chlorinated ethenes with zero-valent iron (ZVI) and iron sulfides. Under anaerobic conditions, ZVI is oxidized to ferrous iron that forms iron sulfide precipitates when sulfate is present and reduced to sulfide. Applications of ISCR typically include a slow-release organic substrate that promotes the biotic reduction of CVOCs via enhanced reductive dechlorination (ERD). Although ERD is not the primary method for CVOC destruction in an

ISCR remedy, bioaugmentation can be included in the ISCR amendment to ensure the presence of the appropriate microbial consortia that is known to completely reduce CVOCs to ethene.

ISCR is implemented by injecting ZVI and other amendments into the subsurface using a grid approach and/or PRB approach. A grid approach injects the ISCR amendment within the footprint of the treatment area, whereas a PRB approach injects the ISCR amendment along a transect that is typically perpendicular to groundwater flow to treat groundwater within the treatment area as it flows through the PRB.

Three remedial alternatives were developed from the retained technologies and evaluated:

1. Monitored Natural Attenuation with Long-Term Monitoring (LTM)
2. ISCR PRB
3. ISCR Grid

4.2.1 Alternative 1 – Monitored Natural Attenuation with LTM

Alternative 1 is the current site management strategy after the air sparge system was shutdown in April 2018 and includes ongoing interim groundwater monitoring. Groundwater monitoring since 2018 shows that the dissolved mass of VC within the NADC plume has decreased approximately 70 grams per year indicating natural attenuation is occurring. To further aid in the evaluation, two monitoring wells MLPV-IW0038 and MLPV-IW0039 were sampled for monitored natural attenuation parameters (**Table 4-1**). Alternative 1 requires operation of the downgradient biosparge barrier until GCTLs are achieved upgradient of the biosparge barrier (downgradient edge of the Hot Spot 2 area). In addition, Alternative 1 includes annual review of the groundwater monitoring data to optimize the monitoring program and to evaluate plume behavior and confirm reduction in VC plume mass and extent.

To estimate the time for Alternative 1 to meet the CAO, VC concentration trends at two wells (MLPV-IW0057 and MLPV-IW0058) located near the centerline of the VC plume and immediately upgradient of the biosparge barrier were evaluated. Assuming exponential decay, the estimated time for VC to decrease below its GCTL is approximately 20 years at MLPV-IW0057 and more than 30 years at MLPV-IW0058. The estimated cost for Alternative 1 is $7.5M to $13.4M to continue groundwater monitoring and biosparge system operation for 20 to 30 years.

4.2.2 Alternative 2 – ISCR PRB

Alternative 2 includes the installation of two PRBs to treat cDCE and VC mass flux in the primary plume migration pathway from 40 to 45 feet bls (**Figure 4-1**). PRB #1 would be installed within the cDCE GCTL plume to decrease mass flux of cDCE, which is a source of VC. PRB #2 would be installed in the VC NADC plume to decrease mass flux of VC upgradient of the biosparge barrier. Both PRBs would be installed from approximately 35 to 47 feet bls in the

more permeable sand and keyed into the underlying clayey sand. Upgradient of the PRBs, cDCE and VC mass would continue to naturally attenuate. The biosparge barrier would continue to operate until GCTLs are achieved upgradient of the biosparge barrier.

The conceptual design used to estimate the cost for the PRBs including the ISCR product, injection spacing, and dosing are similar to the ISCR design for Hot Spot 3 (IMWP currently undergoing review). The ISCR product is Provect-IR; the assumed dosing rate is 0.6% of soil mass; and the injection point spacing is 20 feet (assumes 15 feet radius of distribution). The cost for Alternative 2 includes 20 ISCR injection points and 102,000 pounds of Provect-IR. Although bioaugmentation was not included in Alternatives 2 and 3, bioaugmentation can be included in a final ISCR design for a relatively minimal cost compared to the total cost. The estimated treatment lifespan for the PRBs is 5 to 10 years.

The estimated time for VC to decrease to its GCTL at the biosparge barrier (approximately 250 feet downgradient of PRB #2) is 5 years, during which the biosparge barrier will continue to operate. This estimated time is uncertain and depends on the groundwater travel time between PRB #2 and the biosparge barrier, the VC attenuation rate, and the rate of matrix diffusion from the clayey sand to the sand. The cost for Alternative 2 also assumes NADCs will be achieved upgradient of PRB #2 in 5 years followed by 10 years of interim groundwater monitoring for CVOCs to attenuate to GCTLs. The estimated cost for Alternative 2 is $2.8M and includes $535,000 in capital costs to install the PRBs and $2.3M in recurring costs (15 years of groundwater monitoring and 5 years of biosparge system operation).

4.2.3 Alternative 3 – ISCR Grid

Alternative 3 includes the installation of an ISCR treatment area that treats cDCE and VC mass flux in the primary plume migration pathway from 40 to 45 feet bls (**Appendix U**). The treatment area is the extent of the VC NADC plume and would treat matrix diffusion of cDCE and VC from clayey sand to the sand while the mass of cDCE an VC naturally attenuates in the clayey sand. The targeted treatment interval is the permeable sands from 40 to 45 feet bls. The biosparge barrier would continue to operate until GCTLs are achieved upgradient of the biosparge barrier.

The conceptual design used to estimate the cost for the PRBs including the ISCR product, injection spacing, and dosing are similar to the ISCR design for Hot Spot 3 (IMWP currently undergoing review). The ISCR product is Provect-IR; the assumed dosing rate is 0.6% of soil mass; and the injection point spacing is 25 feet within the grid (assumes 15 feet radius of distribution). The cost for Alternative 3 includes 118 ISCR injection points and 250,000 pounds of Provect-IR. The estimated treatment lifespan for the ISCR is 5 to 10 years.

The estimated time for VC to decrease to its GCTL at the biosparge barrier (approximately 250 feet downgradient of the ISCR treatment area) is 5 years, during which the biosparge barrier will

continue to operate. This estimated time is uncertain and depends on the groundwater travel time between the ISCR treatment area and the biosparge barrier, the VC attenuation rate, and the rate of matrix diffusion from the clayey sand to the sand. The cost for Alternative 3 assumes NADCs will be achieved in the Hot Spot 2 area in 2 years followed by 5 years of interim groundwater monitoring for CVOCs to attenuate to GCTLs. The estimated cost for Alternative 3 is $2.7M and includes $1.1M in capital costs to install the ISCR grid treatment area and $1.6M in recurring costs (7 years of groundwater monitoring and 5 years of biosparge system operation).

4.3 COMPARISON OF ALTERNATIVES

The remedial alternatives were compared by evaluating the advantages, disadvantages, limitations, expectations, costs, and sustainability of each alternative is presented in **Table 4-2** below.

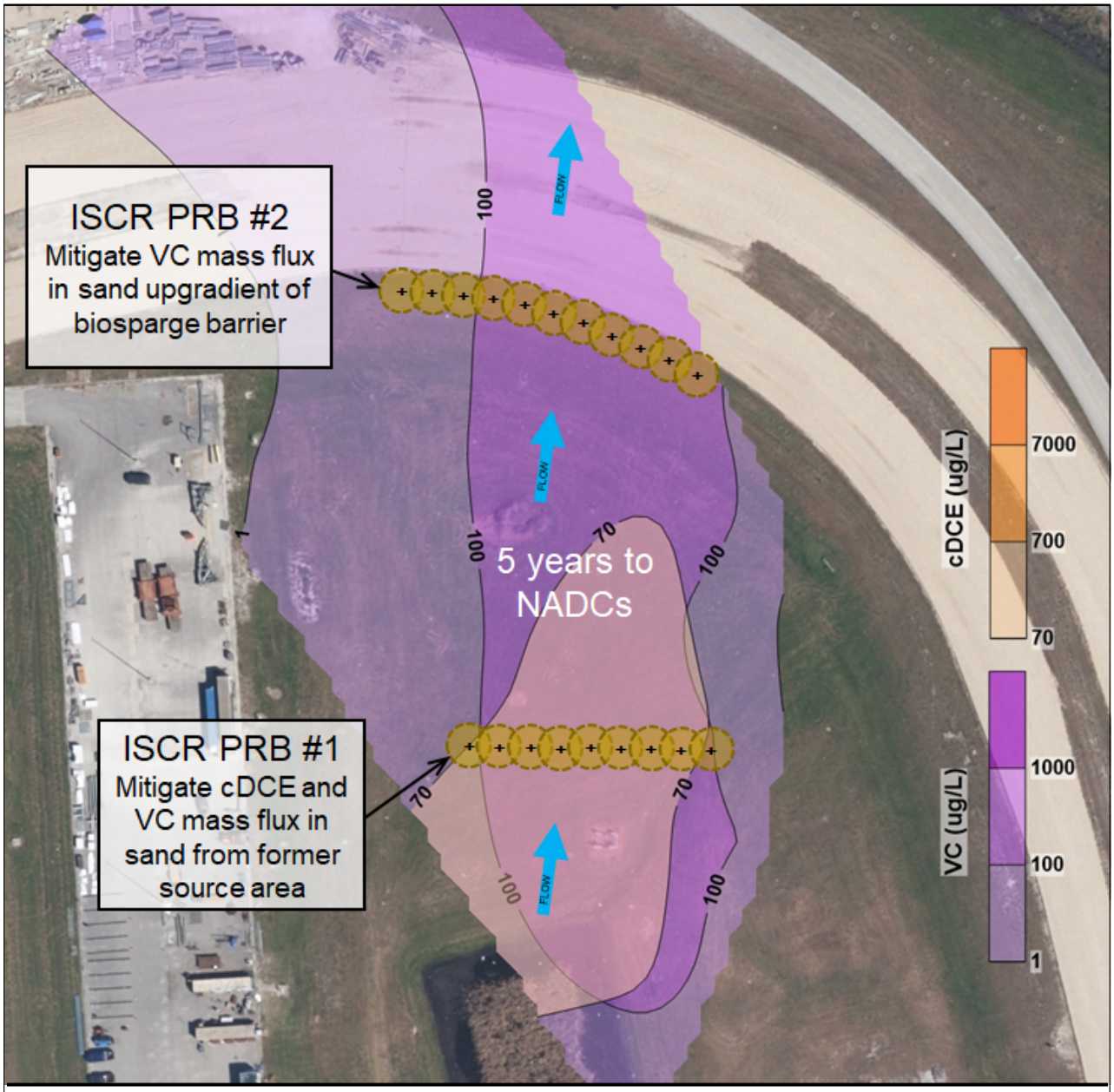
The primary advantage of Alternatives 2 and 3 (ISCR) over Alternative 1 (LTM) is faster achievement of CAOs because of the active treatment and faster reduction of VC mass flux to the biosparge barrier. The active, faster treatment decreases the time to operate the biosparge barrier (less than 5 years), which significantly lowers the cost for Alternatives 2 and 3 ($2.8M and $2.7M) compared to Alternative 1 ($7.5M to $13.4M). In addition, Alternative 2 (ISCR PRBs) provides more flexibility to optimize the PRB designs and has a lower estimated capital cost than Alternative 3 (ISCR Grid) of $535,000 compared to $1.1M. Estimated costs for remedial alternatives are provided in **Table 4-3**.

Alternative 3 is estimated to achieve CAOs faster than Alternative 2 because matrix diffusion is treated over a larger area that is the footprint of the VC NADC plume. However, installation of the larger treatment area in Alternative 3 is not expected to be feasible because of extensive subsurface utilities and the current property use. In regard to sustainability, Alternatives 2 and 3 are similar and have significantly less estimated greenhouse gas emissions, energy and electricity use, and water impacts versus Alternative 1.

The shorter estimated time to achieve CAOs is the primary factor contributing to the cost and sustainability advantage for Alternatives 2 and 3 over Alternative 1. However, the time to achieve CAOs is uncertain and difficult to estimate because of unknown groundwater flux, CVOC attenuation rates, and matrix diffusion. Thus, additional data collection is expected to support use of models that can simulate fate and transport of VC that includes matrix diffusion and decrease the uncertainty in the estimated time to achieve CAOs. Additional data collection would include ongoing groundwater monitoring to estimate CVOC attenuation rates and a field study to measure groundwater and mass flux.

Table 4-2: Comparison of Alternatives

Alternative	Advantages	Disadvantages	Limitations	Expectations	Cost	Sustainability
1 – LTM	• Current strategy • No capital cost • Plumes are attenuating	• Time to achieve CAOs is uncertain and primarily driven by matrix diffusion, which is difficult to model • Does not actively reduce mass flux to shorten time to achieve CAOs	• Annual costs are high and the time to achieve CAOs is likely long (20 to 30 years)	• 20 to 30 years to achieve CAOs • Time to achieve CAOs could be shorter or longer	$7.5 to $13.4M	• Greatest greenhouse gas emissions, total energy use, water impacts, and electricity use
2 – ISCR PRB	• Actively treats and reduces lateral mass flux towards biosparge barrier • PRB design/location can be optimized to shorten time to operate biosparge barrier • Achieves CAOs faster than LTM only	• Does not actively mitigate vertical mass flux from clayey sand; thus, time to achieve CAOs in former HS2 area is uncertain • Time to achieve GCTLs at biosparge barrier uncertain	• May cause changes in groundwater flow • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Strategically located PRB can achieve GCTLs at biosparge barrier in <5 years • Time to achieve CAOs in former HS2 area is likely less than LTM	$2.8M	• Lower greenhouse gas emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar
3 – ISCR Grid	• Actively treats and reduces lateral mass flux towards biosparge barrier • Actively treats and reduces vertical mass flux from clayey sand • Achieves CAOs faster than other options	• Highest capital cost • Temporary disruption to property use	• Subsurface utilities may limit treatment area • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Time to achieve GCTLs at biosparge barrier <5 years (like PRB) • Rapid treatment and achieve CAOs in former HS2 area (~2 years) • LTM outside current NADC plume (~5 years)	$2.7M	• Lower greenhouse gas emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar



Notes:
1. cDCE = cis-1,2-dichloroethene
2. ISCR = in-situ chemical reduction
3. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/ Vehicle Assembly Building Area (VAB)
4. NADC = Natural Attenuation Default Concentrations as provided in 62- 777, Florida Administrative Code
5. PRB = permeable reactive barrier
6. RAE = remedial alternatives evaluation
7. SWMU = Solid Waste Management Unit 056
8. ug/L = micrograms per liter
9. VC = vinyl chloride

N

Scale in feet

0 100 200

FIGURE 4-1
RAE OPTION 2 - ISCR PRB

Former Hot Spot 2 Area
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Table 4-1
RAE - Monitored Natural Attenuation Parameters
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Location	Screened Interval (feet bls)	Date	Methane mg/L	Ethane mg/L	Ethene mg/L	Sulfate mg/L	Iron Total mg/L	Iron Dissolved mg/L	Total Organic Carbon mg/L	pH SU	Orp mV	Temp °C
FDEP Secondary Drinking Water Statndards (62-550.320 FAC)						**250**	**0.3**			**6.5 - 8.5**	**-**	**-**
FDEP Groundwater Cleanup Target Levels (62-777 FAC)						**250**	**0.3**			**-**	**-**	**-**
MLPV-IW0038	30-40	4/26/2023	0.240	0.00075 U	0.00055 U	190.000 J3	1.100	0.840	3.000	7.16	-36.2	24.90
MLPV-IW0039	40-50	4/26/2023	0.100	0.00075 U	0.0019	510.000 J3	1.200	1.100	4.000	6.94	-63.5	25.15

Notes:
FDEP = Florida Department of Environmental Protection
MCL = Maximum Contaminant Level
RAE = Remedial Alternatives Evaluation
°C = Degrees Celsius
SU = Standard Units
mV = millivolts
µg/L = micrograms per liter
J3 = Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

Table 4-3
Estimated Costs for Remedial Alternatives
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2 Area

Common Cost Elements for Remedial Alternative Options

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Biosparge Area Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 63,000	$ 315,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 73,000	$ 365,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 85,000	$ 425,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 99,000	$ 495,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 114,000	$ 570,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 133,000	$ 665,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,835,000	
Former Hot Spot 2 Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 65,000	$ 325,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 75,000	$ 375,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 87,000	$ 435,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 101,000	$ 505,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 118,000	$ 590,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 136,000	$ 680,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,910,000	
Biosparge System Operation & Maintenance						
	Average Annual Cost Years 1-5	5	YEAR	$ 169,000	$ 845,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 196,000	$ 980,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 227,000	$ 1,135,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 264,000	$ 1,320,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 306,000	$ 1,530,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 355,000	$ 1,775,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 7,585,000	

Remedial Alternative Option #1 - Monitored Natural Attenuation by Long-term Monitoring (LTM)

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Low-End of Cost Range (20 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,640,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 20				$ 4,280,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,600,000	See above average annual common cost elements
				Subtotal	$ 7,547,000	
High-End of Cost Range (30 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,910,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 30				$ 7,585,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,835,000	See above average annual common cost elements
				Subtotal	$ 13,357,000	

Table 4-3
Estimated Costs for Remedial Alternatives
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2 Area

Remedial Alternative Option #2 - In Situ Chemical Reduction Permeable Reactive Barrier

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	102,000	LB	$ 2.40	$ 244,800	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 8,000	$ 8,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 20 injection points	15	DAY	$ 4,150	$ 62,250	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	16	DAY	$ 650	$ 10,400	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	16	DAY	$ 250	$ 4,000	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	17	DAY	$ 2,000	$ 34,000	Engineering Estimate
				Subtotal	$ 394,950	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	120	HOUR	$ 150	$ 18,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 81,000	
				Total Capital Cost	$ 534,800	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 5 years to achieve NADCs plus 10 years to achieve GCTLs				$ 1,135,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 2,305,000	
				Option #2 Total	$ 2,839,800	

Table 4-3
Estimated Costs for Remedial Alternatives
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2 Area

Remedial Alternative Option #3 - In Situ Chemical Reduction Grid

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	250,000	LB	$ 2.40	$ 600,000	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 60,000	$ 60,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 20,000	$ 20,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 118 injection points	40	DAY	$ 4,150	$ 166,000	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	40	DAY	$ 650	$ 26,000	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	41	DAY	$ 250	$ 10,250	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	42	DAY	$ 2,000	$ 84,000	Engineering Estimate
				Subtotal	$ 967,750	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	200	HOUR	$ 150	$ 30,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 93,000	
				Total Capital Cost	$ 1,119,600	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 2 years to achieve NADCs plus 5 years to achieve GCTLs				$ 475,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 1,645,000	
				Option #2 Total	$ 2,764,600	

5. CONCLUSIONS, RECOMMENDATIONS, AND EXIT STRATEGY

5.1 HCP INTERIM MEASURES

5.1.1 Former Hot Spot 2

5.1.1.1 Conclusions

The air sparge system has remained off since it was shut down in April 2018. Based on the 2022-2023 interim groundwater monitoring activities, the following conclusions are provided:

- VC remains the predominant contaminant, with groundwater data indicating the highest concentrations located north of the former treatment area.
- Although the mass of VC in the HCP is attenuating (~70 grams per year), concentration trends indicate that VC concentrations are expected to remain greater than its NADC and GCTL and require operation of the biosparge barrier for many years.
- Data confirm the previous evaluation that significant mass of cDCE and VC remain in deep groundwater within lower permeability soil (below 45 ft bls), are not expected to attenuate to GCTLs in the short term and are a source of cDCE and VC in shallower groundwater (above 45 ft bls) via matrix diffusion.
- An evaluation of remedial alternatives concluded that an ISCR remedial approach using PRBs (Alternative 2) has the potential to significantly reduce the time required to achieve CAOs, no longer requiring the operation of the biosparge barrier, and decrease the lifecycle cost for managing the former Hot Spot 2 area.
- The RAE also concluded that the benefit of a remedial alternative different than the current natural attenuation with LTM (Alternative 1) greatly depends on the shorter estimated time to achieve CAOs, which is uncertain.
- Performance monitoring will continue to provide valuable data under the current sampling plan.

5.1.1.2 Recommendations

It is recommended that the former Hot Spot 2 air sparge system remain off and IGM continues with the annual and semi-annual frequency (**Table 5-1**) for analysis of cDCE, tDCE, and VC. Additionally, trends in CVOC concentrations and plume metrics should continue to be evaluated and support estimates of natural attenuation rates (Decision Items 2310-D05 and 2310-D06).

ISCR with two PRBs (Alternative 2) is the recommended remedial alternative to achieve CAOs. However, modeling of VC fate and transport with matrix diffusion is recommended to confirm the estimated reduction in the time to achieve CAOs and the advantages of implementing Alternative 2 (Decision Item 2310-D23). To support the fate and transport model for the former

Hot Spot 2 area, additional data collection may be recommended and will be presented in a work plan (Decision Item 2310-D24).

5.1.2 Exit Strategy

Following implementation of the recommended remedial alternative determined by the RAE, it is anticipated that remediation efforts will continue to decrease the HCP plume until concentrations are reduced to less than GCTLs.

The exit strategy for this site pursues the previously established path forward of modified biennial LTM until concentrations of VC are less than the GCTL.

5.2 BIOSPARGE BARRIER FOR MITIGATING THE HCP

5.2.1 Conclusions

Based on the performance groundwater sampling data obtained during this reporting period, the following conclusions are provided:

- VC remains the predominant contaminant.
- Concentrations in upgradient wells screened 40 to 50 feet bls, while showing a reducing trend in the past three years, indicate the HCP continues to migrate toward the barrier fueled by matrix diffusion within the former Hot Spot 2 area.
- Presence of NADC exceedances downgradient of the northernmost barrier (2016 expansion) correlates with system downtime in 2021 and 2022 during low-flow investigations of Leg 5 and during repair and replacement . Prior to the system shutdown, downgradient concentrations were below the NADC indicating that the biosparge barrier was effectively mitigating the HCP.
- The biosparge expansion effort to close the gap between biosparge barriers will aid in mitigating discharge to the adjacent wetland.
- The RAE recommendation for Alternative 2 (ISCR PRB) will be initiated following approval to remediate the upgradient portion of the untreated HCP.

5.2.2 Recommendations

Due to CVOC exceedances, it is recommended to continue operation of the biosparge system until the HCP in both the former Hot Spot 2 and biosparge areas show signs of full plume collapse. Continued weekly telemetric readings, monthly OM&M activities, and semi-annual sparge well cleanouts are recommended. Additionally, it is recommended to transition three monitoring wells, MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107, from the LCP LTM plan to the semi-annual performance monitoring plan to evaluate plume conditions in the wetland area downgradient of the recently expanded portion of the biosparge barrier (BSW032 through BSW036). The Fall 2023 and 2024 sampling and analysis plan is provided as **Table 5-1**

for monitoring TCE, cDCE, tDCE, and VC. (Decision Items 2310-D02, 2310-D03, and 2310-D04)

5.2.3 Exit Strategies

When operating, the biosparge barrier (biosparge barrier and biosparge barrier expansions) creates a zone of elevated DO to promote aerobic VC degradation to mitigate potential discharge to the adjacent wetlands. The biosparge barrier will operate until collapse of the HCP is observed, which will be evaluated using data from monitoring wells within the biosparge area.

5.3 HOT SPOT 3

5.3.1 Conclusions

Based on the 2021 DPT groundwater analytical data, CVOC concentrations exceed both the NADC and GCTL in several intervals, with maximum CVOC concentrations in the shallow interval. The center of the CVOC plume, and likely TCE source, remains near the southeast corner of the former MLP structure, which is consistent with the 2019 DPT data. While groundwater CVOC and geochemical parameters indicate previous bioremediation (Emulsified Vegetable Oil injections) decreased CVOC mass and plume footprint, the CVOC contamination source is likely still present and the previous bioremediation implementation is not adequate to meet cleanup objectives.

Additional remediation efforts are needed to treat upgradient CVOC mass and plumes still present at the MLP area. In situ chemical reduction (ISCR) was the previously recommended approach in accompaniment with a slow-release hydrogen substrate and micro- or nano-scale zero valent iron. This remediation approach will create optimal conditions for long-term CVOC degradation that treats the plumes and mass flux from the source. An IMWP to implement ISCR is undergoing review at the time of this report submission.

5.3.2 Recommendations

Implementation of the work plan is recommended upon approval.

5.3.3 Exit Strategy

It is anticipated that continued treatment of this area will lead to plume collapse and that IGM will be implemented and continue until concentrations are reduced to below GCTLs.

5.4 HOT SPOT 3 (OFW)

5.4.1 Conclusions

Based on the groundwater analytical data at Hot Spot 3 (OFW), CVOC concentrations are less than GCTLs in the monitoring wells sampled, and concentrations of VC continue to exhibit a stable trend.

5.4.2 Recommendations

Continued sampling at Hot Spot 3 (OFW) is recommended annually (**Table 5-1**) for analysis of TCE, cDCE, tDCE, and VC (Decision Item 2310-D07).

5.4.3 Exit Strategy

The source of the VC impacts in the OFW area was treated through the Hot Spot 3 Bioremediation IM (area with CVOC impacts greater than 10xNADC). It is anticipated that continued treatment of this area will lead to plume collapse, and that IGM will continue to monitor groundwater quality downgradient of the Hot Spot 3 treatment area until upgradient concentrations are reduced to less than the GCTL.

5.5 LONG-TERM GROUNDWATER MONITORING PROGRAM

5.5.1 Conclusions

A total of 67 monitoring wells were sampled in March and April 2023 for biennial LCP LTM. Based on the 2021 LCP LTM evaluation, 39 monitoring wells (37 new and 2 replacement) were proposed for installation sitewide to add to the LTM program (NASA 2022a). A total of 37 monitoring wells were installed in October 2022 through November 2022, and January 2023. Two monitoring well locations could not be accessed within the VAB and were later installed and sampled in the Fall of 2023, outside of this reporting period. Thirteen of the monitoring wells sampled were existing site wells that were added to the biennial sampling plan (including one replacement, MLPV-IW0002IRR) as recommended in the 2021 CMI and IM Annual Report (NASA 2022a). Based on analytical results, the following conclusions are provided:

- **1 to 20 feet bls**: One small-scale isolated VC plume remains within the WCPS, the former TCE plume to the east of the VAB has collapsed, and the plume south of the Orbiter Processing Facility has not migrated west.
- **20 to 35 feet bls**: Isolated LCP on the south side of the Boeing facility and north of the Orbiter Processing Facility have collapsed; LCP plumes in southwest parking lot of the VAB have collapsed; VC plume coverage in the Biosparge area has reduced; and VC has migrated downgradient of the former gap between biosparge barrier walls and into the wetland area at concentrations exceeding the NADC.

- **35 to 45 feet bls**: Isolated LCP in former center MLP area and southwest parking lot of the VAB have collapsed; the LCP is confirmed extending into the wetland area where VC is present at concentrations exceeding the NADC; and the overall LCP extending over the VAB has reduced to the areas near the former Hot Spot 2 area.
- **Greater than 45 feet bls**: Several monitoring wells are screened across this and the 35 to 45 feet interval, however data confirms that the extents of the LCP are greatest within this interval which is consistent with conclusions based on the HCP evaluation (**Section 5.1**). An isolated LCP plume remains to the southeast of the VAB.
- Further evaluation is needed following installation of the two remaining monitoring wells previously proposed within the secured VAB perimeter.

5.5.2 Recommendations

Continued biennial sampling is recommended (Decision Item 2310-D13) with an amended analyte list to include TCE (TCE, cDCE, tDCE, and VC only) and the following modifications (Decision Item 2310-10, 2310-D11, 2310-D12, and 2310-D14):

- **35 to 45 feet bls**: Replace monitoring well MLPV-IW0053 (Decision Item 2310-D08), destroyed during local construction activities, and install four new monitoring wells south of the biosparge barrier. One well is recommended west of the originally proposed location of MLPV-MW0108 to verify the presence of an isolated HCP indicated by 2021 DPT groundwater sampling data from 41 to 45 feet bls. One well is recommended in the wetland area downgradient of the referenced isolated HCP (contingent on access and site conditions). Two monitoring wells are recommended to provide LCP boundary data to the east and south of new monitoring well MLPV-MW0108.
- **Greater than 45 feet bls**: Add monitoring well VABU-IW0006D for data west of the LCP in the parking lot area located to the southeast of the VAB.
- Replace monitoring well MLPV-IW0001SR as part of general well maintenance, though not assigned to a sampling plan (Decision Item 2310-D09).
- Transition monitoring well MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107, located downgradient of the biosparge wall, to the biosparge area sampling plan.

The locations of proposed monitoring wells are provided on **Figure 3-15**. The modified biennial sampling plan is provided in **Table 5-1**. Prior to further modifying the LCP LTM well network, one additional set of data will be collected (to be scheduled for June 2025) to have two biennial data sets that reflect four years of groundwater conditions from the newly installed monitoring wells (Decision Item 2310-D15).

5.5.3 Exit Strategy

Long-term monitoring will continue in combination with HCP IM until VC concentrations demonstrate an established decreasing trend to less than the GCTL.

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Table 5-1
Sampling and Analysis Plan for Fall 2023 and 2024
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 059

System Monitored	Location	Screen Interval (feet bls)	Frequency	Month	Analytical Parameters
Biosparge Area	MLPV-IW0006IR	28 to 33	Semi-Annual	October 2023/ March & September 2024	CVOCs (TCE, cDCE, tDCE, VC)
	MLPV-IW0028I	28 to 33			
	MLPV-IW0046	35 to 45			
	MLPV-IW0057	40 to 50			
	MLPV-IW0058	45 to 50			
	MLPV-IW0059	45 to 50			
	MLPV-IW0060	40 to 50			
	MLPV-ASMW0004	35 to 40			
	MLPV-ASMW0005	35 to 40			
	MLPV-ASMW0006	35 to 40			
	MLPV-IW0031	25 to 35			
	MLPV-IW0061	35 to 40			
	MLPV-IW0062	40 to 45			
	MLPV-IW0063	35 to 40			
	MLPV-IW0064	40 to 45			
	MLPV-MW0102	25 to 35			
	MLPV-MW0103	35 to 45			
	MLPV-MW0107	35 to 45			
Former Hot Spot 2 (Air Sparge System)	MLPV-IW0032	30 to 40	Annual	March 2024	CVOCs (cDCE, tDCE, VC)
	MLPV-IW0038	30 to 40			
	MLPV-IW0040	30 to 40			
	MLPV-IW0042	30 to 40			
	MLPV-IW0011I	35 to 40	Semi-Annual	October 2023/ March & September 2024	
	MLPV-IW0033	40 to 50			
	MLPV-IW0034	30 to 40			
	MLPV-IW0035	40 to 50			
	MLPV-IW0036	40 to 45			
	MLPV-IW0037	40 to 50			
	MLPV-IW0039	40 to 50			
	MLPV-IW0041	40 to 50			
	MLPV-IW0043	40 to 50			
	MLPV-IW0044	40 to 50			
	MLPV-IW0045	40 to 50			
	MLPV-SAMW0004I	35 to 40			
	MLPV-SAMW0004D	45 to 50			
Hot Spot 3 OFW Area	VABRA-MW0011	25 to 35	Annual	October/ September 2023 & 2024	CVOCs (TCE, cDCE, tDCE, VC)
	VABRA-MW0012	15 to 25			
	VABRA-MW0013	20 to 25			
	VABRA-MW0014	25 to 30			

Table 5-1
Sampling and Analysis Plan for Fall 2023 and 2024
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 059

System Monitored	Location	Screen Interval (feet bls)	Frequency	Month	Analytical Parameters
VAB Area/ LCP LTM (Continued on next page)	MLPV-MW0110	1 to 11	Biennial	June 2025	CVOCs (TCE, cDCE, tDCE, VC)
	WCPS-IW0016	15 to 25			
	MLPV-MW0086	15 to 25			
	MLPV-MW0100	15 to 25			
	WCPS-IW0005S	2 to 12			
	WCPS-IW0001SR	2.5 to 12.5			
	VABU-IW0001I	20 to 30			
	MLPV-MW0098	20 to 30			
	MLPV-MW0109	20 to 30			
	SATV-IW0009I	22 to 27			
	MLPV-MW0077	25 to 35			
	MLPV-MW0078	25 to 35			
	MLPV-MW0079	25 to 35			
	MLPV-MW0081	25 to 35			
	MLPV-MW0095	25 to 35			
	MLPV-MW0106	25 to 35			
	MLPV-IW0009I	28 to 33			
	MLPV-IW0002IRR	28 to 33			
	MLPV-IW0027I	28 to 33			
	WCPS-IW0002SRR	3 to 13			
	WCPS-IW0015S	3 to 13			
	MLPV-IW0056	30 to 40			
	MLPV-IW0012I	35 to 40			
	MLPV-IW0014I	35 to 40			
	MLPV-IW0017I	35 to 40			
	MLPV-IW0047	35 to 45			
	MLPV-IW0053	35 to 45			
	MLPV-MW0082	35 to 45			
	MLPV-MW0088	35 to 45			
	MLPV-MW0089	35 to 45			
	MLPV-MW0093	35 to 45			
	MLPV-MW0094	35 to 45			
	MLPV-MW0096	35 to 45			
	MLPV-MW0097	35 to 45			
	Proposed well (SE of BS wall)	35 to 45			
	Proposed well (SE of BS wall)	35 to 45			
	Proposed Well (SW of original MW0108)	35 to 45			
	MLPV-MW0108	35 to 45			
	Proposed well (E of tracks)	37 to 47			
	MLPV-IW0049	38 to 48			
	MLPV-IW0052	40 to 50			
	PRES-IW0009	40 to 50			

Table 5-1
Sampling and Analysis Plan for Fall 2023 and 2024
Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 059

System Monitored	Location	Screen Interval (feet bls)	Frequency	Month	Analytical Parameters
VAB Area/ LCP LTM (continued)	MLPV-IW0050	40 to 50	Biennial	June 2025	CVOCs (TCE, cDCE, tDCE, VC)
	MLPV-IW0054	40 to 50			
	MLPV-IW0055	40 to 55			
	MLPV-IW0029D	42 to 47			
	VABU-IW0006D	42 to 47			
	MLPV-SAMW0001	43 to 48			
	MLPV-SAMW0003	43 to 48			
	MLPV-IW0009D	45 to 50			
	MLPV-IW0012D	45 to 50			
	MLPV-IW0020D	45 to 50			
	MLPV-IW0051	45 to 55			
	E8 (Pending Install)	45 to 55			
	MLPV-MW0076	47 to 57			
	MLPV-MW0080	47 to 57			
	MLPV-MW0083	47 to 57			
	MLPV-MW0084	47 to 57			
	MLPV-MW0085	47 to 57			
	MLPV-MW0087	47 to 57			
	MLPV-MW0090	47 to 57			
	MLPV-MW0091	47 to 57			
	MLPV-MW0092	47 to 57			
	MLPV-MW0099	47 to 57			
	MLPV-MW0101	47 to 57			
	MLPV-MW0104	47 to 57			
	MLPV-MW0105	47 to 57			
	E15 (Pending Install)	47 to 57			
	MLPVIW0022D	48 to 55			
	MLPV-IW0018D	50 to 55			
	MLPV-IW0001D	50 to 55			
	VAB-IW0005D	52 to 57			

Notes:
bls = Below land surface
cDCE = cis-1,2-dichloroethylene
CVOC = chlorinated volatile organic compounds
OFW = Outstanding Florida Waters
SWMU = Solid Waste Management Unit
TCE = trichloroethylene
tDCE = trans-1,2-dichloroethene
VC = vinyl chloride
MLPV-IW0002I and MLPV-IW0001D were added to sampling plan in 2020 following analytical assessment of 2018 & 2020 data
MLPV-IW0028 I and MLPV-IW0046 were transferred from LCP LTM Area sampling plan to the Biosparge Area beginning in 2021
MLPV-IW0006IR was added to the Biosparge Area sampling plan in September 2020.
MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 were transferred from LCP LTM to the Biosparge Area beginning 2023.

6. REFERENCES

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United States Geological Survey. 1976. Orsino, Florida Quadrangle map.

APPENDIX A

KENNEDY SPACE CENTER REMEDIATION TEAM MEETING MINUTES AND ADPs FOR FEBRUARY AND OCTOBER 2023

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Revision 2 Meeting Minutes for October 3rd & 4th, 2023

Attendees:

1. Jason French/FDEP
2. TJ Touran/FDEP
3. Ryan O'Meara/NASA
4. Deda Johansen/NASA
5. Anne Chrest/NASA
6. Chris Adkison/NASA
7. Michelle Moore/NEMCON
8. Mark Jonnet/Tetra Tech
9. Mark Speranza/Tetra Tech
10. Andrew Walters/Tetra Tech
11. Chris Pike/Tetra Tech
12. Alex Murphy/Tetra Tech
13. Debbie Wilson/Tetra Tech
14. Jennifer Buel/Tetra Tech
15. Jennifer Gootee/AECOM
16. Linnea King Clark/AECOM
17. Randy Sillan/AECOM
18. Richard Smith/HGL
19. Jason Bublitz/HGL
20. Ryan Sullivan/HGL
21. Chad Lee/AECOM
22. Sarah Damphousse/Tetra Tech

2310-M01 Michelle Moore/NEMCON

Meeting Minutes and Miscellaneous Items

Objective:

To discuss meeting minutes from the last Team meeting and review open action items for possible closure.

Discussion:

It was pointed out a couple of comments did not make it into the Revision 2 meeting minutes that was recently finalized and sent out via email. A Revision 3 will be issued to correct this after the meeting for Team members to vote on. Revision 3 will then become the finalized minutes that will be distributed and uploaded to the Remediation Information System (RIS).

Note: Post-meeting, Revision 3 of the 2023 June Kennedy Space Center Remediation Team (KSCRT) meeting minutes and decision/action items were approved via email and finalized on October 31, 2023. Members are aware that these could become public record as part of a report at a later date.

Open action items were reviewed, and the following were closed out:

False Cape Data Collection Annex (SWMU 113) Monitoring Well Network: The Florida Department of Environmental Protection (FDEP) recommended a well installation at the MW-F location. NASA will confirm the depth of this new well in an email to FDEP.

Email sent by HGL to FDEP on 09/20/2023 with location and depth of well to be installed **(2306-A01).**

Industrial Area (IA) Long-Term Monitoring (LTM) Update: FDEP inquired when was the last time General Services Administration Seized Property (GSSP) (SWMU 095) GSSP-MW0027 and GSSP-MW0028 were sampled? Monitoring well GSSP-MW0054 is also high too. If it has been more than a decade you may want to sample those wells again. NASA to get back to FDEP with this information.

NASA provided an update at the October 2023 meeting that MW00027 was included in 2019 and below FDEP groundwater cleanup target levels (GCTLs), MW00028 was non-detect. MW00028 and MW00054 will be picked up in future sampling events **(2306-A02**).

2310-M02 Jason French & TJ Touran/FDEP

Program Update:

Since the June meeting, FDEP has worked to familiarize themselves with KSC and the sites and respond to what was deemed urgent documents. FDEP reviewed the CAMP and Oculus for outstanding documents on hand and is working through them. FDEP requests that when NASA submits a document to the Federal Programs section that a requested date for a response be provided. FDEP wants to pivot to address urgent topics quickly and the request-by date will assist with awareness of the project timelines. FDEP wants to respond prior to construction beginning, so a tentative due date with shorter lead time for the urgent docs provided will help in this effort.

FDEP stated that per- and polyfluoroalkyl substances (PFAS) documents are the priority. At conclusion of the Team meeting, FDEP will send a list of outstanding documents they have to the NASA Remediation Technical Lead and the other NASA

Remediation Project Managers (RPMs), if NASA could provide priority for top 2-3 and he will send out for external review to get started while he works through the backlog.

FDEP is currently working on the West Crawler Park Site (WCPS; SWMU 044) Rehabilitation Completion Order Request for no further action (NFA), with moving groundwater under SWMU 056 to close the SWMU 044 site. Also in review is the Headquarters (SWMU 104) Interim Measure Report.

FDEP mentioned the loss of Nadine Brooks and that her workload has been spread amongst the group to cover. This has increased TJ's workload while they move to restaff folks within their organization.

2310-M03 Anne Chrest/ NASA

NASA KSC Remediation Program Update

Objective:

Program Update

Discussion:

From NASA KSC Remediation Program there is nothing to share at this time. Thanks for all Architectural and Engineering (A&E) firm's assistance for your quick responses to get all the tasks contracted by end of fiscal year 2023.

2310-M04 Jennifer Buel/Tetra Tech

Schwartz Road Landfill Additional PFAS Confirmatory Results, PRL #237a, Center-wide PFAS Location of Concern (LOC) #18

Objective: Present results from additional per- and polyfluoroalkyl substances (PFAS) Confirmatory Sampling activities completed in May 2023 and provide recommendations on path forward based on all the data.

Discussion:

PFAS were initially identified in the vicinity of Schwartz Road Landfill through step-out sampling from the Hydrocarbon Burn Facility (HBF). FDEP inquired if datasets are sufficient for fingerprinting at the two sites? Are the PFAS in the landfill distinct

or does it seem there is just one big source? Tetra Tech responded that some analytes did match but there was not a similar distribution, which led to thinking it is not the same source of PFAS at both locations.

Results from groundwater and surface water samples collected in 2021 were compared to the May 2022 EPA Regional Screening Levels (RSLs) for Tapwater. That information was used to select groundwater sampling locations for the May 2023 sampling effort. FDEP inquired if the gradient or direction of the groundwater flow is understood? Tetra Tech responded, yes; the landfill permit compliance sampling data was obtained for that purpose. The groundwater flow is primarily to the northeast at this location.

NASA inquired what the depth to water in this region is and why we didn't we collect a sample at the top of the water table. Tetra Tech responded that for the first round they sampled the existing monitoring wells. The subsequent Direct Push Technology (DPT) groundwater sample depths were matched to the screen intervals of the monitoring wells to be consistent to support data evaluation.

NASA stated we should consider collecting shallower samples in the future. A 2 to 6-foot screen would be good if the water table is 2 to 4 feet. Tetra Tech stated they will add a 2 to 6-foot depth interval DPT sampling to the proposed sampling plan presented on Slide 20 **(2310-A01).**

Referencing Slide 16, NASA inquired why is the max concentration in the deeper samples. Most other sites the max concentration is at a shallower interval.

Tetra Tech had a thought that this was because the site is a landfill and the PFAS sources may be deeper than at the HBF because AFFF applications took place at the surface levels at HBF. Also proposing to look at the groundwater/surface water interaction at this site much like at HBF. Early in the landfill history, some trash was placed below the hard pan at this site, so that might contribute.

DPT results will be evaluated to understand the interaction between the landfill and groundwater. Interaction of groundwater and surface water in this area will also be evaluated.

Conclusions and Path Forward

Approximately two-thirds of site is delineated to the 2022 Tapwater RSLs. Step-out sampling is needed to the north, east, and southwest to delineate to Tapwater RSLs. Additional surface water sampling to the east of SW07 and north of SW06 is proposed to delineate to Florida provisional surface water screening levels. Recommend collection of surface water samples from low areas around landfill to further evaluate relationship of groundwater to surface water in this area.

NASA stated we may want to take deeper samples, too, if your max concentration is greater than 35 feet. Do not marry sampling to the intervals of the monitoring wells at the site – look across the whole water column.

NASA requested that the next ADP provide a history of how this landfill was constructed, which would be helpful.

The Team reached consensus to conduct additional confirmatory sampling (CS) activities under PRL #237a, Center-Wide PFAS, LOC #18 as proposed on Slide 20 **(2310-D01).**

Tetra Tech will plan to collect samples above the 12.5 ft bls as NASA recommends in addition to the depths listed on Slide 20.

FDEP favored the shallower and deeper investigative intervals and concurs with this path forward.

Results: Decision Item 2310-D01
Action Item 2310-A01

2310-M05 Linnea King/AECOM

MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report

Objective: The goal of this Advance Data Package (ADP) is to provide a summary of the activities performed in 2022 through April 2023.

Discussion:

Field efforts summarized in the ADP include startup of the biosparge system after reinstallation, transfer line repairs, biosparge wall expansion activities, semi-annual performance monitoring within the biosparge area, interim groundwater monitoring (IGM) within the former Hot Spot 2 area, annual groundwater sampling from the Hot Spot 3 Outstanding Florida Waters (OFW) area, low concentration plume (LCP) monitoring well installations, and LCP long-term monitoring (LTM). The objective of this ADP is to present existing groundwater quality data and provide an evaluation of the best path forward within each monitored area. A remedial action alternatives evaluation (RAE) for the former Hot Spot 2 Area will be presented separately.

Biosparge Area

The biosparge system was re-started in June 2022 following a December 2020 fire that destroyed the compressor and controls. The system was expanded with the installation of five biosparge wells to cover a gap in the "wall" in April 2023. Fifteen monitoring wells are sampled to monitor performance of the biosparge barrier. The 2021 results showed some rebound of vinyl chloride (VC) concentrations, which was not unexpected since this was the period when the biosparge system was off. The March-April 2023 results showed some decreasing VC concentrations as dissolved oxygen levels increase in the treatment zone. Nine additional monitoring wells were installed downgradient and cross-gradient of the biosparge barrier to supplement the LCP monitoring network.

The Team reached consensus to continue operation of biosparge system until the high concentration plume in both the former Hot Spot 2 and biosparge areas show signs of full plume collapse **(2310-D02).**

The Team reached consensus to continue performance monitoring on a semi-annual basis (as presented) for selected chlorinated volatile organic compounds (CVOCs): tetrachloroethene (TCE), cis-1,2-dichloroethylene (cDCE), trans-1,2-dichloroethene (tDCE), and vinyl chloride (VC) **(2310-D03).**

The Team reached consensus to transition MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from the LCP sampling plan to semi-annual performance monitoring **(2310-D04).**

TJ asked regarding slides shown for Hot Spot 3 (HS3) with sampling for HS3 suspended in 2019 and back up in 2021, do we see an increased concentration of intermediates in 2021? AECOM replied there was an overall significant decrease in our 2021 data with some intervals that did show some higher results. The interim measure (IM) for HS 3 discussed later.

FDEP inquired if we are measuring carbon dioxide at all as part of the analysis at this site. AECOM responded we are not.

Former Hot Spot 2

Interim groundwater monitoring samples were collected in March and April 2022 in the former HS2 area. Overall, CVOC concentrations were reduced by the air sparge system that operated 2012-2018. Samples from the 40-50 ft. interval continue to have results above the natural attenuation default concentrations (NADC) and a RAE is underway.

The Team reached consensus to continue interim groundwater monitoring for select CVOCs (cDCE, tDCE, and VC). The next semi-annual event will be scheduled for Fall of 2023 **(2310-D05).**

The Team reached consensus to evaluate the sampling plan one year after implementation of the selected technology from the RAE (RAE will be presented separately) **(2310-D06).**

Hot Spot 3

HS3 was treated through a bioremediation interim measure conducted in 2017. Performance monitoring conducted in 2019 documented substantial reduction of CVOC mass. In 2021, direct push groundwater sampling was conducted. Two areas with TCE above NADC were identified, with one of those areas also containing TCE up to 129,000 µg/L.

The Interim Measure Work Plan is currently undergoing review and will be submitted to the Florida Department of Environmental Protection (FDEP) once the proposed remediation product is approved by the Department. FDEP noted the product won't be

accepted on a site-by-site basis rather the approval will be state-wide, once the manufacturer demonstrates that the product will have no lasting adverse impacts to groundwater.

Hot Spot 3 OFW Area

Groundwater in the HS3 OFW Area, downgradient of HS3, is monitored annually. Four wells were sampled for CVOCs in December 2022. Results for each well were below State of Florida groundwater cleanup target levels.

The Team reached consensus to continue annual performance monitoring for select CVOCs (TCE, cDCE, tDCE, and VC) to monitor groundwater quality downgradient of Hot Spot 3 former and future treatment areas **(2310-D07).**

LCP monitoring

The MLP/VAB Area LCP is sampled on a biennial basis. To update the long-term monitoring network based on current conditions, 39 monitoring wells were installed between October 2022 and January 2023. In March 2023, 67 monitoring wells were sampled and analyzed for cDCE, tDCE and VC. Sampling was repeated in April for five monitoring wells to confirm the March results. Monitoring well MLPV-IW0053 could not located and is presumed destroyed.

The 2023 LCP covers an area of about 40 acres. In comparison, the 2020 LCP was estimated to cover 65 acres.

The Team reached consensus to replace well MLPV-IW0053 (35-45) that historically exceeds groundwater cleanup target levels (GCTLs) and is part of the sampling plan **(2310-D08).**

The Team reached consensus to replace MLPV-IW0001SR as part of general monitoring well maintenance. This well is not currently part of a sampling plan **(2310-D09).**

Due to restrictions from site layout and conditions in the originally proposed location for MLPVMW0108 (35 to 45), the well had to be installed further south. The Team reached consensus to install two additional monitoring wells to verify the NADC concentrations located south of the biosparge wall that were detected during the 2021 direct push technology (DPT) groundwater sampling event.

- One monitoring well, screened 37 to 47 feet below land surface (bls), located east of the railroad tracks (downgradient, wetland area);
- One monitoring well, screened 35 to 45 feet bls, located southwest and upgradient of original location for MLPV-MW0108;
- Installation is contingent on access to proposed locations, based on ongoing center operations and surface conditions in the wetland area **(2310-D10).**

The Team reached consensus to install two additional monitoring wells, screened 35 to 45 feet bls, southeast of the biosparge area to provide GCTL boundary data around monitoring well MLPV-MW0108 **(2310-D11).**

The Team reached consensus to add VABU-IW0006D (42 to 47) to the biennial sampling plan for boundary data to the east of the isolated plume **(2310-D12).**

The Team reached consensus to continue LTM on a biennial basis for select CVOCs (TCE, cDCE, tDCE, and VC) **(2310-D13).** TCE will be added back to confirm that TCE remains below GCTLs in the LCP. The next LTM event will be scheduled for 2025.

The Team reached consensus to remove MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from LCP sampling plan and transition to the Biosparge area semi-annual performance monitoring plan **(2310-D14).**

Prior to further modifying the LCP LTM well network, the Team reached consensus to collect one additional set of data to have two biennial data sets that reflect four years of groundwater conditions from the newly installed monitoring wells **(2310-D15).**

The Team reached consensus to add TCE to reported analyte list. Select wells (MLPV-MW0077, MLPV-MW0078, MLPV-MW0081, MLPV-MW086, MLPV-MW0097, and MLPV- MW0098) had TCE concentrations above the GCTL in historic DPT groundwater data. TCE results were obtained following the 2023 sampling event and indicated no detections in these or other wells **(2310-D16).**

FDEP inquired where are the locations of the wells in this last bullet? AECOM pulled up Slides 70 to show location of MW00086. The other wells are on Slide 72 in the southern VAB lot.

Results: Decision Items 2310-D02 through D16

2310-M06 Alex Murphy/Tetra Tech

Components Refurbishment and Chemical Analysis (CRCA) (SWMU 041) Long-Term Monitoring Proposed Monitor Well

Objective: The objective of the advance data package (ADP) is to review the current site status and conditions, provide the contaminants of concern (COCs) groundwater analytical results, and present proposed monitoring well locations and screened intervals.

Discussion:

A chlorinated volatile organic compound (CVOC) plume was identified in 2018, with concentrations ranging from: ten times (10X) the Florida Department of Environmental Protection (FDEP) Natural Attenuation Default Concentration (NADC), Hot Spot 1 or HS1); exceeding NADC (High Concentration Plume or HCP); and above State of Florida Groundwater Cleanup Target Levels (GCTLs), Low Concentration Plume or LCP.

Hydraulic containment system (HCS) installation occurred from February to May 2019, followed by system start-up in July 2019 to capture the plume and for HS1 remediation. The HCS system included the installation of three extraction wells, seven injection wells and an air stripper treatment trailer system. NADC exceedances of vinyl chloride (VC) were detected within the deep zone from the baseline sampling event (June 2019) to the end of Year 1 HCS operation (July 2020).

Year 2 (October 2020 to July 2021): After two years of air sparging, no trans-1,2-dichloroethene (tDCE) was detected and reductions of VC to within GCTL levels were seen in the intermediate and deep zones. Year 3 (October 2021 to July 2022 and October 2022): After three years of system operation, a maximum of 2 µg/L VC within the intermediate zone and 26 µg/L were found within the intermediate and deep zones, respectively.

Supplemental direct push technology (DPT) groundwater studies in March 2022, December 2022, and May 2023 further delineated the vertical and areal extent of VC, with the LCP footprint extending in all directions. Two isolated GCTL exceedances were found southeast of the CRCA facility, with VC concentrations less than 3 µg/L within the shallow and deep intervals. No tDCE was detected.

The Team reached consensus on the following recommendations **(2310-D17):**

- Recommend the installation of five well groups to monitor offsite plume migration: 3 well clusters downgradient from existing plume conditions, one well cluster north of the LCP, and one well cluster along the LCP centerline.
- Recommend newly installed monitoring wells MW0033 through MW0046 to be sampled upon completion of installation and then annually thereafter.
- Recommend incorporating the existing well clusters including CRCA-MW0026 (screened 5'-15'), CRCA-MW0027 (screened 30'-40'), and CRCA-MW0028 (screened 53'-63') as part of the LTM program to monitor the southeastern edge of the LCP.
- Recommend each monitoring well to be sampled annually for VOCs via USEPA 8260D.

FDEP inquired if NASA is taking a more proactive approach to address the movement of VC to the west beyond the influence of the extraction wells? Tetra Tech responded that sampling was conducted for *Dehalococcoides*, biological activity indicators and aquifer characteristics. Dehalococcoides was present and the aquifer had natural reductive conditions. The VC is at pretty low concentration in the west and should be reduced through natural reductive dechlorination.

Is MW0031 in the capture zone? Tetra Tech responded that it is. Tetra Tech noted that the LCP outside the capture zone has VC results well below 100 ug/L. The area where the majority of the LCP beyond the capture zone is a real challenging due to wetlands along with railroad constraints.

Result: Decision Item 2310-D17

2310-M07 Andrew Walters/Tetra Tech

2023 Annual Update (Year 2) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring at Launch Complex 39A Operations Support Building Area (AOSB), SWMU 111

Objective: The objective of this briefing is to provide a summary of the Year 2 air sparge system operation and maintenance, performance monitoring results, provide conclusions and recommendations, and test consensus on the path forward.

Discussion:

An air sparge system was installed at AOSB to treat chlorinated volatile organic compounds (VOCs). The plume is being treated throughout its footprint to mitigate discharge to the adjacent Pintail Creek, which is part of the Banana River Lagoon Outstanding Florida Water (OFW). The Year Two operational reporting period was July 2022 through July 2023. System was down approximately 14% of the reporting period due to hurricanes, maintenance events, and planned sampling events.

Performance monitoring included sampling 11 wells each semi-annual event. AOSB-MW0009 (northeast edge of the sparge area) is the only well with groundwater cleanup target level (GCTL) exceedances. The 2018 RCRA Facility Investigation (RFI) direct push technology (DPT) groundwater samples outside the air sparge treatment zone were less than GCTLs, which delineated the sparge area.

The air sparge system is operating as designed. The interim measure is meeting its objective. In baseline sampling (May 2021), target VOCs (trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE] and/or vinyl chloride) exceeded a GCTL in four monitoring wells. As of the recent monitoring event in July 2023, only one well (MW0009) had a GTCL exceedance, with a TCE result of 4.1 µg/L.

Operation of the air sparge system was modified from Year 1. Only 18 of the 26 air sparge wells (ASW) were active during Year 2. ASWs 6, 8, 14, 15, 16, 17, 26 in the MW0009 Area and ASWs 1, 2, 3, 5, 11, 12, 19, 20, 21, 24, 25 along the edge of the former low

concentration plume (LCP) near the OFW operated during Year 2. ASWs 4, 7, 9, 10, 13, 18, 22, 23 were shut off based on the area around them being less than GCTLs.

A DPT investigation was conducted to determine if any contamination exists beyond MW09 and the influence of the sparging treatment zone. Ten locations were samples at 25, 35 40, 45, and 55 feet below land surface (bls). Three TCE GCTL exceedances were observed (DPT058 at 25 and 35 feet bls and DPT063 at 25 feet bls). DPT sampling results conclude that site COCs do not extend beyond air sparging treatment zone in the MW0009 area.

Monitoring wells MW0009, MW0010, and MW0011 were analyzed for per- and polyfluorinated alkyl substances (PFAS) in July 2023. No results exceeded EPA Regional Screening Levels (RSL). During April 2022 sampling, MW0010 exceeded the perfluorooctanoic acid (PFOA_ RSL (6 ng/L) with a result of 12 ng/L.

The proposed path forward is to continue operating the air sparge system on the same cycle as Year 2 and continue semi-annual performance sampling. A transition to long-term monitoring will be evaluated during Year 3 operation based the performance monitoring and DPT sampling results.

The Team reached consensus to continue operation of ASWs 6, 8, 14, 15, 16, 17, and 26 in the MW09 area and ASWs 1, 2, 3, 5, 11, 12, 19, 20, 21, 24, 25 along the edge of the former LCP to continue being protective of OFW; ASWs 4, 7, 9, 10, 13, 18, 22, 23 to remain shut off based on this area being less than GCTLs **(2310-D18).**

The Team reached consensus to continue semi-annual sampling frequency for all wells **(2310-D19).**

A Performance Monitoring Report will be submitted to document the activities and results presented in this Advance Data Package.

Results: Decision Items 2310-D18, D19

2310-M08 Jennifer Buel/Tetra Tech

Hydrocarbon Burn Facility (SWMU 007) Interim Groundwater Monitoring

Objective: This advance data package (ADP) provides a summary of the interim groundwater monitoring for chlorinated volatile organic compounds (CVOCs); benzene, toluene, ethylbenzene, and xylenes (BTEX); and miscellaneous VOCs. Test consensus statements for a path forward are provided.

Discussion:
The Hydrocarbon Burn Facility (HBF) was a fire training area, and there are per- and polyfluorinated alkyl substances (PFAS) present in the groundwater. The PFAS plume overlaps with the VOC plume, which contributed to the decision to conduct interim groundwater monitoring for the VOC plume while the PFAS plume is delineated, and remedial options considered.

Annual sampling was conducted in November 2022. Two of the 30 wells in the monitoring program were inaccessible due to flooding from a recent hurricane; those were sampled in May 2023. One well could not be sampled due to a nesting alligator. Six additional monitoring wells were installed in March 2023 and sampled for VOCs in April 2023. Groundwater samples were collected at three locations via direct push technology (DPT) in May 2023 and analyzed for select VOCs.

CVOCs show concentrations decreasing overall. There is no vertical plume migration, but the CVOC footprint is expanding downgradient. The BTEX plume appears stable. The miscellaneous VOCs are chloroethane, 1,1,-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), 1,4-dioxane and isopropylbenzene. Chloroethane, 1,1-DCA, 1,1-DCE and 1,4-dioxane were detected in concentrations above their GCTLs. The miscellaneous VOCs remain delineated both horizontally and vertically. 1,4-Dioxane was above its GCTL in a downgradient well, but results from the May 2023 DPT samples provided delineation.

Three wells are called out on slide 25 as having notable decreases in CVOC results between 2021 and 2022. FDEP inquired if the reason is understood. Tetra Tech responded that there was no specific activity identified. FDEP asked if there were storm events? Tetra

Tech stated hurricane Ian happened during that timeframe and this area is prone to flooding.

FDEP inquired where was the increase in xylene concentration. Was that in the same area as the benzene? Xylene is benzene with a methyl group; that reaction does not happen in nature. Have you tested toluene in the area? Tetra Tech responded that they had. Upgradient of the where BETX is currently above GCTLs, an oxygen-releasing compound was applied in the area of the burn pans some years ago.

FDEP had a historical question– initially were there three separated plumes? Tetra Tech stated in 2016/2015 there seemed to be three separate plumes. It does look like they have merged together since.

The Team reached consensus that results from DPTs 394, 395, and 396 delineated 1,4-dioxane GCTL exceedances in wells IW0092 and IW0093 **(2310-D20).**

The Team reached consensus that additional DPT sampling will be conducted to confirm and delineate VC GCTL exceedances at IW0093 and DPT 394. This will include resampling of DPT 394, collecting three DPT groundwater points downgradient of the DPT 394 exceedance, and analyzing all intervals (10, 25, 35, and 45) for site COCs **(2310-D21).**

The Team reached consensus to continue interim groundwater monitoring as outlined on Slide 56. A total of 40 wells will be sampled during 2023 and analyzed for site COCs. The same list of 2022-2023 wells will be sampled with the addition of IW0039S. Triennial sampling of MNA parameters including microbial analysis will be completed in 2023 **(2310-D22).**

Results: Decision Items 2310-D20 through D22

DAY 2

2310-M09 Randy Sillan/AECOM

<u>MLP/VAB Hot Spot 2 Remedial Action Alternatives Analysis</u>

Objective: This advance data package (ADP) presents the evaluation of alternative remediation approaches within the former Hot Spot 2 (HS 2) area, especially targeting the finer grained clayey

unit where matrix diffusion to sand of predominantly vinyl chloride (VC) is prolonging natural attenuation and operation of the down-gradient biosparge barrier.

Discussion:
The objective of the selected approach is to reduce mass flux and achieve Groundwater Cleanup Target Levels (GCTLs) upgradient of the biosparge barrier to eliminate the need for continued operation. Using the most recent groundwater monitoring data and known soil characteristics, three options are presented and evaluated for sustainability, feasibility, cost, timeframe, and effectiveness.

Air sparging was used to treat HS 2 from 2012 through 2018 in the area upgradient of the biosparge barrier. In the former treatment area, chlorinated volatile organic compounds (primarily vinyl chloride [VC]) are below natural attenuation default concentrations (NADC) and often GCTLs in the sandy lithology from 0 to 40 feet. VC mass flux toward the biosparge barrier is decreasing. However, recent investigations demonstrate that VC and cis-1,2-dichloroethene are back-diffusing from the clayey sand that begins at about 45 ft. below ground surface. While natural attenuation of VC in the upper sandy aquifer appears to outpace its rate of matrix diffusion from the clay into the sands, concentration trends indicate that the VC concentrations are likely to remain above NADC and GCTL for many years, requiring continued operation of the biosparge system.

Technologies for treatment of the volatile organics above NADCs in a low permeability zone were screened. Three were retained and were evaluated in detail: monitored natural attenuation by long-term monitoring, in-situ chemical reduction (ISCR) using permeable reactive barriers (PRB), and ISCR using an injected grid. In all three cases, the biosparge barrier would continue operation until the corrective action objective of achieving GCTLs upgradient of the barrier was met.

The recommended alternative includes ISCR using two PRBs. The first barrier will mitigate mass flux in sand from the former source area. The second barrier will mitigate mass flux upgradient of the biosparge barrier.

The Team reached consensus that Option 2 - ISCR PRBs is the recommended remedial alternative to achieve corrective action objectives **(2310-D23).**

The Team reached consensus to model the fate and transport (F&T) of VC at the site to support selection and optimal design of an ISCR remedy to manage matrix diffusion, and to support cost evaluation and confirm shorter remediation time frame for ISCR alternatives **(2310-D24).**

NASA inquired with the path forward with F&T and ISCR PRB, should PFAS be considered at all? We have PFAS in this area. Should that be taken into consideration?

AECOM replied, "This alternative was developed with regards to treating CVOCs. Short answer is no because it wouldn't affect the remedy. If PFAS is concern in mass flux, we would probably want to look at that and see if there is a corrective action objective near the barrier that you want to achieve. There are some modifications to the PRBs we could make. However, we don't know where that PFAS is migrating. If there are significant PFAS at the water table, that is a different location than the deeper CVOC location. The current remedy won't be affected by PFAS, but it is not likely to treat PFAS at the site either."

Results: Decision Items 2310-D23, D24

2310-M10 Andrew Walters /Tetra Tech

2023 Annual Update (Year 1) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring of the Eastern High-Concentration Plume Area at Components Cleaning Facility (CCF), SWMU 030

Objective: This advance data package (ADP) addresses the east plume at the former Component Cleaning Facility (CCF). The plume on the west side of the site is in a different remediation phase. The ADP provides a summary of the air sparge system interim measure Year One operation, maintenance, and monitoring activities at the eastern CCF.

Discussion:
The site is in Corrective Measures Implementation for volatile organic compounds (VOCs) in groundwater from a traditional RCRA stand-point. Adaptive site management is being utilized through on-going assessment, design, and interim measures. The objective of the CCF East Interim Measure (IM) is to reduce VOC concentrations within the high concentration plume (HCP) to facilitate transition of the site into monitored natural attenuation (MNA) through a long-term monitoring (LTM) program. The overall Corrective Action Objective (CAO) for CCF is to reduce concentrations of VOCs to less than their respective Florida Groundwater Cleanup Target Levels (GCTLs).

In 2016-2017, the trichloroethene source zone on the east side of CCF was effectively treated using electric resistive heating. In 2020, direct push technology (DPT) groundwater sampling was used to re-characterize the VOC HCP. An air sparge system consisting of 88 air sparge wells (ASWs) was installed to address the HCP. There are four ASWs to 15' below land surface (bls), eight ASWs to 25' bls, twenty-four ASWs to 35' bls, eleven ASWs to 45' bls, and thirty-eight ASWs to 50' bls, and three ASWs to 61' bls.

FDEP inquired if there are plans to sample MW0002ID again? Tetra Tech referenced Slide 10 and Meeting Minute 2205-M03, Decision D18 that recommended sampling IW0014ID and IW0002ID (if DNAPL not present) for analysis of 1,4-dioxane every five years.

Interim groundwater monitoring was conducted annually at IWs 71 through 78 to evaluate the HCP prior to air sparge IM, and at IW35 to monitor a former TCE hot spot. FDEP concurrence was reached to migrate interim groundwater monitoring wells into the annual performance monitoring program for the air sparge IM. March 2022 DPT samples around IW35 indicate additional sampling is needed. It is recommended that IW35 continue to be sampled annually for VOC and additional DPT sampling work be conducted to delineate the IW35 Hot Spot.

The CCF East air sparge system began full-scale operation in June 2022. The Year One operational reporting period was June 2022 through June 2023. System was down approximately 20% of the reporting period due to hurricanes, maintenance events, and planned sampling event.

Baseline groundwater sampling consisted of collecting 21 groundwater samples in February 2022, and quarterly groundwater sampling consisted of collecting 25 groundwater samples in September 2022, November 2022, March 2023, and June 2023. Quarterly air monitoring was also conducted. Air results indicated air emissions are not an issue.

During baseline sampling, eights wells had results of cDCE or VC greater than Natural Attenuation Default Concentrations (NADCs). As of June 2023, no wells exceed NADCs. Only VC concentrations remain greater than GCTLs.

FDEP inquired if there was construction at that site; if so, is it completed or still ongoing? Tetra Tech advised currently there are paint booths above ground (Quonset huts), which are spring form shelters serving as a laydown area.

Two wells (IWs 0072 and 0073) with vinyl chloride (VC) concentrations greater than its NADC during baseline sampling had reductions to less than NADCs by Quarter 1. There was an overall, general reduction in contamination in the shallow wells. No wells had TCE, cDCE, or tDCE GCTL exceedances in Quarter 1 through Quarter 4. Three wells (IW0071, IW0080A, and IW0086A) have VC concentrations exceeding GCTL.

IWs 0049 and 0084A had VC concentrations greater than its NADC during baseline sampling with VC concentrations reduced to less than NADC in Quarter 1. Overall, general reduction in contamination was observed in the intermediate wells. No wells had TCE, cDCE, or tDCE GCTL exceedances in Quarter 3 or Quarter 4. Only one well (IW0081A) has a VC concentration exceeding GCTL.

cDCE concentrations at IW0076 exceeded 10x NADC during the baseline event. cDCE concentrations were reduced to 32 µg/L at that well during Quarter 1. Three wells had VC concentrations greater than its NADC (IWs 0009I, 0077, and 0083A) during baseline sampling. All three wells were reduced to less than NADCs by Quarter 1 and only one of the wells remains above the VC GCTL as of Quarter 4. Overall, general reduction in contamination was seen in the deep wells.

Surface samples were collected from three locations in the drainage canal on the north side of CCG. SW0002 and SW0003 exceeded VC surface water cleanup target level (SWCTL) of 2.4 µg/l during baseline sampling; no exceedances during Quarter 1. SW004 exceeded VC SWCTL in Quarter 2 and Quarter 4. Samples were not collected from SW0002 and SW0004 in Quarter 3 as surface water was not present in the canal. SW0002, SW0004 and SW0004 had cDCE detections. There is no SWCTL for cDCE.

Performance monitoring results at IW0076 indicated air sparging has been effective in the Pilot Study Treatment Area as concentrations of cDCE have been reduced from 24,000 µg/L to 4.9 µg/L. However, it is recommended that a DPT investigation be conducted in the around the Pilot Study ASWs to confirm results and determine the current extents of contamination in the retarding unit extends beyond the Pilot Study treatment area. Expansion of the AS system will be warranted if NADC exceedances are found beyond the Pilot Study Treatment Area.

The Team reached consensus to reduce Year 2 performance monitoring frequency to semi-annual sampling **(2310-D25).**

The Team reached consensus that baseline and quarterly air sampling results indicated air emissions are not an issue and air sampling will be discontinued **(2310-D26).**

The Team reached consensus to conduct DPT investigation in the Pilot Study Treatment Area to confirm performance monitoring results and determine if contamination in the retarding unit extends beyond the current treatment area **(2310-D27).**

FDEP inquired the reasoning for the 10-ft grid density? Tetra Tech pointed to Slide 29 and stated it was because of the low permeability in this area and small radius of influence (ROI) in these areas.

FDEP asked if we analyze all these samples? Tetra Tech responded they collect as many as they can and have the lab analyze the step-outs based on results of the initial set of samples.

Path forward includes continuing operation, maintenance, and monitoring (OM&M) of the AS system for Year 2. A Year 1 OM&M Report will be submitted to FDEP, upon completion.

Results: Decision Items 2310-D25 through D27

2310-M11 Mark Jonnet/Tetra Tech

LC34 Annual Performance Monitoring (SWMU CC054)

Objective: The goal of this ADP is to summarize groundwater interim measures (IMs) and monitoring results for chlorinated volatile organic compounds (CVOCs) from April 1, 2022, through March 31, 2023, that will be documented in the 2023 Performance Monitoring Report.#

Discussion:

Confirmatory Sampling

LC34 is located on Cape Canaveral Space Force Station, a barrier island bounded by the Banana River and Atlantic Ocean, with a 315-acre CVOC groundwater plume exceeding State of Florida Groundwater Cleanup Target Levels (GCTLs) referred to as a Low Concentration Plume (LCP). Within the LCP plume is an area of 157 acres that exceeds Florida Department of Environmental Protection (FDEP) Natural Attenuation Default Concentrations (NADCs), 52.6 acres that exceed 10-times NADCs (referred to as Hot Spots), 9.3 acres that exceed 100-times NADCs, and a two-acre trichloroethene (TCE) source zone referred to as the dense non-aqueous phase liquid (DNAPL) Source Zone (DSZ). The DSZ Hydraulic Containment System (HCS) and Hot Spot 6 (HS6) Air Sparging IM were operational during this reporting period.

A brief site history and background were provided on LC34. The geology at LC34 was shown with the recovery wells intervals. Generally speaking, Layers 1, 2, 3, 5, 6, and 8 are sandy; Layer 4 is clay; Layer 7 is silty; and Layer 9 is the clay of the Hawthorn Group. Layers 4 and 7 have sorbed mass in addition to dissolved mass. Historic site-wide groundwater contours indicate mounding near the HCS compound in the shallow intervals (Layers 1, 2, 3), and flow generally to the southeast, southwest, and west in deeper intervals (Layers 6 and 8). Site-wide potentiometric contours were developed for Layers 1 and 2 using water level measurements collected in February 2023 from the wells in the biennial sampling program. Groundwater flow in Layer 1 is radial around monitoring wells 10SR

and 25S with an easterly component towards the Atlantic Ocean, a southerly component towards Phillips Parkway, and a westerly component. Groundwater flow in Layer 2 is radial around wells 10IR and 110 with a similar easterly component towards the Atlantic Ocean and southeasterly/southwesterly components.

Biennial LTM Sampling

Site-wide biennial groundwater monitoring was scheduled to be conducted in December 2022 (wet season) but was delayed until February due to flooding from hurricanes and other heavy rain events and included 56 monitoring wells (MWs) for VOCs and one MW for polychlorinated biphenyls (PCBs). Monitoring well CW0002 was planned to be sampled, but the area was covered by several feet of sand from hurricanes and the well could not be located. TCE was not detected in any of the biennial wells; detection limits exceeded TCE GCTL in IW10IR, IW21I, IW31I, IW37I, IW51I, and IW101. Trans-1,2-dichloroethene (tDCE) was detected in 5 of the 55 wells with all results less than GCTL. Cis-1,2-dichloroethene (cDCE) was detected in 32 of the 55 wells with 8 results exceeding GCTL and 5 of those 8 also exceeding NADC. Vinyl chloride (VC) was detected in 33 of the 55 wells with all detections exceeding its GCTL; 11 of the 33 detections also exceeded NADC and 3 of those 11 detections also exceeded ten times NADC. In the shallow zone (above Layer 4), maximum detections within the site-wide plume area have been greatly reduced since the HCS and Air Sparging operations began, with maximum cDCE being reduced from 190,000 ug/L (pre-HCS) to 3,900 ug/L (Feb 2023) and VC from 88,500 ug/L (pre-HCS) to 6,200 ug/L (Feb 2023).

Mann-Kendall trend analysis was used to evaluate monitoring well trends. All 55 LTM wells and two wells in Hot Spot 6 (57S/57I) were considered for evaluation; ultimately, only wells with GCTL exceedances in 2020 and 2023 were evaluated. TCE and tDCE were less than GCTLs in all wells; cDCE and VC had decreasing trend in 5 and 7 wells, respectively; stable trend in 1 and 4 wells, respectively; increasing trend in 5 and 14 wells, respectively; and no trend in 2 and 12, respectively.

cDCE was less than GCTLs in all Layer 1 wells; 5 wells within Layer 2 had increasing trend within the HCP. VC was less than

GCTLs in 20 wells with decreasing trend in 7 wells, stable trend in 4 wells, increasing trend in 14 wells, and no trend in 12 wells. Two wells with increasing trend were in Layer 1 and 12 wells with increasing trend were in Layer 2. For evaluation purposes, the wells are grouped into LCP Perimeter Wells, LCP wells, LCP/HCP Interface, HCP wells, and IW0122 (the well analyzed for PCBs in the former T2 Electrical Substation IM Area). Twenty wells are monitored in the LCP Perimeter Wells. VC is in the only VOC exceeding GCTLs, with an increasing trend in IWs 06I, 61I, and 96, decreasing trend in IWs 39I and 59I, and no trend in IWs 29S and 95. IWs 04S, 39I, 64I, 97, and 110 are part of the LCP grouping, cDCE exceeded GCTL in IW64I with a decreasing trend and VC exceeded the GCTL in IWs 39I, 64I, and 97 with IW64I also exceeding NADC. Decreasing trends were observed in IW39I, increasing trend in IW64I, and no trend in IW97. The LCP/HCP Interface grouping includes sixteen wells. Four wells were less than GCTLs, two wells had decreasing trend, three wells were stable, five wells had increasing trend, and two wells had no trend. The HCP grouping includes seventeen wells. Two wells were less than GCTLs, three wells had decreasing trend, IW54S was stable, five wells had increasing trend, and six wells had no trend.

PCBs were sampled from one well during the biennial event (IW0122). This well is located in the 2019 soil IM area near the launch pad. Pre-IM groundwater results identified PCBs above the GCTL, with a maximum concentration of 3.8 ug/L (vs. GCTL of 0.5 ug/L). This well was abandoned for the soil IM and then re-installed and incorporated into the biennial sampling program. All Aroclor results were below detection limits during the December 2022 event, as well as the previous event conducted in December 2020.

The Team reached consensus to properly abandon CW0002 and install a new well at that location with the screen interval 2 to 12 ft bls **(2310-D28).**

The Team reached consensus to continue biennial site wide LTM at the same 55 MWs as the 2023 sampling event and the replacement well shown on Slide 18 for CVOCs, and also one MW (IW0122) for PCBs. The next biennial event is scheduled for December 2024. The area where CW0002 is located was covered by several feet of sand from hurricanes and could not be located and is proposed to be

properly abandoned and replaced with new well shown on Slide 18 **(2310-D29).**

Hydraulic Containment System

The IM objective for the HCS is to attain hydraulic control of the DSZ and TCE HCP within Hot Spots 2, 3, and 4 by hydraulic containment with ex-situ treatment. The HCS began full-scale operation in May 2010, the system was expanded in 2015, and in August 2019 a new recovery well was installed 80 to 95 feet below land surface (ft bls). Three additional recovery wells (80 to 95 ft bls) were installed in February 2021. An additional recovery well (86 to 106 ft bls) was installed in January 2023. The current HCS includes 10 shallow recovery wells (15 to 45 ft bls), 7 deep recovery wells (50 to 80 ft bls), 4 deeper recovery wells (80 to 95 ft bls), 1 recovery well screened 86 to 106 ft bls, equalization tank and discharge pump, 2 air strippers, discharge pump, and liquid-phase granular activated carbon (LPGAC) treatment for polishing (if needed), catalytic oxidizer, quench tower, scrubbing unit, and 12 deep injection wells (50 to 80 ft bls) and an infiltration gallery for discharge of treated water.

The HCS hydraulically controls the DSZ by utilizing recovery wells to extract contaminated groundwater. The extracted groundwater flows into an equalization tank, which is then treated by two air strippers in series, polished by LPGAC, and subsequently pumped to injection wells and an infiltration gallery. The contaminants in the air stream from the air strippers are destroyed by a catalytic oxidizer. The catalytic oxidizer effluent is cooled in a quench tower and then neutralized by the acid gas scrubber prior to discharge to the atmosphere. During the Year 13 operational period (April 1, 2022, through March 31, 2023), system runtime was 90%. The majority of downtime was due to hurricanes, normal maintenance activities, and minor electrical failures. Over 27 million gallons of groundwater were treated during Year 13 with 3,404 pounds of CVOCs destroyed. Since HCS operation began, over 313 million gallons of groundwater have been treated with 88,337 pounds of CVOCs destroyed.

Performance sampling is conducted to evaluate the HCS operations. The air strippers' effluent and LPGAC effluent are sampled monthly, individual recovery wells and combined influent are sampled

quarterly, and catalytic oxidation influent and effluent (vapor) are sampled annually. In addition, nine locations are sampled annually via direct-push technology (DPT) to evaluate aquifer conditions within the DSZ. At each location, samples were collected in five-foot intervals from 8 to 98 ft bls.

Influent system concentrations were stable over the reporting period. Sample results, as shown on slide 50, indicate that contaminants in groundwater were reduced to less than GCTLs in the GAC effluent during all sampling events in the reporting period.

Individual recovery wells results, flow rates, and mass recovery rates were summarized on slides 53 and 54. The total recovery well flow rate of 84 gpm was maintained during the reporting period. When recovery well 21D was brought online, recovery wells 12A, 13A, 14A, 15A, and 16B were shut down. TCE was less than detection limits in these wells with the exception of 16B which had TCE detected at 4.7 I µg/L during the December 2022 sampling event. The highest TCE results were detected in RW02A (shallow capture zone), RW02B (deep capture zone), and RW19C (deeper zone), with the highest overall TCE result of 360,000 µg/L from RW19C in March 2023. The four recovery wells in the deeper zone (Layer 7; RWs 17C, 18C, 19C, 20C) are each operating at 1 gpm due to the silty lithology in this layer and RW21D operated at 15 gpm a portion of the screen is in Layer 8. As of March 2023, these five recovery wells have recovered 4,363,103 gallons of groundwater with 9,636 pounds of VOCs treated.

The catalytic oxidizer influent and effluent sample results were shown on slide 51. The influent results translate to 8.5 lb/day for total VOCs and 6.5 lb/day for TCE, and the effluent results translate to 0.001 lb/day for Total VOCs and 0.00039 lb/day for TCE. Based on the effluent results the catalytic oxidizer continues to meet the permissible daily hazardous air pollutants (HAP) levels of 6.8 lb/day for Total VOCs and 2.7 lb/day for TCE.

Annual DPT sampling was conducted in December 2022 to evaluate aquifer conditions within the DSZ. An evaluation of the results by extraction zone was summarized on Slide 55, with the highest TCE results of 1,400,000 ug/L (shallow capture zone), 1,800,000 µg/L (between shallow and deep capture zones), 1,500,000 µg/L (deep capture zone), 150,000 µg/L (Layer 7 capture zone), and 24,000

µg/L in RW21D. Sampling results were compared to previous sample events, and tabulated to show TCE concentrations in percent composition over all sample intervals in relation to recovery well capture zone (Slides 56 to 59). Data shows that the majority of contamination is located at 48 ft bls (30% above/within Layer 4), 53 ft bls (18.4% directly below Layer 4), and 83 ft bls (15% in Layer 7).

In regard to Slide 58 (Deep DPT TCE Results), FDEP asked Tetra Tech to comment on the spike in TCE in the 2021 sampling event. Tetra Tech explained they had a pilot study for air sparge where they shut off the shallow and deep recovery wells. Wells 1B, 1A, 3B, and 3A were shut off so that the entrained air did not damage the recovery well pumps. The recovery wells were off for months, and DNAPL mass flux resulted in higher TCE concentrations in the aquifer. Now that the recovery wells are back on, the 2022 results are back to the previous concentrations.

Groundwater samples from Layer 7 and 8 monitoring wells were also collected in December 2022 to monitor vertical migration of contamination. All wells sampled were below detection limits, except 43D2, 44D2, and 162.

cDCE and VC were detected in 43D2 at 1.0 and 4.2 µg/L; cDCE and VC have been detected in 8 and 2 of the 12 sampling events since November 2009. The next sampling event for this well is scheduled for December 2023.

cDCE was detected in 44D2 at 1.2 ug/L; cDCE has been detected in 7 of the 12 sampling events since November 2009. The maximum cDCE of 5.3 ug/L was detected during the November 2009 event.

TCE has had an increasing trend in IW162 since December 2021. Frequent sampling of this well was implemented in March 2022. TCE increased from 2.4 I to 280 ug/L during the period of December 2021 to December 2022.

RW21D was installed adjacent to RW20C in January 2023 to address the increasing TCE trend in IW162. The planned total depth was 100 ft bls. The materials for this well were a special order by the driller. Prior to the field event Tetra Tech verified the driller received the materials to install the recovery well to 100 feet bls. The driller had an extra 5-foot section of riser they brought onsite. Unaware of

the extra 5-foot section, Tetra Tech instructed field person to install the well with the materials driller brought onsite assuming they only had the special ordered materials. RW21D was installed to a depth of 106 ft bls extending approximately five feet into Layer 8. Rather than abandoning the recovery well, NASA decided to operate the recovery well with a biweekly sampling of IW162 and two additional wells, IW44D2 and IW162.

FDEP asked if there are other monitoring wells southeast of 44D2 that we can sample? Is it possible the plume is migrating? That is a 40 times increase in a matter of 6 months. Will RW21D pull back the contamination in IW44D2? Tetra Tech believes the continued pumping for RW21D is pulling back the dissolved contaminants. Monitoring wells 01D2 and 161 could be sampled to monitor a wider area, as FDEP suggested. FDEP concurred with those locations and asked if sampling every 2 weeks gives the information to know if we should abandon well RW21D if warranted? Tetra Tech stated it does, and that the biweekly sampling provides a good picture of conditions at that depth. Adding IW-165 to sampling events was discussed and concluded to be unnecessary at this time.

The Team reached consensus to continue IM OM&M of the HCS for Year 14, the operational period of April 1, 2023 to March 31, 2024, consistent with the current approach that includes: biweekly samples from IWs 01D2, 161, 44D2, and 162; monthly sampling of the air stripper's effluent (aqueous), quarterly sampling of the combined influent and individual RW influent (aqueous), and annual sampling of the influent and effluent of the CatOx (vapor), DPT (aqueous), and Layer 7/8 monitoring wells (aqueous) **(2310-D30).**

Hot Spot 6 Air Sparging:

The IM objective for the HS6 Air Sparging IM is to remediate contaminated groundwater within the treatment zone to prevent impacts to the drainage ditch and support transition to monitored natural attenuation (MNA). The initial phase of the HS6 IM began full scale operations in July 2018, and was then expanded from 160 air sparging wells (ASWs) to 300 ASWs with full scale operations beginning in May 2019. The 300 ASWs were installed beneath the VOC contamination on the top of Layer 4 (approximately 40 feet

bls). The design included an ASW flow rate of 5.0 CFM, and 25 ft radius of influence with ASWs spaced 25 feet apart with no overlap. The system operates in nine treatment zones, with compressed air supplied from a 75-horsepower rotary screw compressor.

Slide 64 showed cycle times for the nine zones associated with the system. Zones 1 and 2 remained off during the operational period as cleanup objectives have been met in this area. System run time was 80% over the reporting period. The system is monitored remotely, and if any issues arise a technician is dispatched to troubleshoot and resume operations. Monthly site visits are conducted to ensure the system is operating properly and the system is balanced.

Semi-annual performance sampling was conducted at 28 monitoring wells and 3 surface water locations in the nearby canal/drainage ditch. Performance results were shown on Slides 67 to 68. From the October 2022 event, 20 wells are less than GCTLs, four wells exceed GCTLs, one well exceeded NADCs, and one of which also exceed 10-times NADCs. IWs 134 and 135 exceeded cDCE GCTL, with maximum concentration of 6,300 µg/L exceeding NADC. IWs 57I, 123, 129, 130, 134, and 135 exceeded VC GCTL, with IW135 exceeding VC NADC at 110 µg/L, and IW134 had maximum VC concentrations of 2,500 µg/L. The wells with NADC exceedances are on the upgradient side of the sparge area and receive flux from the DSZ.

Slide 69 displayed the Hot Spot 6 plume configurations from June 2018 (prior to system startup) and present. As of October 2022, 14.1 acres of treatment area are below GCTLs, and 1.6 acres remain above GCTLs. COC concentrations have been drastically reduced since system startup with maximum cDCE reducing from 53,800 ug/L (baseline) to 6,300 µg/L (October 2022) and maximum VC reducing from 13,600 (baseline) to 2,500 µg/L (October 2022). Surface water results were all non-detect during the 2022 sampling events, showing that impacts to the drainage ditch have been eliminated.

The expansion area began full scale operations on 27Aug2023. The existing treatment system operated as designed and met performance criterion. VC in IW57I, the remaining well within the existing treatment area, decreased from 1.7 I (October 2022) to 0.5 U µg/L (April 2023). The current sparging operations include 48 ASWs

operating in Zone 8 to prevent upgradient contamination from impacting the previously treated area and 190 ASWs in Zone 9 to 14 treating an additional 11.2 acres.

The Team reached consensus to continue operation of the HS6 air sparging system of the active 238 ASWs for the operational period of April 1, 2023, to March 31, 2024 **(2310-D31).**

The Team reached consensus for quarterly sampling of 21 monitoring wells associated with expansion for VOCs and field parameters **(2310-D32).**

The Team reached consensus to continue semi-annual sampling of 28 monitoring wells and 3 surface water locations associated with previous treatment area for VOCs and field parameters **(2310-D33).**

FDEP mentioned that generally Rule 62-780 has us do quarterly sampling after shutting a system down. Since NASA is not seeking site closure and will conduct semi-annual sampling, the proposed sampling program should be okay.

NASA said they planned to present this briefing earlier this year but changes in the meeting schedule pushed it out. It was not our intent to be this far into the Year 14 operations before presenting to the Team.

Path Forward:

In summary, the path forward will include: (1) Monthly System Sampling will include HCS effluent samples collected from air strippers, LPGAC when online; (2) Quarterly Sampling will include HCS total system influent, and HCS individual recovery wells (18 RWs); (3) Quarterly sampling of Hot Spot 6 Expansion Area performance sampling (21 MWs) and semi-annual sampling of Hot Spot 6 performance sampling (28 MWs and 3 SWs); (4) Annual Sampling (December 2021) will include HCS CatOx influent and effluent, HCS DPT samples from 9 locations (8 to 98 ft bls at each boring), and Layer 8 Performance MWs; (5) Biennial Site-Wide LTM Sampling (December 2022) will include sampling of 56 MWs for VOCs and one MW for PCBs; and, (6) Schedule abandonment of CW-02.

Results: Decision Items 2310-D289 through D33

2310-M12 Chad Lee/AECOM

Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update

Objective: This briefing summarizes work performed at four of the sites included in this LTM program in 2023, presents results and conclusions, and recommends next steps.

Discussion:

Former Development and Testing Laboratory (FDTL) – SWMU 075:

Site contaminants of concern (COCs) are trichloroethene (TCE) and vinyl chloride (VC). Activities included: measurement of water levels from 18 monitoring wells to determine groundwater flow direction; collection of groundwater samples from seven monitoring wells for analysis of 1,1-dichloroethene (11DCE), cis-1,2-dichloroethene (cDCE), trans-1,2-dichloroethene (tDCE), tetrachloroethene (PCE), TCE, and VC; and collection of three surface water samples for analysis of 11DCE, cDCE, tDCE, PCE, TCE, and VC.

Groundwater flow at the site in May 2023, was to the west in the 5 to 15 feet below land surface (bls) zone; and northeast in the south, northeast in the northwest, and south in the east in the 10 to 25 feet bls zone. Analytical results indicate that VC concentrations were above the State of Florida Groundwater Cleanup Target Level (GCTL) of 1 microgram per liter (µg/L) in six monitoring wells (FDTL-IW0015S, FDTLIW0007I, FDTL-IW0008I, FDTL-IW0009I, FDTL-IW0010I, and FDTL-IW0019I). TCE was not detected in the groundwater samples, and TCE and VC were not detected in the surface water samples.

The Team reached consensus to conduct biennial sampling of eight monitoring wells FDTL-IW0015S, FDTL-IW0007I, FDTLIW0008I, FDTL-IW0009I, FDTL-IW0010I, FDTL-IW0014I, FDTL-IW0017I, and FDTL-IW0019I for site VOCs **(2310-D34).**

The Team reached consensus to collect five surface water samples: three at FDTL-SW0002, FDTL-SW0003, and FDTL-SW0004, and two proposed locations, one west of FDTL-IW0009I at historical

location FDTL-SW0001, and one west of FDTL-IW0010I at new location FDTL-SW0005 **(2310-D35).**

The Team reached consensus to collect water level measurements at 18 monitoring wells. The next sampling event is scheduled for November 2024 **(2310-D36).**

FDEP inquired if monitoring well 14I ever had a detection? AECOM responded is has not had a detection since 2013.

Launch Complex 39 Observation Gantry Area (LC39OGA) – SWMU 107:

Site COC is VC. One new monitoring well LC39OGA-MW0010, screened from 5 to 15 feet bls, was installed on the downgradient edge of the volatile organic compound plume. Approved future monitoring wells LC39OGA-MW0011 and LC39OGA-MW0012 will be installed once site access is granted at the MSS Park Site. LTM activities included: measurement of water levels from 10 monitoring wells to determine groundwater flow direction; collection of groundwater samples from 10 monitoring wells for analysis of cDCE, tDCE, TCE, and VC; and collection of four surface water samples for analysis of cDCE, tDCE, TCE, and VC

Groundwater flow at the site in May 2023 was to the southwest in both the 5 to 15 feet bls zone and the 22 to 27 feet bls zone. Analytical results indicate that cDCE, tDCE, and TCE were detected, but below GCTLs. VC was not detected in the groundwater or surface water samples collected.

FDEP inquired on LC39OGA if DPT 54 and DPT 55 exceeded GCTLs? AECOM confirmed they did. DPT54 had 2.0 ug/L VC at 15 feet and DPT55 had 2.8 ug/L VC at 15 feet. FDEP inquired if we plan to put a well in the east to delineate. AECOM stated not at this time, based on the southwesterly groundwater flow. FDEP believes that MW0001 and MW0005, as long as they remain clean, will adequately delineate the site without a well further east.

The Team reached consensus to conduct annual sampling at 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012 **(2310-D37).**

The Team reached consensus to collect surface water samples at four locations, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006. Samples will be analyzed for site VOCs **(2310-D38).**

The Team reached consensus to collect water level measurements at 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012. The next sampling event is scheduled for December 2023 **(2310-D39).**

Launch Equipment Shop (LES) – PRL 051:

LTM activities consisted of: measurement of water levels from 12 monitoring wells to determine groundwater flow direction; And collection of groundwater samples from three monitoring wells for analysis of total recoverable petroleum hydrocarbons (TRPH), the site COC. Groundwater flow at the site in May 2023 was to the southeast. Analytical results indicate that TRPH was not detected in the groundwater samples.

The Team reached consensus to conduct groundwater sampling at three monitoring wells, LES-IW0005S, LES-IW0009S, and LES-IW0011S, and analyze the samples for TRPH **(2310-D40).**

The Team reached consensus to change the sampling frequency from annual to biennial **(2310-D41).**

The Team reached consensus to continue water level measurements at 12 monitoring wells, LES-IW0002S through LES-IW0013S. The next sampling event will be scheduled for November 2024 **(2310-D42).**

NASA inquired on AECOM's thoughts on elevated detection limits for the last round of sampling. AECOM will check with lab on the TRPH for the LES shop. FDEP stated that the elevated detection limit is near the GCTL. They would like to understand the cause of the elevated detection limit, as it might mask early signs of migration, particularly if sampling is to be conducted biennially going forward **(2310-A02).**

Shuttle Flight Operations Contract (SFOC) Generator Maintenance Facility – SWMU 081:

Antimony is the COC at SFOC. LTM activities included: installation of a new monitoring well, SFOC-IW0009, screened from 2 to 12 feet bls; measurement of water levels from nine monitoring wells to determine groundwater flow direction; and collection of groundwater samples from three monitoring wells for analysis of antimony. Groundwater flow at the site in May 2023 was to the north-northeast in the north and to the northwest in the south. Analytical results indicate that antimony was above the GCTL of 6 µg/L and above the State of Florida Natural Attenuation Default Concentration of 60 µg/L in SFOC-IW0001S.

FDEP inquired where was the tube placement? Middle of screen or top of water column? AECOM responded that the tubing was 6.5ft (middle of the screen). FDEP responded that it is a big difference between top of screen from MW1S (screen 2-12 ft.) to MW8 (8-18 ft.).

The Team reached consensus to add SFOC-IW0002S to the LTM Program as an upgradient well **(2310-D43).**

The Team reached consensus that prior to the next event, re-develop four monitoring wells: SFOC-IW0001S, SFOC-IW0002S, SFOC-IW0004S, SFOC-IW0009 **(2310-D44).**

The Team reached consensus to conduct groundwater sampling at three monitoring wells, SFOC-IW0001S, SFOC-IW0004S, and SFOC-IW0009, and analyze the samples for antimony **(2310-D45).**

The Team reached consensus to continue water level measurements at nine monitoring wells, SFOC-IW0001S through SFOCIW0009. The next sampling event will be scheduled for November 2024 **(2310-D46).**

Results: Decision Items 2310-D34 through D46
Action Item 2310-A02

2310-M13 Jason Bublitz and Ryan Sullivan/ HGL

Communications, Maintenance & Storage (CM&S) Vapor Intrusion Work Plan (SWMU 082)

Objective: This briefing summarizes the site description and history, details site reconnaissance activities, presents an air monitoring plan, and tests consensus on a path forward.

Discussion:

Based on volatile organic compound (VOC) groundwater concentrations beneath Building M6-791, air monitoring will be completed to determine if the vapor intrusion exposure pathway is complete and, if so, to estimate potential risks to current and future building occupants.

The approach consists of completing the building manager questionnaire, conduct building reconnaissance, developing an air monitoring plan, completing subslab soil gas sampling, evaluating results, and presenting recommendations in an Air Monitoring Report. The building manager questionnaire was completed July 20, 2023. Building reconnaissance was completed August 4th. The building comprises offices and storage areas. No significant preferential pathways for vapor intrusion were identified. One chemical storage cabinet was identified.

The air monitoring plan for soil gas sampling will consist of: Two sampling events: wet season (June-August) and dry season (January-March), five soil gas samples and one ambient (outdoor) air sample per event, with soil gas samples to be collected using subslab vapor pins.

Sample locations will be biased toward underlying groundwater concentrations, regularly occupied workspaces, lateral coverage of building footprint, flooring material (i.e., avoiding carpet, ceramic tile, etc.). Soil gas sampling will be conducted after regular business hours. Samples will be collected over an approximately 5-minute time period (i.e., grab samples) and analyzed for: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cDCE), trans-1,2-dichloroethene (tDCE), vinyl chloride (VC), and 1,1-dichloroethene (1,1-DCE) via EPA Method TO-15, and methane via Modified ASTM D-1946.

Following sample collection and analysis, an Air Monitoring Report will be prepared to present field notes, field photographs, soil gas and ambient (outdoor) air analytical data, and a comparison of detected concentrations to EPA target Vapor Intrusion Screening Levels (VISL) for soil gas (cancer risk = 1E-06, non-cancer hazard quotient = 0.1).

If detected soil gas concentrations exceed EPA target VISLs for soil gas, indoor air sampling will be recommended. In this scenario, indoor air sampling procedures will be detailed in a future Air Monitoring Plan. If detected soil gas concentrations are less than EPA target VISLs for soil gas, the Air Monitoring Report will conclude that unacceptable risks are not indicated in Building M6-791 which lies within SWMU 082.

The Team reached consensus to proceed with the proposed Air Monitoring Plan as outlined in the advance data package. Two soil gas sampling events from proposed locations as shown on Slide 16 will be conducted, and an air monitoring report will be submitted **(2310-D47).**

This is part of the larger site characterization which will be presented at the next meeting. This is not a stand-alone element and just part of a bigger picture. FDEP observed that the Contaminated Site Cleanup Criteria rule does not address vapor intrusion or ambient air. Performing this evaluation as part of the larger conceptual site model is appropriate.

NASA stated that air monitoring results will be shared with KSC's Industrial Hygienist.

Results: Decision Item 2310-D47

2310-M14 Chad Lee/AECOM

Q6 Radar Station

Objective:

This briefing provides a summary of the activities performed for the Q6 Radar Station, Q6-0082, Solid Waste Management Unit (SWMU) 112 – Locations of Concern (LOCs) 3 and 10 – Soil Interim Measures (IM) Implementation.

Discussion:

Q6 Radar Station – SWMU 112:

A summary of work includes:

Soil IM removal and backfill activities from January 23 through February 9, 2023.

Site restoration activities on February 17 and March 24, 2023.

Removal of 77.43 tons (approximately 64.5 cubic yards) of barium and copper contaminated soil to a total depth of 2.0 feet below land surface (bls).

Restoration of the site to original condition using certified clean backfill material (sand), and then finishing the surface with 3 to 6 inches of 57 stone gravel on top of weed prevention filter fabric.

Groundwater sampling at one monitoring well Q6RS-MW0003 (screened from 3.5 to 8.5 feet bls), which is located within the Soil IM removal area, for barium and copper analysis.

Analytical results indicated barium and copper concentrations were both below the State of Florida Groundwater Cleanup Target Levels in groundwater in the Soil IM Area.

NASA added that the interim measure was bounded by sidewalk/concrete all the way around. Vertically, soils were excavated to the depth of clean samples.

FDEP inquired if the Team is saying they only got to exposed soils and not the soils under concrete? NASA responded that the concrete has been in place since initial construction of the facility. With paint residues from structures as the source of soil contamination, the paved surfaces provided a barrier to the soils beneath,

No Further Action (NFA) for soil at LOC 3 and LOC 10 is proposed. FDEP would like to review the data more closely prior to granting an NFA concurrence.

The Team reached consensus to continue the LOC 1 investigation for groundwater under the Q6 Radar Station – SWMU 112 Project; results will be presented under separate cover (**2310-D48).**

Results: Decision Item 2310-D48

2310-M15 Jason Bublitz/HGL

Vertical Processing Facility (VPF) Decommissioning of the Air Sparge System, October 2023

Objective:

This briefing provides a summary of the activities performed for the Air Sparge (AS) system abandonment activities.

Discussion:

The project objective was to abandon the AS wells and remove all associated AS system piping. HGL coordinated with NASA Remediation Project Manager, Facility Manager, KSC Locators, and BOSS to conduct a temporary electrical utility outage to disconnect the former AS trailer temporary power supply to a transformer. Concrete and other construction debris was transported off-site and disposed of at an appropriate facility in accordance with all local and federal regulations. Site restoration activities were conducted to ensure areas of former system operation are in original or better condition.

In conclusion, the AS system has been properly decommissioned. All AS wells were abandoned by a Florida-licensed water well contractor in accordance with all applicable regulations. Well abandonment permits were completed for all wells that were abandoned. All AS piping was removed and transported off site for disposal with other concrete debris. Site restoration activities completed restored the site to original or better condition.

A Decommissioning of the AS System Report will be submitted as a courtesy to FDEP.

2310-M16 Alex Murphy/Tetra Tech

Paint and Oil Locker (POL) Southern Treatment Area and Supply Warehouse 3 (SW3) Program

Objective:

The goal of this briefing is to present POL Southern Treatment Area Year 2 Performance Monitoring Year 2 performance groundwater

monitoring results, Year 2 system operation, groundwater monitoring results, and proposed path forward. It also includes results and recommendations for the POL Northern Area and SW3 Long-Term Monitoring (LTM). All will be documented in the POL Southern Treatment Area Year 2 Performance Monitoring and POL Northern Area and SW3 LTM Report.

Discussion:

POL (Solid Waste Management Unit [SWMU] #067) and SW3 (SWMU #088) are both located in the Kennedy Space Center (KSC) Industrial Area near the corner of 5th Street SE and C Avenue SE. Note: Per- and Polyfluorinated Alkyl Substances (PFAS) are being investigated in this vicinity under SWMU 117 Sewage Treatment Plant 1 and Sludge Disposal Area. SWMU 117 overlays the POL/SW3 area.

POL Southern Treatment Area:

A brief site history and facility description of POL was provided. The geology within the POL Southern Treatment Area consists of a fine-grained sand/silt (0-4' bls), organic sand hard-pan (4-8' bls), fine-grained sand/silt (8-23' bls), fine-grained sand with fragmented shell/coarse shell (23-53' bls), and a hard clay (53'+ bls). A summary of recent direct push technology (DPT) groundwater sampling (October 2021) was provided with the goal to evaluate the low concentration plume (LCP) boundaries and ensure the volatile organic compound (VOC) plume is adequate delineated. A total of 199 DPT samples were collected from intervals ranging from 10 to 54' bls. Results indicated no detections of trichloroethene (TCE), trans-1,2-dichloroethene (tDCE), or vinyl chloride (VC) along the boundary locations of POL, low detections of cis-1,2-dichloroethene (cDCE) in the POL boundary locations, and VC detections of 2 ug/L at 2 locations along the SW3 boundary locations. A subsequent DPT groundwater sampling event was conducted in August 2022 in the POL Southern Treatment Area to confirm the Year 1 performance analytical results and determine whether any source zone (SZ) or hot spot (HS) plume migration has occurred that is not captured by the current monitoring well network. Sixty total DPT groundwater samples were collected from intervals from 10 to 54' bls. Peak concentrations were observed to be 4.3 ug/L of TCE and 3.1 ug/L of

VC. cDCE and tDCE were not detected in any samples exceeding the Florida groundwater cleanup target levels (GCTLs).

The objective of the POL Southern Treatment Area Interim Measure (IM) is to reduce groundwater concentrations within the TCE SZ, HS, and high concentration plume (HCP) to support the transition to LTM. The overall objective is to reduce groundwater concentrations of TCE, cDCE, and VC to below their respective State of Florida GCTLs. Full-scale operation of the POL Southern Treatment Area air sparge (AS) system began in February 2021. The AS system consists of 112 AS wells (15 ft. radius of influence each) at 3 depth intervals and 6 zones, a 75-hoursepower rotary air compressor, and one centrally located distribution manifold trailer. Throughout the operation period, the AS system was able to meet IM design criteria. In January 2022, all of the Zone 1 and Zone 2 wells were shut off and in May 2022 11 AS wells in Zone 3 and 12 AS wells in Zone 4 were shut off due to upwelling in an adjacent ditch.

During Year 2 of AS system operation: the AS system was shut down approximately 1 week prior to each groundwater sampling event. Additional shutdowns included for Hurricane activity (September 2022 and November 2022), unknown electrical fault (February 2023), trouble shooting for impacts to adjacent ditches, power outage and compressor maintenance (March 2023), and 4000-hour compressor maintenance (June 2023). On June 12, 2023, upon meeting IM objectives, the AS system was turned off and the compressor trailer was moved to Launch Complex 39B. The shutdown was approved by FDEP in advance.

The POL Southern Treatment Area Year 2 performance monitoring plan consisted of semi-annual sampling of 3 shallow wells, 10 intermediate wells, and 2 deep wells; annual sampling of 1 shallow well, 4 intermediate wells, and 1 deep well. Each groundwater sample was analyzed for VOCs via EPA Method 8260D. Air monitoring was conducted at 5 locations in January 2023 and analyzed via EPA Method TO-15. Air results show no TCE, cDCE, tDCE, or VC detected in any of the 5 samples collected.

Potentiometric flows in the shallow groundwater interval showed slight mounding along 5th Street with radial flow and a general site flow towards the southeast. The intermediate and deep intervals showed a flow generally to the southeast with slight depressional

areas. Year 2 Performance groundwater results showed peak concentrations of TCE - 10 ug/L in MW0043I in July 2023, cDCE - 110 ug/L in MW0026s March 2023, tDCE – 6.1 ug/L in MW0026S in October 2022, and VC – 17 ug/L in MW0012S in October 2022.

Results of the Year 2 Performance Monitoring:

- Shallow Groundwater Plume (5-20' bls)
  - October 2019 baseline DPT indicated VOCs >10XNADC within 10-20' bls interval. During Year 1 operation, only slight GCTL exceedances were observed.
  - Year 2 – GCTL exceedances in October 2022 (VC), March 2023 (cDCE and VC) and July 2023 (cDCE and VC)
  - By end of Year 2, VC and cDCE >GCTL at only one location (MW0026S)
- Intermediate Groundwater Plume (20-40' bls)
  - October 2019 baseline DPT indicated VOCs >SZ. During baseline monitoring well event, only 10XNADC exceedances were observed.
  - During Year 2, GCTL exceedances of TCE were detected within the intermediate zone in December 2022 (MW0042SI and MW0043I) and July 2023 (MW0041SU and MW0043I).
- Deep Groundwater Plume (>40' bs)
  - Only slight GCTL exceedances were observed during October 2019 DPT baseline sampling event
  - All monitoring wells were <GCTLs throughout Year 1 and Year 2
- For Year 3 sampling at the POL Southern Treatment Area, recommendation was provided to transition the site to LTM based on residual contaminants that remain and to provide consistent sampling schedule with POL Northern Area and SW3.

POL Northern Area and Supply Warehouse LTM

A brief history of the SW3 AS treatment and POL Northern Area treatment was provided. The SW3 and POL North LTM monitoring plan was reviewed which includes 12 monitoring wells at SW3 and 7 monitoring wells at POL. Of those monitoring wells, SW3-MW0029

through -MW0035 and POL-MW0048I and POL-MW0048D were installed in March/April 2023 to monitor downgradient LCP plume migration (if any). The proposed monitoring wells and screened intervals were submitted via email to the FDEP for approval following the October 2022 KSCRT meeting. Results of the POL and SW3 LTM sampling determined:

SW3: All VOC concentration remain less than NADC in all wells sampled in October 2022. Newly installed monitoring wells along the LCP downgradient edge all reported non-detect concentrations in July 2023.

POL North: All VOCs <NADCs in October 2022. TCE concentrations were variable. Water level appears to directly contribute to TCE concentrations in MW0034S. Newy installed monitoring wells along the POL LCP plume edge reported non-detect concentrations in July 2023.

FDEP asked to look at the figure on Slide 57 showing results of 9S, 33I and 33S to see the fluctuations and comparing real time. There were no questions on this.

The Team reached consensus to prepare the POL Southern Treatment Area Year 2 Performance Monitoring Report and POL Northern Area and SW3 LTM Report and submit to FDEP/NASA (**2310-D49).**

The Team reached consensus to transition the following wells under the POL Southern Treatment Area to LTM sampling (sample in October 2023 in conjunction with POL North and SW3). The wells are Shallow: POL-MW0012S, -MW0016S, -MW0017S, -MW0026S, and -MW0045S; Intermediate: POL-MW0022I, -MW0036SI, MW0041SI, -MW0042SI, -MW0043I, and -MW0045I; and Deep: POL-MW0022D, -MW0039ID, -MW0043D, -MW0044D, and -MW0047D (**2310-D50).**

The Team reached consensus to continue with the following LTM to include: SW3: Continue sampling SW3-MW0009, -MW0024, -MW0025, -MW0027, and -MW0028 through -MW0035 (conducted in October 2023 to maintain uniform sampling cycle); POL Northern Area: Continue sampling POL-MW0009S, -MW0026S, -MW0033SI, -MW0034S, -MW0048I, and -MW0048D (**2310-D51).**

The Team reached consensus to prepare LTM Report capturing above LTM recommendations for NASA's submittal to FDEP (**2310-D52).**

Results: Decision Item 2310-D49 through D52

2310-M17 Anne Chrest/NASA

Program Update

Discussion:

Senior Management will be visiting on November 30 and Dec 1st and the NASA KSC Remediation Team has been asked to support a tour for them. When we set agenda today, we may have to reduce duration of the meeting based on the guidance from management, with a virtual meeting to cover topics. Jason French is not available that week to attend. NASA is checking to see who will be on the tour and if TJ can attend the tour.

2310-M18 Chris Adkison/ NASA

CAMP Deliverable Look Ahead

The CAMP version has been revised this month already. Some items have been pushed to October/November/December timeframes. Next couple of months there will be quite a few deliverables sent to STRIVES. If any additional changes are needed, please let Chris Adkison know. Some tabs not applicable to everyone but the FDEP review tab was added per TJs request. This is the most current version and will be sent out to the team.

2310-M19 KSCRT

Miscellaneous Discussion

AECOM

1. Wilson Corners CCR ADP (Linnea) 60 minutes
2. South Repeater Bldg. Plume Stop Pilot Plan and annual LTM sampling from April 2024, 30 minutes (technical review needed prior to team meeting on this)

HGL

1. CCF 2023 annual LTM report 45 minutes
2. FSRA Annual GWMR 45 minutes
3. CM&S Site Characterization 60 minutes (technical review needed prior to team meeting on this)
4. SWMU 113 IM Completion 30 minutes

Tetra Tech

1. Maybe CRCA Treatability Study – will email Chris is they have that (technical review needed prior to team meeting on this)

2023 Meeting Dates (continues to be hybrid option in 2023)
November 30th and December 1st

FDEP
15-20-minute FDEP update by Program Manager
Chris Adkison is the team leader next meeting so email topics to this individual after the meeting is over.

October 2023 Decision Items Rev 2		Decision
Decision No.	Minutes Reference	
2310-D01	2310-M04	**Schwartz Road Landfill Additional PFAS Confirmatory Results, PRL #237a, Center-wide PFAS Location of Concern (LOC) #18:** The Team reached consensus to conduct additional confirmatory sampling (CS) activities under PRL #237a, Center-Wide PFAS, LOC #18 as proposed on Slide 20.
2310-D02	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to continue operation of biosparge system until the high concentration plume in both the former Hot Spot 2 and biosparge areas show signs of full plume collapse.
2310-D03	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to continue performance monitoring on a semi-annual basis (as presented) for selected chlorinated volatile organic compounds (CVOCs): tetrachloroethene (TCE), cis-1,2-dichloroethylene (cDCE), trans-1,2-dichloroethene (tDCE), and vinyl chloride (VC).
2310-D04	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to transition MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from the LCP sampling plan to semi-annual performance monitoring.
2310-D05	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to continue interim groundwater monitoring for select CVOCs (cDCE, tDCE, and VC). The next semi-annual event will be scheduled for Fall of 2023.
2310-D06	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to evaluate the sampling plan one year after implementation of the selected technology from the RAE (RAE will be presented separately).
2310-D07	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to continue annual performance monitoring for select CVOCs (TCE, cDCE, tDCE, and VC) to monitor groundwater quality downgradient of Hot Spot 3 former and future treatment areas.
2310-D08	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to replace well MLPV-IW0053 (35-45) that historically exceeds groundwater cleanup target levels (GCTLs) and is part of the sampling plan.
2310-D09	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to replace MLPV-IW0001SR as part of general monitoring well maintenance. This well is not currently part of a sampling plan.
2310-D10	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to install two additional monitoring wells to verify the NADC concentrations located south of the biosparge wall that were detected during the 2021 direct push technology (DPT) groundwater sampling event. •One monitoring well, screened 37 to 47 feet below land surface (bls), located east of the railroad tracks (downgradient, wetland area); •One monitoring well, screened 35 to 45 feet bls, located southwest and upgradient of original location for MLPV-MW0108; •Installation is contingent on access to proposed locations, based on ongoing center operations and surface conditions in the wetland area
2310-D11	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to install two additional monitoring wells, screened 35 to 45 feet bls, southeast of the biosparge area to provide GCTL boundary data around monitoring well MLPV-MW0108.
2310-D12	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to add VABU-IW0006D (42 to 47) to the biennial sampling plan for boundary data to the east of the isolated plume.
2310-D13	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to continue LTM on a biennial basis for select CVOCs (TCE, cDCE, tDCE, and VC).
2310-D14	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to remove MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from LCP sampling plan and transition to the Biosparge area semi-annual performance monitoring plan.
2310-D15	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** Prior to further modifying the LCP LTM well network, the Team reached consensus to collect one additional set of data to have two biennial data sets that reflect four years of groundwater conditions from the newly installed monitoring wells.
2310-D16	2310-M05	**MLP/VAB Area (SWMU 056) 2022-2023 Corrective Measures Implementation (CMI) and Interim Measure (IM) Progress Report:** The Team reached consensus to add TCE to reported analyte list. Select wells (MLPV-MW0077, MLPV-MW0078, MLPV-MW0081, MLPV-MW086, MLPV-MW0097, and MLPV- MW0098) had TCE concentrations above the GCTL in historic DPT groundwater data. TCE results were obtained following the 2023 sampling event and indicated no detections in these or other wells.
2310-D17	2310-M06	**Components Refurbishment and Chemical Analysis (CRCA) (SWMU 041) Long-Term Monitoring Proposed Monitor Well:** The Team reached consensus on the following recommendations: •Recommend the installation of five well groups to monitor offsite plume migration: 3 well clusters downgradient from existing plume conditions, one well cluster north of the LCP, and one well cluster along the LCP centerline. •Recommend newly installed monitoring wells MW0033 through MW0046 to be sampled upon completion of installation and then annually thereafter. •Recommend incorporating the existing well clusters including CRCA-MW0026 (screened 5'-15'), CRCA-MW0027 (screened 30'-40'), and CRCA-MW0028 (screened 53'-63') as part of the LTM program to monitor the southeastern edge of the LCP. •Recommend each monitoring well to be sampled annually for VOCs via USEPA 8260D.
2310-D18	2310-M07	**2023 Annual Update (Year 2) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring at Launch Complex 39A Operations Support Building Area (AOSB), SWMU 111:** The Team reached consensus to continue operation of ASWs 6, 8, 14, 15, 16, 17, and 26 in the MW09 area and ASWs 1, 2, 3, 5, 11, 12, 19, 20, 21, 24, 25 along the edge of the former LCP to continue being protective of OFW; ASWs 4, 7, 9, 10, 13, 18, 22, 23 to remain shut off based on this area being less than GCTLs.
2310-D19	2310-M07	**2023 Annual Update (Year 2) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring at Launch Complex 39A Operations Support Building Area (AOSB), SWMU 111:** The Team reached consensus to continue semi-annual sampling frequency for all wells.
2310-D20	2310-M08	**Hydrocarbon Burn Facility (SWMU 007) Interim Groundwater Monitoring:** The Team reached consensus that results from DPTs 394, 395, and 396 delineated 1,4-dioxane GCTL exceedances in wells IW0092 and IW0093.

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2310-D21	2310-M08	**Hydrocarbon Burn Facility (SWMU 007) Interim Groundwater Monitoring:** The Team reached consensus that additional DPT sampling will be conducted to confirm and delineate VC GCTL exceedances at IW0093 and DPT 394. This will include resampling of DPT 394, collecting three DPT groundwater points downgradient of the DPT 394 exceedance, and analyzing all intervals (10, 25, 35, and 45) for site COCs.
2310-D22	2310-M08	**Hydrocarbon Burn Facility (SWMU 007) Interim Groundwater Monitoring:** The Team reached consensus to continue interim groundwater monitoring as outlined on Slide 56. A total of 40 wells will be sampled during 2023 and analyzed for site COCs. The same list of 2022-2023 wells will be sampled with the addition of IW0039S. Triennial sampling of MNA parameters including microbial analysis will be completed in 2023.
2310-D23	2310-M09	**MLP/VAB Hot Spot 2 Remedial Action Alternatives Analysis:** The Team reached consensus that Option 2 - ISCR PRBs is the recommended remedial alternative to achieve corrective action objectives.
2310-D24	2310-M09	**MLP/VAB Hot Spot 2 Remedial Action Alternatives Analysis:** The Team reached consensus to model the fate and transport of VC at the site to support selection and optimal design of an ISCR remedy to manage matrix diffusion, and to support cost evaluation and confirm shorter remediation time frame for ISCR alternatives.
2310-D25	2310-M10	**2023 Annual Update (Year 1) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring of the Eastern High-Concentration Plume Area at Components Cleaning Facility (CCF), SWMU 030:** The Team reached consensus to reduce Year 2 performance monitoring frequency to semi-annual sampling.
2310-D26	2310-M10	**2023 Annual Update (Year 1) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring of the Eastern High-Concentration Plume Area at Components Cleaning Facility (CCF), SWMU 030:** The Team reached consensus that baseline and quarterly air sampling results indicated air emissions are not an issue and air sampling will be discontinued.
2310-D27	2310-M10	**2023 Annual Update (Year 1) on the Interim Measure Operation, Maintenance, and Groundwater Monitoring of the Eastern High-Concentration Plume Area at Components Cleaning Facility (CCF), SWMU 030:** The Team reached consensus to conduct DPT investigation in the Pilot Study Treatment Area to confirm performance monitoring results and determine if contamination in the retarding unit extends beyond the current treatment area.
2310-D28	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus to properly abandon CW0002 and install a new well at that location with the screen interval 2 to 12 ft bls.
2310-D29	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus to continue biennial site wide LTM at the same 55 MWs as the 2023 sampling event and the replacement well shown on Slide 18 for CVOCs, and also one MW (IW0122) for PCBs. The next biennial event is scheduled for December 2024. The area where CW0002 is located was covered by several feet of sand from hurricanes and could not be located, and is proposed to be properly abandoned and replaced with new well shown on Slide 18.
2310-D30	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus to continue IM OM&M of the HCS for Year 14, the operational period of April 1, 2023 to March 31, 2024, consistent with the current approach that includes: biweekly samples from IWs 01D2, 161, 44D2, and 162; monthly sampling of the air stripper's effluent (aqueous), quarterly sampling of the combined influent and individual RW influent (aqueous), and annual sampling of the influent and effluent of the CatOx (vapor), DPT (aqueous), and Layer 7/8 monitoring wells (aqueous).
2310-D31	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus to continue operation of the HS6 air sparging system of the active 238 ASWs for the operational period of April 1, 2023 to March 31, 2024.
2310-D32	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus for quarterly sampling of 21 monitoring wells associated with expansion for VOCs and field parameters.
2310-D33	2310-M11	**LC34 Annual Performance Monitoring (SWMU CC054):** The Team reached consensus to continue semi-annual sampling of 28 monitoring wells and 3 surface water locations associated with previous treatment area for VOCs and field parameters.
2310-D34	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to conduct biennial sampling of eight monitoring wells FDTL-IW0015S, FDTL-IW0007I, FDTL-IW0008I, FDTL-IW0009I, FDTL-IW0010I, FDTL-IW0014, FDTL-IW0017I, and FDTL-IW0019I for site VOCs.
2310-D35	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to collect five surface water samples: three at FDTL-SW0002, FDTL-SW0003, and FDTL-SW0004, and two proposed locations, one west of FDTL-IW0009I at historical location FDTL-SW0001, and one west of FDTL-IW0010I at new location FDTL-SW0005.
2310-D36	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to collect water level measurements at 18 monitoring wells. The next sampling event is scheduled for November 2024.
2310-D37	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to conduct annual sampling at 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012.
2310-D38	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to collect surface water samples at four locations, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006. Samples will be analyzed for site VOCs.
2310-D39	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to collect water level measurements at 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012. The next sampling event is scheduled for November 2024.
2310-D40	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to conduct groundwater sampling at three monitoring wells, LES-IW0005S, LES-IW0009S, and LES-IW0011S, and analyze the samples for TRPH.
2310-D41	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to change the sampling frequency from annual to biennial.
2310-D42	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to continue water level measurements at 12 monitoring wells, LES-IW0002S through LES-IW0013S. The next sampling event will be scheduled for November 2024.
2310-D43	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to add SFOC-IW0002S to the LTM Program as an upgradient well.
2310-D44	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus that prior to the next event, re-develop four monitoring wells: SFOC-IW0001S, SFOC-IW0002S, SFOC-IW0004S, SFOC-IW0009.

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2310-D45	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to conduct groundwater sampling at three monitoring wells, SFOC-IW0001S, SFOC-IW0004S, and SFOC-IW0009, and analyze the samples for antimony.
2310-D46	2310-M12	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** The Team reached consensus to continue water level measurements at nine monitoring wells, SFOC-IW0001S through SFOCIW0009. Due to the NADC exceedance for antimony in SFOC-IW0001S, the next sampling event will be scheduled for November 2024.
2310-D47	2310-M13	**Communications, Maintenance & Storage (CM&S) Vapor Intrusion Work Plan (SWMU 082):** The Team reached consensus to proceed with the proposed Air Monitoring Plan as outlined in the advance data package. Two soil gas sampling events from proposed locations as shown on Slide 16 will be conducted, and an air monitoring report will be submitted.
2310-D48	2310-M14	**Q6 Radar Station:** The Team reached consensus to continue the LOC 1 investigation for groundwater under the Q6 Radar Station – SWMU 112 Project; results will be presented under separate cover.
2310-D49	2310-M16	**Paint and Oil Locker (POL) Southern Treatment Area and Supply Warehouse 3 (SW3) Program:** The Team reached consensus to prepare the POL Southern Treatment Area Year 2 Performance Monitoring Report and POL Northern Area and SW3 LTM Report and submit to FDEP/NASA.
2310-D50	2310-M16	**Paint and Oil Locker (POL) Southern Treatment Area and Supply Warehouse 3 (SW3) Program:** The Team reached consensus to transition the following wells under the POL Southern Treatment Area to LTM sampling (sample in October 2023 in conjunction with POL North and SW3). The wells are Shallow: POL-MW0012S, -MW0016S, -MW0017S, -MW0026S, and -MW0045S; Intermediate: POL-MW0022I, -MW0036SI, MW0041SI, -MW0042SI, -MW0043I, and -MW0045I; and Deep: POL-MW0022D, -MW0039ID, -MW0043D, -MW0044D, and -MW0047D.
2310-D51	2310-M16	**Paint and Oil Locker (POL) Southern Treatment Area and Supply Warehouse 3 (SW3) Program:** The Team reached consensus to continue with the following LTM to include: SW3: Continue sampling SW3-MW0009, -MW0024, -MW0025, -MW0027, and -MW0028 through -MW0035 (conducted in October 2023 to maintain uniform sampling cycle); POL Northern Area: Continue sampling POL-MW0009S, -MW0026S, -MW0033SI, -MW0034S, -MW0048I, and -MW0048D.
2310-D52	2310-M16	**Paint and Oil Locker (POL) Southern Treatment Area and Supply Warehouse 3 (SW3) Program:** The Team reached consensus to prepare LTM Report capturing above LTM recommendations for NASA's submittal to FDEP.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Comments
1712-A01	1712-M07	Team	If a document contains materials controlled under EAR99 (as determined by Export Control), the following clause shall be included on the first page (Action item): "EAR99 – NO LICENSE REQUIRED This information or item is controlled under the Export Administration Regulations (EAR) as EAR99. It may be exported without a license, expect to embargoed/designated countries (General Provision Six) or entities of concern. The designation of EAR99 does not constitute public release. Per Lori Ray, Reference STI TN#### NASA KSC Export Control Office, 321-867-9209."	Open	Standing Open Item
1810-A01	1810-M01	Team	NASA legal is concerned about copyright infringement regarding the inclusion of lab reports in documents. Reach out to labs to get release statements from them for the lab reports.	Open	Standing Open Item
2002-A03	2002-M10	A&Es	NASA requests that all A&E firms please large file transfer the .pdf and PowerPoint versions of the ADPs being presented so they can be uploaded to the folder and utilized for the team meeting. Cover letters should summarize the goal of the ADPs and the consensus statements should be provided for the minutes.	Open	Standing Open Item
2102-A09	2102-M13	Team	General Comment: FDEP observed that, based on the current monitoring network and plume depiction, one could think the plume is not delineated. Trepidations exist about making decisions without understanding how MNA has progressed. For clarity moving forward, the NASA lead requested that future documents include the end point assessment map that shows that we have plume delineation at a site, as well as a cross-section reference (e.g., what was the last map that brought us to the point of LTM, and where are we now [all the circa data circa]).	Open	Standing Open Item
2102-A07	2102-M13	NASA (RPO)	**Industrial Area LTM, February 2021 (ORSY Site):** FDEP inquired about past results for monitoring well ORSY-DRM-MW0001I. NASA stated they will look into the historical sampling results and get back with the Team.	Open	Findings and recommendations were submitted to FDEP. NASA is implementing the recommendations and will be revisited at a later date.
2102-A08	2102-M13	NASA (RPO)	**Industrial Area LTM, February 2021 (EHF Site):** FDEP and NASA discussed the site. NASA stated that the MNA program is routinely optimized, but this site was never included in an engineering evaluation process. Mounding takes place at this location, and a building was removed in the past few years. NASA took an action item to review the sampling data in the RFI for this location.	Open	Findings and recommendations were submitted to FDEP. NASA is implementing the recommendations and will be revisited at a later date.
2102-A10	2102-M13	NASA (RPO)	**Industrial Area LTM, February 2021 (M7-505 Site):** NASA took an action item to investigate if there are deeper data points around the location of MW0033.	Open	Findings and recommendations were submitted to FDEP. NASA is implementing the recommendations and will be revisited at a later date.
2102-A11	2102-M13	NASA (RPO)	**Industrial Area LTM, February 2021 (GSSP Site):** FDEP inquired if this site was delineated to the northwest of the lake, and if we have vertical delineation at this location. NASA stated a site characterization was performed in 2012. In 2009, DPT55 was placed on the west side of the pond (west of MW0035) and DPT56 was located on the east side of the pond (20ft NW of the location of monitoring wells MW0033, MW0034, and MW0035). On the west side there were no detections, and on the east side there were low detections. Surface water was also sampled here. NASA took an action item to provide this data to FDEP for reference following the meeting.	Open	Findings and recommendations were submitted to FDEP. NASA is implementing the recommendations and will be revisited at a later date.
2102-A12	2102-M13	NASA (RPO)	**Industrial Area LTM, February 2021 (KARS Park 1 Site):** FDEP inquired if this was a skeet range previously? NASA stated there was a rifle/pistol range with a skeet range to the west (reference slide 154). FDEP inquired on the groundwater in the rifle/pistol range area? NASA stated that the groundwater was not monitored in that area. Tetra Tech pulled up the old wells in a previous presentation figure during the meeting. The only well shown in the area of discussion was in the lead shot area (KP1-MW0007). FDEP stated they would like to know what happened west of LOC 9 if NASA can provide that data. NASA took an action item to look into this.	Open	Findings and recommendations were submitted to FDEP. NASA is implementing the recommendations and will be revisited at a later date.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Comments
2106-A01	2106-M03	NASA/FDEP	**NASA Remediation Program Updates, June 2021:** FDEP stated that, regarding the existing Statement of Basis template being acceptable, it would be best for FDEP and NASA to have a follow up meeting to review the current template. FDEP and NASA can decide from there.	Open	
2106-A02	2106-M03	NASA/FDEP	**NASA Remediation Program Updates, June 2021:** Regarding updating the Statement of Basis (SB) for a site after an IM has taken place (post initial SB publication), FDEP agrees that this is an administrative item and it does have significance. For the Federal Facilities Branch, it may not be critical to see the change in SB post IM, but the RCRA Program may have a different perspective. We need an understanding of what are considered significant changes on the permit, what triggers public notification, etc. That is a conversation NASA and FDEP should have to provide firmer ground on what is required going forward.	Open	Most of this has been addressed in the current permit modification, but still need a follow up meeting with FDEP to discuss the SB requirements.
2203-A05	2203-M09	NASA	**Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:** FDEP requested a brief letter report with the findings to support discontinuing the MNA at this OSRY (SWMU 004) site for groundwater. NASA confirmed it would provide this.	Open	This is being worked currently.
2210-A01	2210-M02	NASA	**C-5 Electrical Substation (SWMU #066) Groundwater Monitoring Report and Long-Term Monitoring Work Plan:** NASA stated that the well with the detection is the downgradient well. There was not a detection in the upgradient well; it was a "J" exceedance. There may be surface water and groundwater interaction at that location. Perhaps under the Center-wide investigation, we can do a co-located sample at this location. This will be an action item for NASA and AECOM to discuss	Open	NASA discussed with AECOM (under Center-wide Investigation) who will collect a surface water sample at this location and collect a sample from the existing monitoring well.
2210-A03	2210-M03	NASA	**LC39A Operations Support Building Area (AOSB) (SWMU #111) Year One Performance Monitoring, October 2022:** The Team reached consensus to include PFAS analyses for MWs 10 and 11 during the semi-annual sampling events. FDEP inquired if this was going to be an effort included under a larger investigation eventually? NASA responded that the center is co-located with water bodies, and the river could be a source. There is a PFAS source associated with a former STP, but that is not located here. It may be worth adding a surface water sample to this area. Let's talk about our Center-wide investigation first and how this might tie in.	Open	This will be addressed under the Center-wide PFAS investigation.
2210-A05	2210-M05	NASA	**LC39B (SWMU 009) LOX Area DPT Investigations and Air Sparging:** FDEP referring to Slide 27 inquired why staining samples aren't sent to the lab? How do you ascertain whether there is petroleum in that interval? Tetra Tech stated if they didn't see the visual stain, they sent it to the lab for the other contaminants of concern (COCs). However, that is an easy addition to sample for. FDEP instructed the Team to collect from that interval and send the samples to the lab, versus performing a visual inspection.	Open	Soil samples will be collected in the future
2210-A10	2210-M10	NASA	**Base Support Building (SWMU 014) and KARS Park II (SWMU #118) PFAS Site Assessment Report:** NASA took an action item to sample the borrow pit to the west of KARS Park II.	Open	This will be addressed under the Center-wide PFAS investigation.
2304-A02	2304-M04	NASA	**CCB SWMU #089 - MW21 Area Groundwater IMWP:** Action item was added to look for this information (sodium and TDS) and submit to FDEP for their information.	Open	TDS sampling was available. Chris Adkison going to check further. If no sodium available then NASA will recommend sampling of three background wells moving forward for sodium and TDS. TDS and sodium were both available but old data. Will include the sampling of background wells for sodium and TDS moving forward.
2304-A03	2304-M04	NASA	**CCB SWMU #089 - MW21 Area Groundwater IMWP:** Tetra Tech will provide FDEP the trade names of the proposed chemicals to be used at the site via email as soon as possible.	Open	Follow up emails determined the trade name proposed has not been approved yet. Tetra Tech is following the process to get this chemical approved for use at this location and for future use.
2306-A03	2306-M09	NASA	**GSA Reclamation Yard (SWMU 10) Shallow Soil Polychlorinated Biphenyl (PCB) Site Assessment and Proposed Interim Measures (IM) Work Plan:** Chapter 62-780 of the Florida Administrative Code requires delineation to below CTLs in every direction. Buildings and paved surfaces are being used in some areas as boundaries of the proposed excavation areas, and delineation is not complete beyond the southwest fence line. AECOM will need to take a look at that (southwest corner).	Open	will be addressed in the IM\WP that gets submitted
2306-A04	2306-M12	NASA	**Miscellaneous Discussion:** The CCB project team heard back on Provect IR60; it is covered under the previous Provect IR. Tetra Tech will forward FDEP the approval email (to Jason French). It looks like we are good to use that product for the Converter Compressor Building MW21 area.	Open	MLP HS 3 - proposed use of IR60
2310-A01	2310-M04	NASA	**Schwartz Road Landfill Additional PFAS Confirmatory Results, PRL #237a, Center-wide PFAS Location of Concern (LOC) #18:** Tetra Tech stated they will add a 2 to 6-foot depth interval DPT sampling to the proposed sampling plan presented on Slide 20.	Open	

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Comments
2310-A02	2310-M12	NASA	**Vehicle Assembly Building (VAB) Area Groundwater Long-Term Monitoring (LTM) Update:** NASA inquired on AECOM's thoughts on elevated detection limits for the last round of sampling. AECOM will check with lab on the TRPH for the LES shop. FDEP stated that the elevated detection limit is near the GCTL. They would like to understand the cause of the elevated detection limit, as it might mask early signs of migration, particularly if sampling is to be conducted biennially going forward.	Open	

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
1906-A01	1906-M01	NASA (Ryan O'Meara)	Per FDEP correspondence letter dated (March 22, 2019) RPM Ryan O'Meara will provide a site history of the Visitor Center Maintenance Area (SWMU 099) at a future team meeting.	Closed	10/2/2019	Discussion earlier this month with FDEP
1906-A02	1906-M11	FDEP	Discuss with FDEP Management to ensure Alternative Soil Cleanup Target Levels approved for use by Cape Canaveral Air Force Station for barium and copper may be applies to Kennedy Space Center sites.	Closed	8/8/2019	FDEP indicated that the ASCTLs that have been approved for use at CCAFS by the University of Florida can be referenced and applied to KSC sites. FDEP sent the Team an email on this subject on 6/27/19.
1908-A01	1908-M03	NASA Remediation Program wide	An action item was added for the NASA Remediation Program to begin adding a references section in all new and revised LUCIP documents moving forward.	Closed	2/6/2020	FDEP approved the use of a site-specific document reference within the NASA LUCIPs that states, "Site-specific documentation is available for review by contacting the Environmental Assurance Branch at telephone number (321)867-6971", moving forward.
1908-A02	1908-M04	FDEP	FDEP will check with their records department to add language that requires the preferred submission method of a report cover page with the CD only for report submittals moving forward.	Closed	10/23/2019	No FDEP mentioned record - this submittal method is acceptable.
1910-A01	1910-M02	NASA & TetraTech	Launch Complex (LC) 34 (SWMU CC054): DNAPL Source Zone Site Characterization Engineering Evaluation and Remedial Alternatives Evaluation (RAE) for the DSZ discussed the MWs in Layer 8 vertically delineating the TCE (four existing and four newly installed wells were sampled). The Team discussed the Layer 8 wells and recommended they be sampled as part of the next annual plume-wide sampling event scheduled in Dec 2020. An action item for NASA was added to work with Tetra Tech to make sure the deep wells get incorporated into the sampling program accordingly.	Closed	4/16/2020	These wells have been incorporated
2002-A01	2002-M07	A&Es	NASA requests that any updates to the PFAS six questionnaires be provided to Mark Speranza with Tetra Tech so he can utilize those same questions at other sites where Tetra Tech is investigating PFAS.	Closed	4/16/2020	No updates to questionnaires
2002-A02	2002-M07	FDEP	FDEP to look into the review and responses of the following document "White Paper: Development of Surface Water Criteria for PFOA and PFOS based on the protection of aquatic receptors" published by the Center for Environmental & Human Toxicology at the University of Florida , and provide input back to the Team.	Closed	6/18/2020	John Winters looked into and provided response on 05/22/2020 to the Team.
2008-A01	2008-M02	AECOM	Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area (MLP/VAB), Solid Waste Management Unit (SWMU #056) Corrective Measures Implementation (CMI) and Interim Measures (IM) Update, August 2020: There seems to be a gap of treatment with regards to wells IS1, 1D and 6IR and if the HS2 area is turned off, is there a concern of contaminants slipping through? AECOM clarified that these sparge wells are spaced closely but not operating at the same time. The ROI distance and spacing in the expansion was based on what was learned from the original system design. Looking at DO and ORP, and performance monitoring, AECOM is not seeing data that this area is not being treated. NASA inquired if the wells 1S, 1D, and 6IR are being sampled? AECOM stated these are not being sampled, but they will take an action to research why and come back with an explanation to FDEP.	Closed	10/8/2020	Teams meeting with AECOM on 8/27/20 - The recently observed ROI of the BS system overlaps at the space between treatment barrier walls, therefore there is not gap in treatment. IW0006IR was not sampled because collective data from previous DPT investigations indicated VOCs > 100 ug/L was not present at the 6IR location and that the ROI of treatment wells was treating the targeted >100 VC plume as designed. IW0001S was not sampled because it is not within the treatment interval. Conclusion: IW0001D and IW0006IR will be included in the upcoming September 2020 sampling event. IW0006IR will continue to be monitored for VOC and dissolved oxygen (DO) during OM&M events.
2008-A03	2008-M02	AE Firms	Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area (MLP/VAB), Solid Waste Management Unit (SWMU #056) Corrective Measures Implementation (CMI) and Interim Measures (IM) Update, August 2020: NASA asked the AE firms to query their teams to find out what sites are sampling using PDBs.	Closed	10/8/2020	HGL and Tetra Tech are not using PDBs at any of their sites. AECOM to look into the sites where this may be used and will report back to NASA. AECOM followed up with NASA that two sites were planned for use of PDBs to include Wilson Corners and the VAB LTM. Per NASA's request, PDBs will no longer be used in sampling moving forward, but the preferred "low-flow" sampling will be used from this point on.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2008-A04	2008-M03	AECOM	GSRY Reclamation Yard (SWMU #0010) - An April 2020 approval letter from FDEP regarding UIC at the site stated that since Provect-OX was applied to the saturated subsurface in multiple LDA/caisson excavation cells, monitoring for appropriate Underground Injection Control (UIC) parameters was recommended for a subset of wells, and should be analyzed for the iron, manganese, and sodium. After one year, sampling frequency and locations should be assessed. This means that the Team would need one additional sampling round to meet that year timeframe. AECOM will take an action to update the presentation prior to uploading to RIS for the records	Closed	10/8/2020	AECOM's Jennifer Joyal confirmed this presentation was updated prior to uploading to RIS.
2008-A05	2008-M07	FDEP	FDEP stated that the department has been doing a pilot project beginning with listing out dry cleaner and other cleanup sites. This PFAS tracking spreadsheet has minimal data and link to the reports associated with them, and the state is really trying to identify the max concentrations by media type. It is interesting to see what is coming up. AECOM inquired if the state has a list issued for the hazardous waste sites? AECOM did locate the dry-cleaning list. FDEP stated there are links in the spreadsheet to all different facilities to include landfills and electroplaters. There is an updated version of the tracking sheet, and FDEP will send out a copy to the Team.	Closed	10/8/2020	Laura Barrett (FDEP) provided the latest version of the tracking sheet to the Team.
1906-A03	1906-M09	NASA (Deda Johansen)	Component Refurbishment and Chemical Analysis (CRCA) facility (SWMU 041) Follow-up with NASA Compliance to determine if piping/sumps within the main CRCA building (K6-1696) and adjacent hazardous storage building are double-lined and compliant with Spill Prevention, Control, and Countermeasure (SPCC) requirements.	Closed	12/10/2020	NASA reached out to Jeff Bobersky (NASA Compliance SPCC) on this topic, and was referred to Albert Gibson (NASA Compliance Haz Materials/ Haz Waste) for answers. This piping is not subject to SPCC double-lined requirements, and should be discussed from a hazardous materials/haz waste compliance standpoint. Project has been reassigned from Ryan O'Meara to Deda Johansen
2010-A01	2010-M02	NASA	Components Refurbishment and Chemical Analysis (CRCA) Solid Waste Management Unit (SWMU) #041, Year 1 Operations Maintenance and Monitoring: NASA took an action item to transition MW0032 to quarterly monitoring.	Closed	12/10/2020	MW0032 has been transitioned to quarterly monitoring
2010-A02	2010-M02	NASA (Deda Johansen)	Components Refurbishment and Chemical Analysis (CRCA) Solid Waste Management Unit (SWMU) #041, Year 1 Operations Maintenance and Monitoring: NASA took the action to present a basket item after the next two rounds of quarterly groundwater data, which will take place in October 2020 and January 2021	Closed	12/10/2020	Tetra Tech presented groundwater data in a basket item at the 12/10/2020 KSCRT meeting to update FDEP on the October sample results for monitoring well CRCA-MW0032, and propose installation of MW0033 to monitor the downgradient plume edge west of MW0032
2010-A03	2010-M3	NASA (Anne Chrest)	KSC Headquarters Building Area (KHQA) (SWMU #104) Perimeter Soil IM Completion: NASA will provide a copy of the Interim Measure Work Plan for LOC 2D and 2E to FDEP	Closed	12/10/2020	Anne provided after meeting - FYI only and previously submitted and approved by FDEP earlier regime.
2010-A04	2010-M04	Tetra Tech	LC34 DNAPL Source Zone Remediation Alternative Evaluation (RAE) Discussion and Proposed Pilot Study, October 2020: Aquifer testing was conducted in 2019 for Layer 7. During the test, an upward gradient was observed in well pairs screened in Layers 6 and 8, suggesting an upward gradient. FDEP inquired if the Team recalls how much of a gradient was observe? TetraTech will take an action to provide that information following the meeting to FDEP.	Closed	12/10/2020	Mark Jonnet (Tetra Tech) provided the requested information to Kirk Johnson (FDEP) by email on 10/9/2020. Water level elevations at the paired wells differed by 0.7 to 0.8 ft and the average vertical gradient was 0.02 ft/ft.
2008-A02	2008-M02	AECOM & NASA	Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area (MLP/VAB), Solid Waste Management Unit (SWMU #056) Corrective Measures Implementation (CMI) and Interim Measures (IM) Update, August 2020: An action item was assigned to NASA and AECOM to convene and review past data and devise a plan to present to the state regarding the data gap in the northwest portion of the site, and the downgradient wells that serve as the points of compliance, where the vinyl chloride results have recently exceeded its groundwater cleanup target level (1 µg/L) and show signs of increasing.	Closed	2/17/2021	AECOM is under contract to conduct additional groundwater assessment and installation of wells to the east of the biosparge barrier and railroad tracks. Up to 10 monitoring wells will be installed based on the results of the groundwater assessment.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2012-A01	2012-M02	NASA (Deda Johansen)	Maintenance and Operations (M&O) Building (SWMU #014) Confirmation Sampling Work Plan for Soil Land Use Control Implementation Plan (LUCIP) Removal, December 2020: NASA (Deda Johansen) took an action item to look more into the site history for data from the prior investigation	Closed	2/17/2021	A bibliography with brief descriptions of document content was prepared. It will be included in HGL's upcoming Confirmatory Sampling Work Plan for Soil LUCIP Close-out
2012-A02	2012-M03	NASA (Mike Deliz)	Review of Site Status and Deliverables, December 2020: FDEP inquired if NASA will be going over the outstanding CAMP documents later on, or if a list could be provided. NASA (Mike Deliz) took an action item to consolidate and send the outstanding document summary to FDEP	Closed	2/17/2021	A consolidation of the outstanding CAMP documents was provided to FDEP following the meeting
2102-A01	2102-M05	NASA (DJ)	Contractors Road Heavy Equipment Area (SWMU #055) 2020 Annual Groundwater Monitoring, February 2021: FDEP asked about the TDS and sodium results in the bioremediation area that are above Class GII groundwater standards. NASA responded that the sodium and TDS are compared to the KSC background levels, and took an action to provide the approved plan and data to FDEP for future reference.	Closed	4/28/2021	Completed - NASA sent both the background study and the approval letter to FDEP on 2/19/2021. A follow-up meeting was held between NASA, FDEP and HGL on 3/1/2021. FDEP requested a copy of the Decision Process Document, and as a follow-on later requested a copy of the actual background study. On 4/18/2021, FDEP recommended that NASA identify a suite of wells at the site that can be used to generate site-specific background information. NASA will follow that recommendation.
2102-A02	2102-M05	NASA (DJ)	Contractors Road Heavy Equipment Area (SWMU #055) 2020 Annual Groundwater Monitoring, February 2021: FDEP inquired if NASA has an UIC approval order to identify what NASA is using? NASA stated UIC monitoring was approved as part of the IM work plans that will be provided to FDEP .	Closed	4/28/2021	NASA provided FDEP with the 2016 and 2018 Bioremediation Work Plans that included the UIC Notifications as an appendix in each.
2102-A03	2102-M05	NASA (DJ)	Contractors Road Heavy Equipment Area (SWMU #055) 2020 Annual Groundwater Monitoring, February 2021: FDEP inquired if the Team resampled for benzene and chloroform at the site, and found these not to be a risk? NASA performed a real-time investigation during the KSCRT meeting of past data and did not find resampling of benzene. Since no soil benzene source was identified in soil or groundwater, and the detections did not exceed the commercial level, NASA submitted these sampling results to the NASA Industrial Hygiene Office for review. FDEP would like to see the email to help understand the resampling and rationale of the dropping of these chemicals off the sampling list. NASA will provide this benzene data to FDEP and have a discussion to review the data and also the UIC information from May/June 2014.	Closed	4/28/2021	NASA sent the Vapor Intrusion Memorandum to FDEP on 2/19/2021. A follow-up meeting was held between NASA, FDEP and HGL on 3/1/2021. FDEP's primary concern was that the sub-slab vapor results would be acted on if needed. NASA explained that KSC's Industrial Hygienist was consulted about the findings which FDEP had concerns about and found no need for action, and that vapor sampling results will continue to be provided to KSC's Environmental and Occupational Health organization.
2102-A04	2102-M10	NASA (DJ)	GSA Reclamation Yard (SWMU#010), DPT Results, February 2021: FDEP pointed out that the iron in monitoring well MW0071 exceeded the secondary standard. What is the basis for not including monitoring well MW0071? NASA responded that the results for iron were within the range of background values for KSC, and will provide documentation. FDEP stated that site-specific background data may be needed at some point. NASA took an action item to look at the RFI for that data, and provide to FDEP.	Closed	4/28/2021	The RFI and CMS groundwater metals data for GSRY were reviewed. The majority of the data are from the upper horizon of the aquifer (30 ft. or shallower), while the zone treated with Provect-OX™ was 40-50 ft below ground surface. In the 2021 wet season groundwater sampling event, samples for iron will be collected from a site well outside the treated area.
2102-A05	2102-M13	NASA (RO)	needs to be a downgradient well establishing the extent of the plume at FSA1 (PRL #157). Do we have one? AECOM took an action item to look into that request	Closed	4/28/2021	NASA will be installing a downgradient well.
2102-A06	2102-M13	NASA (RO)	Industrial Area LTM, February 2021 (FSA1 Site): NASA stated they will take a look into the prior DPT data to see if we need to install that well and provide the Team with an update and make a recommendation	Closed	4/28/2021	NASA will be installing a downgradient well.
2104-A01	2104-M04	NASA (AMC)	Area South of K7-0516 and Eastern Component Cleaning Facility (SWMU #030) Interim Measure, Operation, Maintenance, & Monitoring, and Performance Monitoring and Interim Groundwater Monitoring, April 2021: An action item to incorporate surface water sampling into the CCF monitoring program was assigned to NASA and Tetra Tech	Closed	6/22/2021	This surface water sampling was incorporated in the barge canal sampling program moving forward.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2012-A03	2012-M03	NASA (MD)	Review of Site Status and Deliverables, December 2020: Mike will summarize the look ahead and send a detailed version to FDEP that will provide site histories, what NASA has completed, and where they are going (plume maps, the works). FDEP inquired if they could also obtain a copy of the slides being presented today. NASA confirmed they would provide the slides via large file transfer	Closed	9/15/2021	Look ahead and maps have been provided to FDEP by NASA
2104-A02	2104-M04	NASA (AMC)	Area South of K7-0516 and Eastern Component Cleaning Facility (SWMU #030) Interim Measure, Operation, Maintenance, & Monitoring, and Performance Monitoring and Interim Groundwater Monitoring, April 2021: FDEP requested that the sampling plans for 2021 be documented in a letter since there will not be a report submitted this year for this site. NASA stated they would put a memo together and provide the work plan for the next year of monitoring	Closed	9/15/2021	FDEP referenced the April 2021 advance data package (ADP) in their review letters dated May 11, 2021 (for CCF, SWMU #030) and May 12, 2021 (for 516S, SWMU #100). Both letters state additional groundwater assessment activities will be conducted in 2021. This work has been delayed and will now occur in early 2022. The proposed sampling plans were presented in the April 2021 ADP. Revisions to the CCF East sampling plan will be presented at the September Team meeting. This meets the intent of this action item.
2106-A03	2106-M03	NASA	NASA Remediation Program Updates, June 2021: FDEP received a request from Florida Today requesting documents associated with PFAS on KSC. NASA stated they will provide the Oculus document/report names to FDEP to assist with the inquiry.	Closed	9/15/2021	NASA assisted FDEP with this inquiry
2012-A04	2012-M04	NASA (MD)	Firex Water Tank (SWMU #069) Confirmation Sampling Work Plan for Soil LUCIP Removal, December 2020: NASA (Mike Deliz) took an action item to see what NASA can find out on these discharge reports	Closed	11/9/2021	Internal discharge records were located and saved to the NASA shared drive. No additional spill records have been located for the release(s). The site entered the RCRA process through a SWMU Assessment and was added to KSC's RCRA Permit Appendix A. A Discharge Report Form does not appear to have been filed.
2109-A02	2109-M09	NASA (MJD)	KSC Center-Wide Per- and Polyfluoroalkyl Substances (PRL 237) Locations of Concern, September 2021: NASA has conducted sampling in the Indian River for PFAS. NASA to provide FDEP with the surface water sample results from the Indian River	Closed	11/9/2021	Sample results provided to FDEP
2109-A01	2109-M09	NASA (AC)	Wilson Corners (SWMU 001) High Concentration Plume Site Characterization and Revised AS System Layout, September 2021: NASA will send historic groundwater sampling data to FDEP.	Closed	1/11/2022	This data was provided to FDEP on November 9, 2021, during the KSCRT meeting.
2109-A03	2109-M14	NASA (DJ)	General Services Administration Reclamation Yard (GSRY) SWMU 010, May/June Groundwater Monitoring Results September 2021: NASA asked that the pre-Interim Measure UIC sample results be added to the applicable figure and requested that AECOM update the table with pre-treatment results in the ADP and get that back to the Team for the records.	Closed	1/11/2022	The pre-Interim Measure UIC results were included in the UIC discussion in the annual groundwater monitoring report that was submitted in November 2021.
2201-A02	2201-M04	NASA	Center-Wide Per- and Polyfluoroalkyl Substances (PRL #237) Phase III Solid Waste Management Unit Site Assessment and Confirmatory Sampling Report Summary, January 2022: NASA will update the summary table for KARS Park I and email back out to the Team.	Closed	5/3/2022	addressed in the meeting minutes
2203-A01	2203-M03	NASA	Contractors Rd Heavy Equipment Area (SWMU 055) 2021 Annual Groundwater Monitoring Report Advanced Data Package, March 2022: FDEP requested that HGL provide information regarding the number of sample points necessary for Mann-Kendall statistical analysis	Closed	5/3/2022	HGL provided the requested information to FDEP in a follow up email on March 8, 2022 to FDEP.
2203-A04	2203-M06	NASA	GSA Reclamation Yard (SWMU 010) Groundwater Monitoring Update, March 2022: FDEP requested a synoptic figure of the last two clean sampling events of the two wells.	Closed	5/3/2022	AECOM provided figure to FDEP on March 9, 2022
2203-A06	2203-M09	NASA	CAMP Deliverables Look-Ahead and Document Requirements, March 2022: FDEP inquired if the CAMP document being presented is the document sent around March 1? NASA confirmed that it was, but that it was revised since then. For PRL 237, there were two errors on dates (inadvertently switched), but will send this after the meeting.	Closed	5/3/2022	NASA provided the updated CAMP to team members
2201-A03	2201-M04	NASA	Center-Wide Per- and Polyfluoroalkyl Substances (PRL #237) Phase III Solid Waste Management Unit Site Assessment and Confirmatory Sampling Report Summary, January 2022: NASA owes FDEP an update on Q6 Radar Station (SWMU #112), so they will put together an ADP to review the RFI they completed.	Closed	6/28/2022	contract was modified and NASA will present results for this in a future presentation

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2205-A02	2205-M08	NASA	**Wilson Corners (SWMU #001) 2021 Annual Long-Term Monitoring Update, May 2022:** FDEP stated that VOC concentrations are increasing to the west but the natural attenuation default concentrations (NADC) footprint hasn't changed much. AECOM confirmed that was correct. Based predominantly on DPT data, the existing wells are appropriate for the extent of the low-concentration plume (LCP). The performance monitoring wells are more on the interior of the plume and will give us a better idea of what is going on with the high concentration plume (HCP). FDEP inquired what the vertical head difference of the zones are that are being referred to. AECOM will look into this question and provide the information.	Closed	6/28/2022	AECOM provided vertical head data for 2019, 2020 and 2021 to FDEP on May 5, 2022.
1810-A02	1810-M04	NASA	**Launch Complex 39B (LC39B) (SWMU 009)** - revisit team consensus 1810-D13 on weir installation based on permits date expiration and Year 2 PM results. (Team consensus reached to suspend the weir installation since CVOC concentrations adjacent to the pond are below their respective GCTLs and to re-evaluate the need for the weir prior to the SJRWMD and USACE permit expiration (11 July 2023).	Closed	10/6/2022	The Team reached consensus to evaluate Action Item 1810-M04, 1810-A02 in 2022 to re-evaluate the need for a weir near OFW. Tetra Tech resampled for line of evidence and upon reviewing the results presented in an ADP on October 6, 2022, this action was closed out.
2201-A01	2201-M04	NASA	**Center-Wide Per- and Polyfluoroalkyl Substances (PRL #237) Phase III Solid Waste Management Unit Site Assessment and Confirmatory Sampling Report Summary, January 2022:** NASA stated that the red boundary (PFAS LOC) in the figure on slide 90 is for the fire station, and not for Central Supply. NASA will gather together the figures they are investigating, and provide to FDEP.	Closed	10/6/2022	This was addressed in the submittal of the Center-wide report.
2203-A02	2203-M03	NASA	**Contractors Rd Heavy Equipment Area (SWMU 055) 2021 Annual Groundwater Monitoring Report Advanced Data Package, March 2022:** FDEP inquired if there is still extensive VC present in the 46-60ft bls interval, which is depicted on a single figure What is below 60 ft bls? NASA responded that below 60 ft bls is clean and there were no exceedances at that interval. HGL added that DPT results achieved GCTLs at the 56-60 ft depth level. FDEP requested that this information be provided on separate figures (46-56 ft bls and a 56-60 ft bls), to show there is vertical delineation.	Closed	10/6/2022	This information was provided in the report submitted to FDEP on August 23, 2022.
2203-A03	2203-M03	NASA	**Contractors Rd Heavy Equipment Area (SWMU 055) 2021 Annual Groundwater Monitoring Report Advanced Data Package, March 2022:** FDEP requested a copy of the proposed DPT sample points. FDEP referenced the 2020 DPT in the HS1 area, noting some additional points on the southern side of the plume might be needed in the deeper interval. NASA responded they agree there exists a data gap on the southeast edge. In 2021, HGL collected more data to close those gaps. HGL and NASA will look to see if more data is needed in that locale. FDEP would also like to see the additional proposed points in the northwest area for defining the HC plumes NASA will get FDEP their initial plan when it is prepared.	Closed	10/6/2022	The proposed sampling locations were provided to FDEP on July 1, 2022.
2205-A01	2205-M03	NASA	**Annual Update on the Interim Measure Operation, Maintenance, and Monitoring at Area South of K7-516 and Interim Groundwater Monitoring of 516S and Eastern Components Cleaning Facility, May 2022:** FDEP recommended e a monitoring well with results showing that the groundwater plume is not having an impact on the OFW. Along with the two surface water samples, the monitoring well sample would provide a reasonable assessment. A screen interval similar to the other side of the air sparge curtain (27-37 bls) seems appropriate. HGL suggested consideration with placing the new monitoring well closer to the barge canal, similar to MW36. Tetra Tech will come up with a recommendation and provide a map to FDEP.	Closed	10/6/2022	NASA provided a map with the suggested well locations to FDEP on 06/19/2022. Close out.
2206-A02	2206-M04	NASA	**Annual Update on Launch Complex 34 :** A brief site history and background were provided on LC34. FDEP inquired if the part of the plume that is above GCTLs discharges to the Atlantic Ocean. Tetra Tech stated they had temporary wells along the ocean. They can go back and pull together the data if this would be helpful. FDEP agreed this would be helpful to understand the history of the site.	Closed	10/6/2022	NASA provided this information by email to FDEP on August 2, 2022.
2206-A03	2206-M04	NASA	**Annual Update on Launch Complex 34 :** FDEP referenced Slide 15, which gives an overview of the HCS. Are there groundwater flow maps available that present the depth to groundwater and groundwater flow within the capture zone? NASA requested this be captured as an action item to follow up on .	Closed	10/6/2022	NASA provided this information by email to FDEP on August 2, 2022.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2206-A04	2206-M04	NASA	**Annual Update on Launch Complex 34 :** FDEP inquired if it was possible the northeasterly DSZ finger had been present prior to the 2019 recharacterization, but had been missed by earlier DPT points? Tetra Tech stated that it is possible and they will take an action item to look at the 2019 recharacterization for DPT coverage in that area. Whether it was missed or moved, sampling indicates the plume has not come out from under the blockhouse.	Closed	10/6/2022	NASA provided this information by email to FDEP on August 2, 2022.
2206-A05	2206-M05	NASA	**Fluid Servicing Road Area Interim Groundwater Monitoring Summary, June 2022:** HGL will provide the 2020 DPT results for this site to the Team at the next meeting.	Closed	10/6/2022	This information was included in the ADP dated September 13, 2022.
2206-A01	2206-M03	NASA	**Update on NASA KSC Program:** For PFAS, NASA made a commitment to provide an update to this GIS layer semiannually. NASA will consider providing the GIS layer and will follow up with FDEP on this request.	Closed	2/7/2023	The GIS layer was provided to FDEP in November 2022. This will be closed out.
2206-A06	2206-M07	NASA	**SLERA Conclusions and Recommendations for the Un-numbered Operational Area (UNOA), PRL #229, June 2022:** FDEP stated that they will farm this information out to University of Florida (UF) for review. NASA responded that this SLERA report is already drafted and they will submit the report for review with the details.	Closed	2/7/2023	This has been submitted and will be closed out.
2206-A07	2206-M09	NASA	**Stand-alone Electrical Equipment Confirmation Sampling Report Addendum and Interim Measure Work Plan, June 2022:** NASA stated they will be removing everything 0.5 mg/kg to the building, and inquired with FDEP how the PCB coordinated removal would work. FDEP has not participated in one of those yet, so this will be a mutual learning experience. NASA will forward the Notification Letter sent previously to Bruce.	Closed	2/7/2023	Deda will look for this letter and send out to FDEP. Deda provided to FDEP on 09/27/2022; this will be closed out.
2210-A04	2210-M04	NASA	**Fire Station #3 PFAS Site Assessment Update, October 2022:** First flush rain evaluations and Nalgene samplers are planned to be used. Once the monitoring well installation locations are determined, does FDEP want to know where those are? FDEP responded that they would like to know for information purposes. NASA will provide these locations to FDEP prior to installation.	Closed	2/7/2023	Sent to FDEP on 01/24/2023; this will be closed out
2210-A07	2210-M09	NASA	**Meeting Minutes and Miscellaneous Updates:** Annual Update on Launch Complex 34 at a prior meeting provided an overview of the hydraulic containment system (HCS). FDEP requested groundwater flow maps at the time that present the depth to groundwater and groundwater flow within the capture zone. NASA provided this information by email to FDEP on August 2, 2022. As a result, FDEP noted that the information provided was capture modeling and FDEP would like to see water level measurements to support the capture zone. NASA and Tetra Tech will provide that data to FDEP.	Closed	2/7/2023	The additional information was provided to FDEP and will be closed out.
2210-A08	2210-M10	NASA	**Base Support Building (SWMU 014) and KARS Park II (SWMU #118) PFAS Site Assessment Report:** The half white half back circle represents surface water. NASA requested to add a note to the Slide 35 to clarify what the symbol means for the ADP and the report.	Closed	2/7/2023	Standardization for symbols was provided by NASA to the A&E firms (January 11, 2023); this will be closed out.
2210-A09	2210-M10	NASA	**Base Support Building (SWMU 014) and KARS Park II (SWMU #118) PFAS Site Assessment Report:** NASA would like to maintain consistency throughout all the PFAS presentations (e.g., triangle symbol for surface water, etc.). The NASA RPMs will get together and issue guidance to the A&E firms on the use of identifiers in presentations for consistency.	Closed	2/7/2023	Standardization for symbols was provided by NASA to the A&E firms (January 11, 2023); this will be closed out.
2210-A12	2210-M12	NASA	**SWMU 067 POL and SWMU #088 SW3 ADP:** Tetra Tech will create a figure of the proposed monitoring well locations and give to Deda with NASA.	Closed	2/7/2023	Figure created and provided to FDEP. This will be closed.
2210-A02	2210-M02	NASA	**C-5 Electrical Substation (SWMU #066) Groundwater Monitoring Report and Long-Term Monitoring Work Plan:** FDEP requested the team construct an east/west cross-section of the plume to show vertical delineation of the site and put data points on the figure. A figure like this already exists and was developed during the site characterization. NASA will send this figure to FDEP.	Closed	4/5/2023	The figure was included in the C-5 Electrical Substation Groundwater Monitoring Report that was sent to FDEP on January 23, 2023.

Action Item No.	Minutes Reference	Responsible Team Member	Action item	Status	Date Closed	Closure Comments
2210-A06	2210-M08	NASA	**Fire Station #1 (SWMU #116), Sewage Treatment Plant #1 and Sludge Disposal Area (SWMU #117) PFAS Sites Assessment Update:** The image on Slide 35 displays surface water PFOS results. Future sampling will be focused on influent into the Gator Pond, effluent from the gator pond, associated borrow pits that are part of the stormwater management system, tributaries into Buck Creek, locations within Buck Creek, junction of Buck Creek and Banana River with offsets north and south, isolated borrow pits northeast of gator pond to determine impacts, and four locations along Banana River that will correspond to DPT locations. Tetra Tech will email FDEP the locations of the proposed monitoring well locations.	Closed	4/5/2023	Locations provided to FDEP on February 22, 2023.
2210-A11	2210-M11	NASA	**Fire Station #2, Former Sewage Treatment Plant #17, and Towway Area (SWMU 114):** Space Florida sampled their effluent as they dewatered (referencing slide 25). Didn't see PFOS until last week or two and discharged to the east along Astronaut Rd and will keep in mind in future sampling efforts (in the hundreds). (Jan/Feb) DPTs along astronaut road predate the discharge. Will have to investigate south of the new road. We didn't have connectivity to the SLF with that dewatering effluent. We will go back to those areas to see what might have been spread within the SWMU boundary. Make a figure to show where all the effluent sample locations are.	Closed	4/5/2023	Maps have been drafted and will be submitted with the Land Use Control Annual Report; estimated February 2023.
2302-A01	2302-M12	NASA	**Launch Complex 39A (SWMU #008) and Launch Complex 39B (SWMU #009) Performance Monitoring, February 2023:** Action item for NASA to provide a list of wells that will be sampled for PFAS at LC39A to FDEP prior to conducting the sampling	Closed	6/28/2023	The list of wells were provided to FDEP.
2302-A02	2302-M12	NASA	**Launch Complex 39A (SWMU #008) and Launch Complex 39B (SWMU #009) Performance Monitoring, February 2023:** Action item for NASA to provide a list of wells that will be sampled for PFAS at LC39B to FDEP prior to conducting the sampling	Closed	6/28/2023	The list of wells were provided to FDEP.
2304-A01	2304-M03	NASA	**GSA Reclamation Yard (GSRY) 2022 Groundwater Monitoring Results:** NASA to provide FDEP approval emails or correspondence regarding lack of pre-injection data at the site and the selection of MW0002IS as a site-specific background well.	Closed	6/28/2023	Emails sent by NASA to FDEP on June 7, 2023.

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September 12, 2023

Mr. Ryan O'Meara
Remediation Project Manager
National Aeronautics and Space Administration
Mail Code SI-E2
Building K6-1547 (Logistics Facility)
John F. Kennedy Space Center
Kennedy Space Center, FL 32899-0001

Subject: **Mobile Launch Platform (MLP) Rehabilitation Sites and the Vehicle Assembly Building (VAB) Area, (Solid Waste Management Unit [SWMU] 056), 2022-2023 Corrective Measures Implementation (CMI) and Interim Measures (IM) Update, Advanced Data Package (ADP) for the October 2023 Kennedy Space Center Remediation Team (KSCRT) Meeting**

Reference: **Indefinite Delivery Indefinite Quantity (IDIQ) Contract 80KSC019D0010**

Dear Mr. O'Meara:

AECOM Technical Services, Inc. (AECOM) is pleased to provide Kennedy Space Center (KSC), National Aeronautics and Space Administration (NASA), with the ADP for the MLP/VAB Area (SWMU 056). This ADP provides a brief background for the site and a summary of work performed in 2022 through April of 2023.

Field efforts summarized in the ADP include startup of the biosparge system after reinstallation, transfer line repairs, biosparge wall expansion activities, semi-annual performance monitoring within the biosparge area, interim groundwater monitoring (IGM) within the former Hot Spot 2 area, annual groundwater sampling from Hot Spot 3 Outstanding Florida Waters (OFW) area, low concentration plume (LCP) monitoring well installations, and LCP long-term monitoring (LTM). The objective of this ADP is to present existing groundwater quality and provide an evaluation of the best path forward within each monitored area. A remedial action alternatives evaluation (RAE) for the former Hot Spot 2 Area will be presented separately.

The following consensus statements will be presented to the KSCRT:

- Biosparge Area
  - Continue operation of biosparge system until the high concentration plume in both the former Hot Spot 2 and biosparge areas show signs of full plume collapse.
  - Continue performance monitoring on a semi-annual basis (as presented) for selected chlorinated volatile organic compounds (CVOCs): tetrachloroethene (TCE), cis-1,2-dichloroethylene (cDCE), trans-1,2-dichloroethene (tDCE), and vinyl chloride (VC).
  - Transition MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from the LCP sampling plan to semi-annual performance monitoring
- Former Hot Spot 2
  - Continue interim groundwater monitoring for select CVOCs (cDCE, tDCE, and VC). The next semi-annual event will be scheduled for Fall of 2023.
  - Evaluate the sampling plan one year after implementation of the selected technology from the RAE (RAE presented separately).
- Hot Spot 3
  - No consensus. Interim Measure Work Plan is currently undergoing Florida Department of Environmental Protection review.
- Hot Spot 3 OFW Area
  - Continue annual performance monitoring for select CVOCs (TCE, cDCE, tDCE, and VC) to monitor groundwater quality downgradient of Hot Spot 3 former and future treatment areas.

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- LCP monitoring
    - Replace well MLPV-IW0053 (35-45) that historically exceeds groundwater cleanup target levels (GCTLs) and is part of the sampling plan.
    - Replace MLPV-IW0001SR as part of general monitoring well maintenance. This well is not currently part of a sampling plan.
    - Due to restrictions from site layout and conditions in the originally proposed location for MLPV-MW0108 (35 to 45), the well had to be installed further south. Propose installing two additional monitoring wells to verify the NADC concentrations located south of the biosparge wall that were detected during the 2021 direct push technology (DPT) groundwater sampling event.
        - One monitoring well, screened 37 to 47 feet below land surface (bls), located east of the railroad tracks (downgradient, wetland area)
        - One monitoring well, screened 35 to 45 feet bls, located southwest and upgradient of original location for MLPV-MW0108
        - Installation is contingent on access to proposed locations, based on ongoing center operations and surface conditions in the wetland area
    - Install two additional monitoring wells, screened 35 to 45 feet bls, southeast of the biosparge area to provide GCTL boundary data around monitoring well MLPV-MW0108
    - Add VABU-IW0006D (42 to 47) to the biennial sampling plan for boundary data to the east of the isolated plume.
    - Continue LTM on a biennial basis for select CVOCs (TCE, cDCE, tDCE, and VC)
    - Remove MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 from LCP sampling plan and transition to the Biosparge area semi-annual performance monitoring plan.
    - Prior to further modifying the LCP LTM well network, collect one additional set of data to have two biennial data sets that reflect four years of groundwater conditions from the newly installed monitoring wells.
    - Add TCE to reported analyte list. Select wells (MLPV-MW0077, MLPV-MW0078, MLPV-MW0081, MLPV-MW086, MLPV-MW0097, and MLPV- MW0098) had TCE concentrations above the GCTL in historic DPT groundwater data. TCE results were obtained following the 2023 sampling event and indicated no detections in these or other wells.

Should you require additional information, please contact Linnea King Clark at linnea.king@aecom.com or via phone at 407.456.1535.

Sincerely,

AECOM Technical Services, Inc.

Linnea King Clark
Task Order Manager

Jennifer Gootee, PE
Program Manager

Enclosure

Cc: FDEP
Richard Smith, HGL
Mark Speranza, Tetra Tech

2022 - 2023 Corrective Measures Implementation (CMI) and Interim Measures (IM) Update

Mobile Launch Platform Rehabilitation Sites and the Vehicle Assembly Building Area (MLP/VAB)

Solid Waste Management Unit (SWMU) 056

October 2023

Delivering a better world

Disclaimer: This Advance Data Package (ADP) was prepared for NASA to aid in evaluation of site conditions and remedial actions. This is not a decision document. New information may come to light that makes this ADP outdated.

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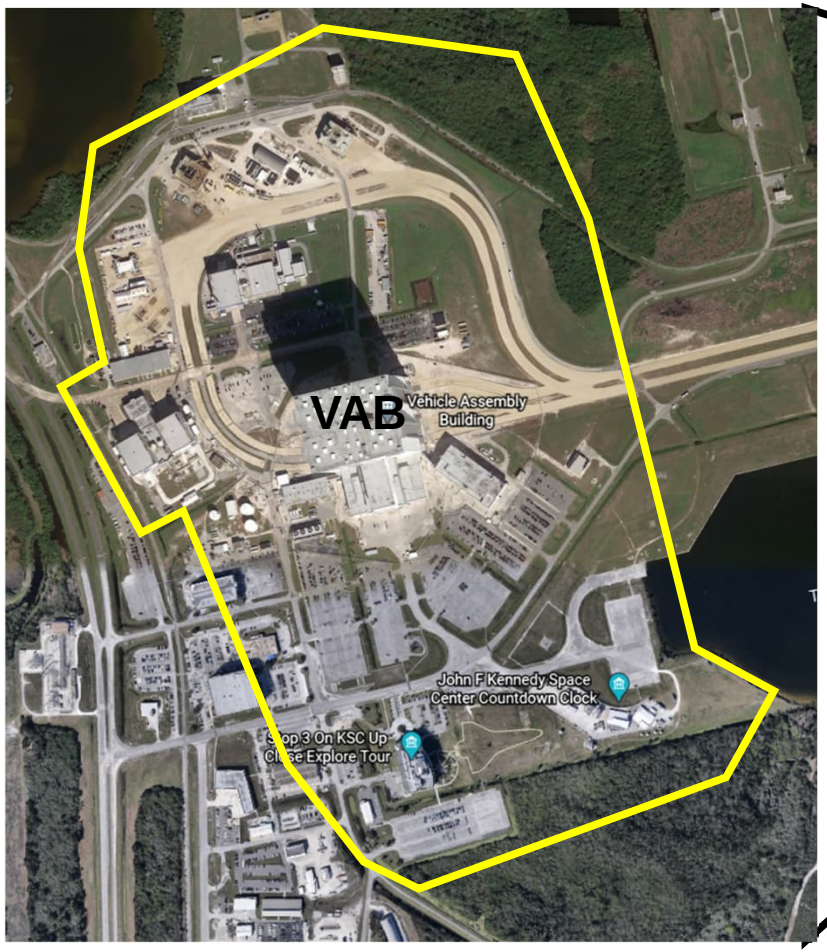
Outline

1. Mobile Launch Platform Rehabilitation Sites and Vehicle Assembly Building Area (MLP/VAB), Solid Waste Management Unit (SWMU), Overview
2. Biosparge Barrier for Mitigating the High Concentration Plume (HCP)
   - Current Biosparge System Layout
   - Timeline
   - Transfer Pipe Investigation
   - 2023 Biosparge System Expansion
   - Operation, Maintenance and Monitoring (OM&M)
   - Performance Monitoring 2023
3. HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area
   - Soil Cores and Updated Lithology
   - Interim Groundwater Monitoring (IGM) 2023
4. Hot Spot 3 Overview
5. Hot Spot 3 Outstanding Florida Waters (OFW) Area
   - Historical Site Assessment
   - Performance Monitoring 2022
6. Low Concentration Plume (LCP) Long Term Monitoring (LTM)
   - Previous Activities
   - 2023 Analytical Results by interval

MLP/VAB, SWMU 056 Overview

Site Location

Solid Waste Management Unit (SWMU) #056 is in the northern half of Kennedy Space Center around the Vehicle Assembly Building (VAB).





MLP/VAB, SWMU 056 Overview

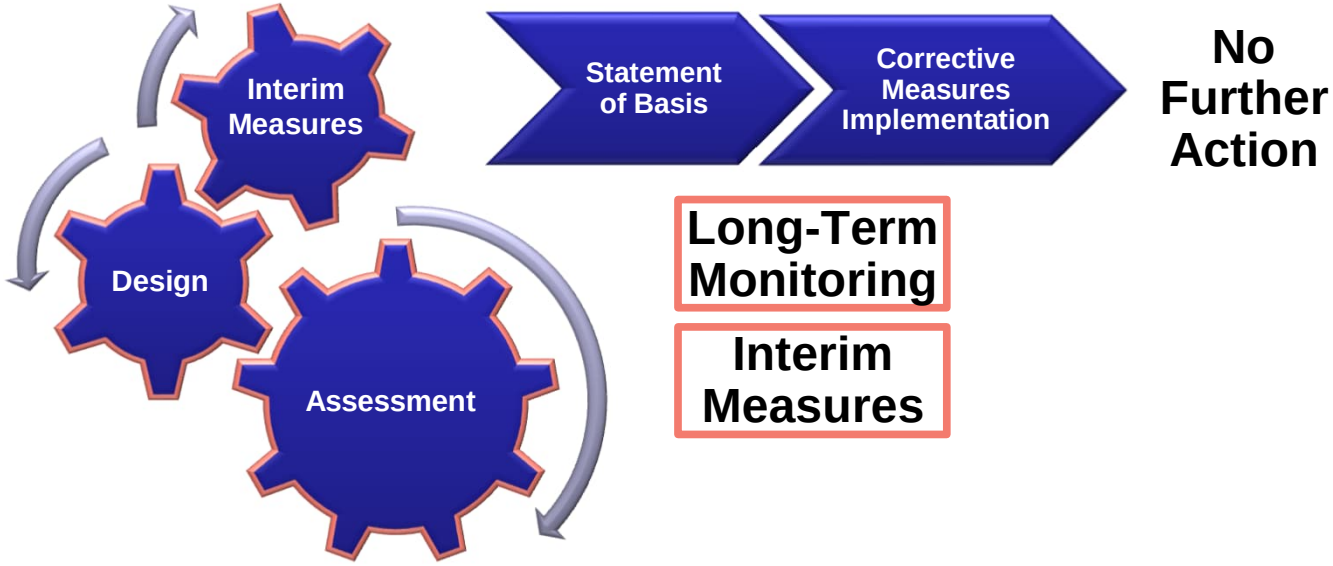
Where are we in the RCRA process?

- Site is in Corrective Measures Implementation (CMI) from a traditional Resource Conservation and Recovery Act (RCRA) standpoint.
- Adaptive site management is being utilized through ongoing assessment, design, and interim measures.
- This approach also meets the requirements of Chapter 62-780 Florida Administrative Code (FAC).

Traditional Linear Approach to RCRA Corrective Actions



KSC Approach to RCRA Corrective Actions



Source: KSC Remediation Program

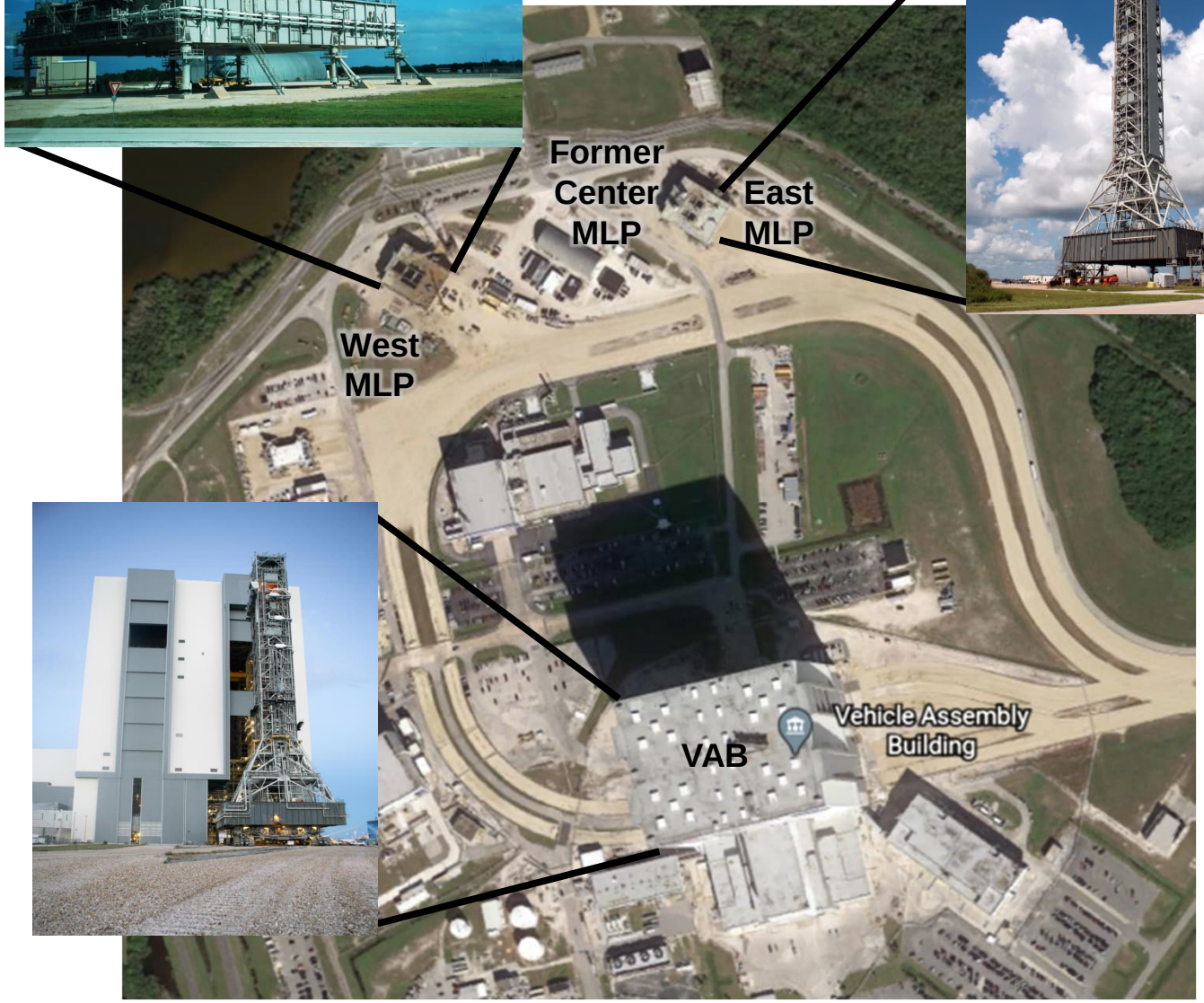
MLP/VAB, SWMU 056 Overview

Site Use

- Mobile Launch Platform (MLP) area and VAB were constructed in the mid-1960s
- MLP area historical site use:
  - Original construction sites for the Apollo Mobile launchers; consisted of three park sites
  - Area was used to repair corrosion and blast damage on the mobile launchers following launches
  - Center MLP site was replaced with a storage building in 1991.
- VAB historical use:
  - Used to stack and prepare the space vehicles prior to launch.
- Current Use:
  - VAB and MLP areas are construction sites
  - Facilities within the Solid Waste Management Unit boundary have been leased to tenants



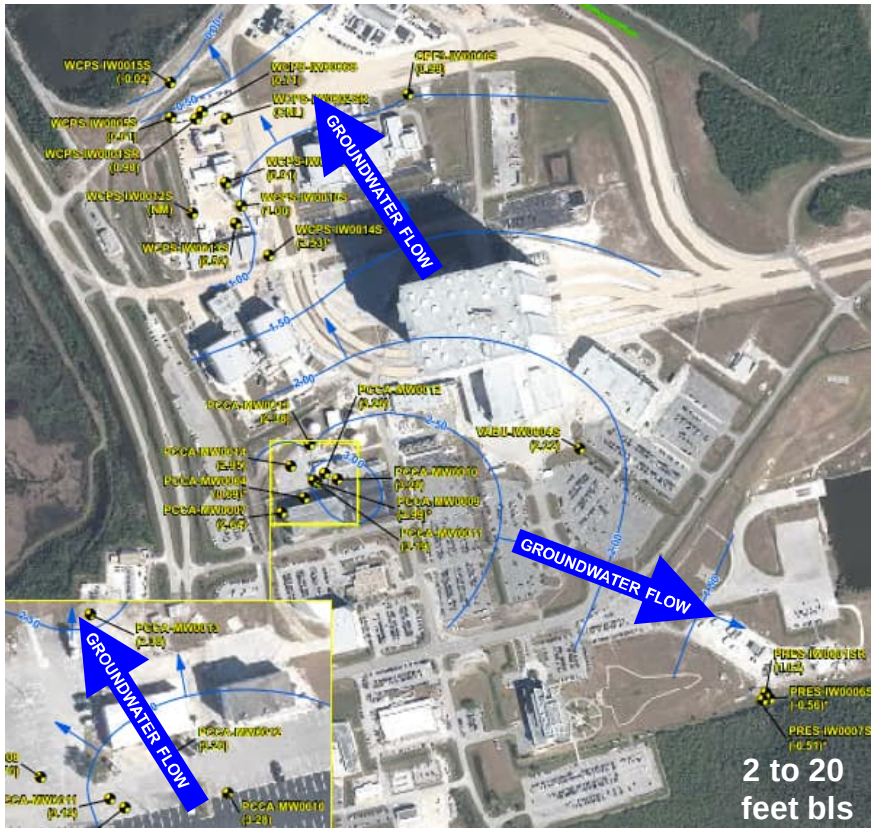




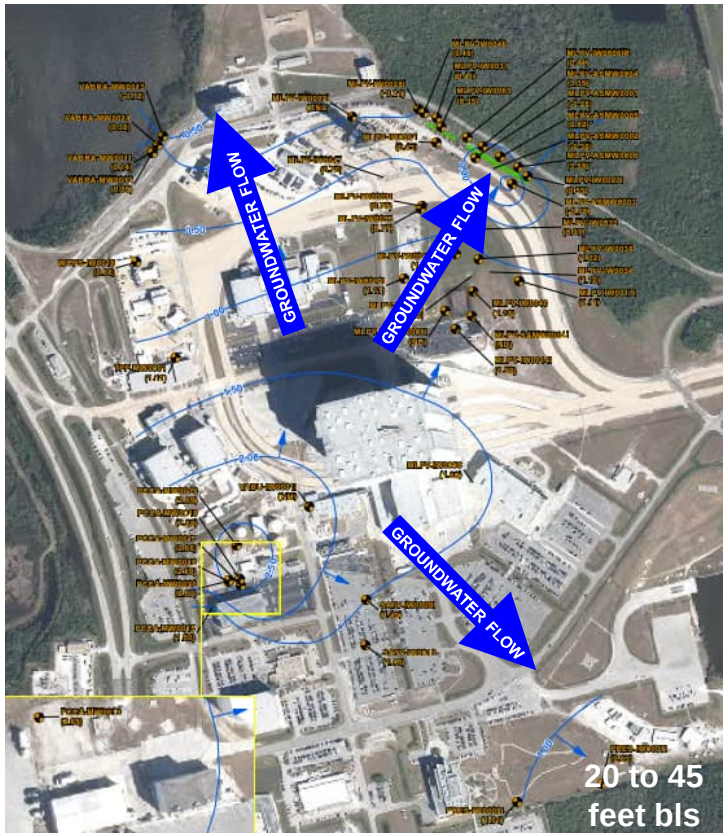
MLP/VAB, SWMU 056 Overview

Site-Wide Hydrogeology

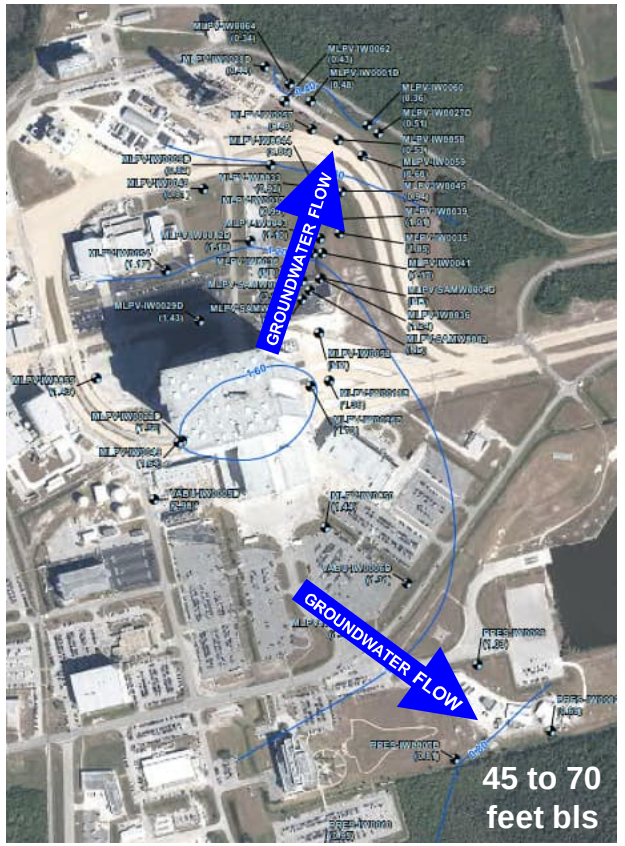
- 2021 Average depth to water in the dry season (November through April) ranged from 3 to 4 feet below land surface (bls)
- Water gauging during the wet season (May through October) is scheduled for 2023
- Groundwater generally flows to N and NE on the north side of the VAB and E and SE to the south of the VAB, with an NW flow in the shallow intervals, which is consistent with previous groundwater flow observations.



SHALLOW – 2 to 20 feet bls



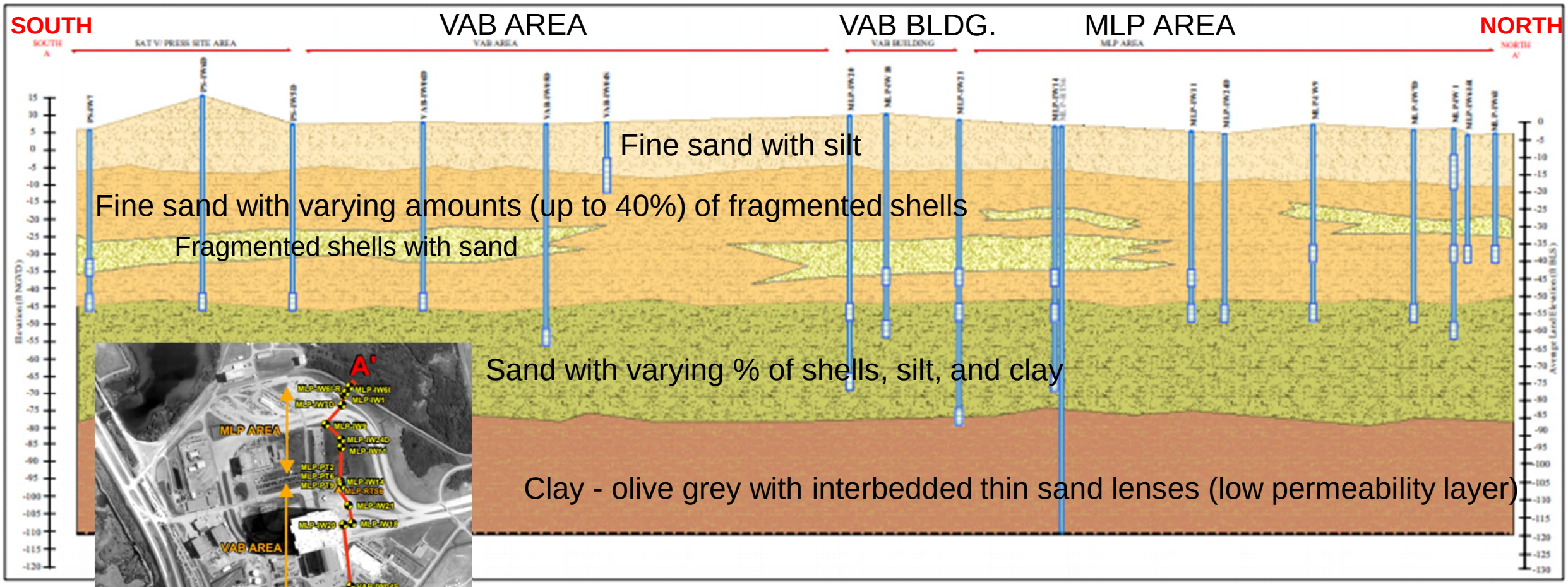
INTERMEDIATE – 20 to 45 feet bls

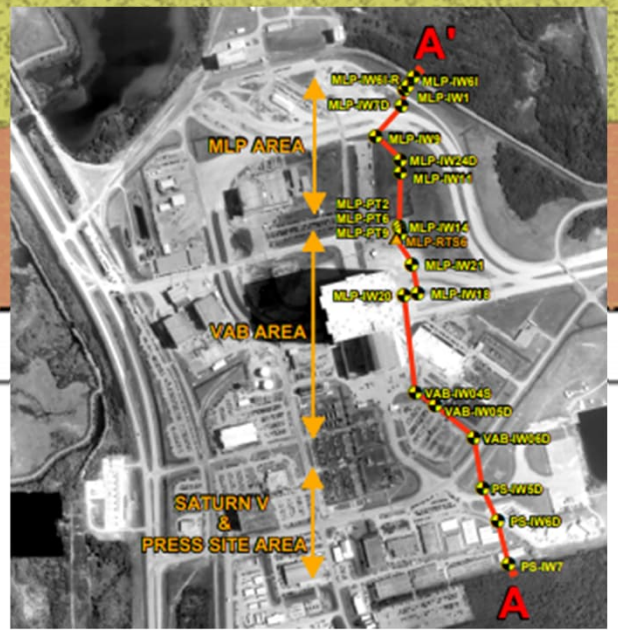


DEEP – 45 to 70 feet bls

MLP/VAB, SWMU 056 Overview

Site-wide Lithology



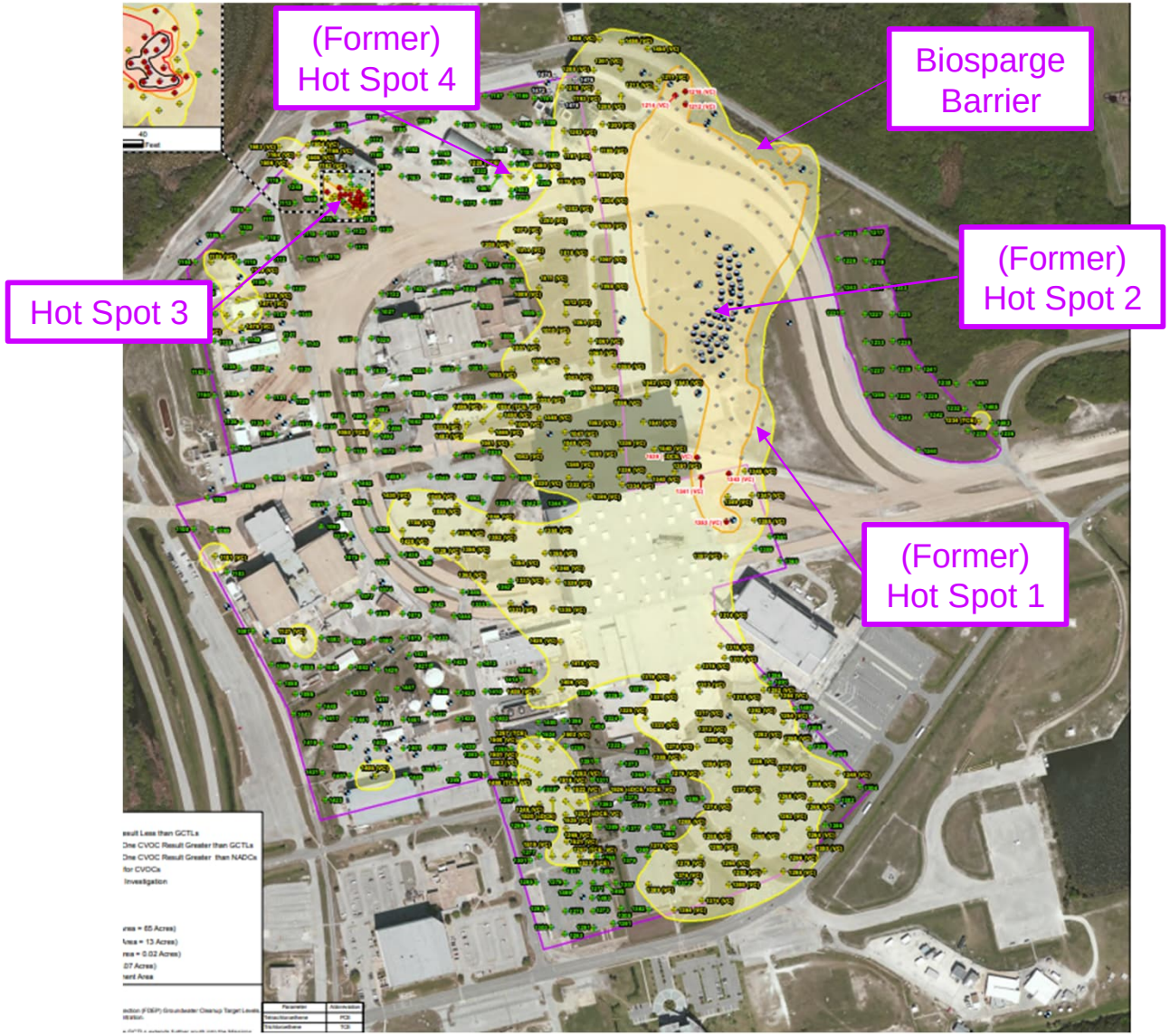


Lithology: sandy silts with shell fragments to 46 feet below land surface (bls), followed by low permeability layer from 50 to 85 feet bls

MLP/VAB, SWMU 056 Overview

Historical Site Assessment

- **1993** Preliminary investigations began focusing on MLP sites
- **1997 through 2014** Multiple actions and phases of assessment and post-RFI/Pre-design activities were performed to include VAB area
    - Delineated soil impacts near East MLP
    - Delineated groundwater plume over 115 acres with expanded footprint of direct push technology (DPT) groundwater sampling in VAB and surrounding area
    - As part of the 2011- 2013 VAB reassessment project
        - 4,922 groundwater samples were collected from 556 locations (100’ matrix)
        - 240 soil samples were collected from 175 locations
    - Soil coring and microcosm studies indicated groundwater amenable to active dechlorination and bioremediation
    - Designated four hot spots (where concentrations are greater than 10x Natural Attenuation Default Concentration [NADC] listed in Chapter 62-777 FAC)

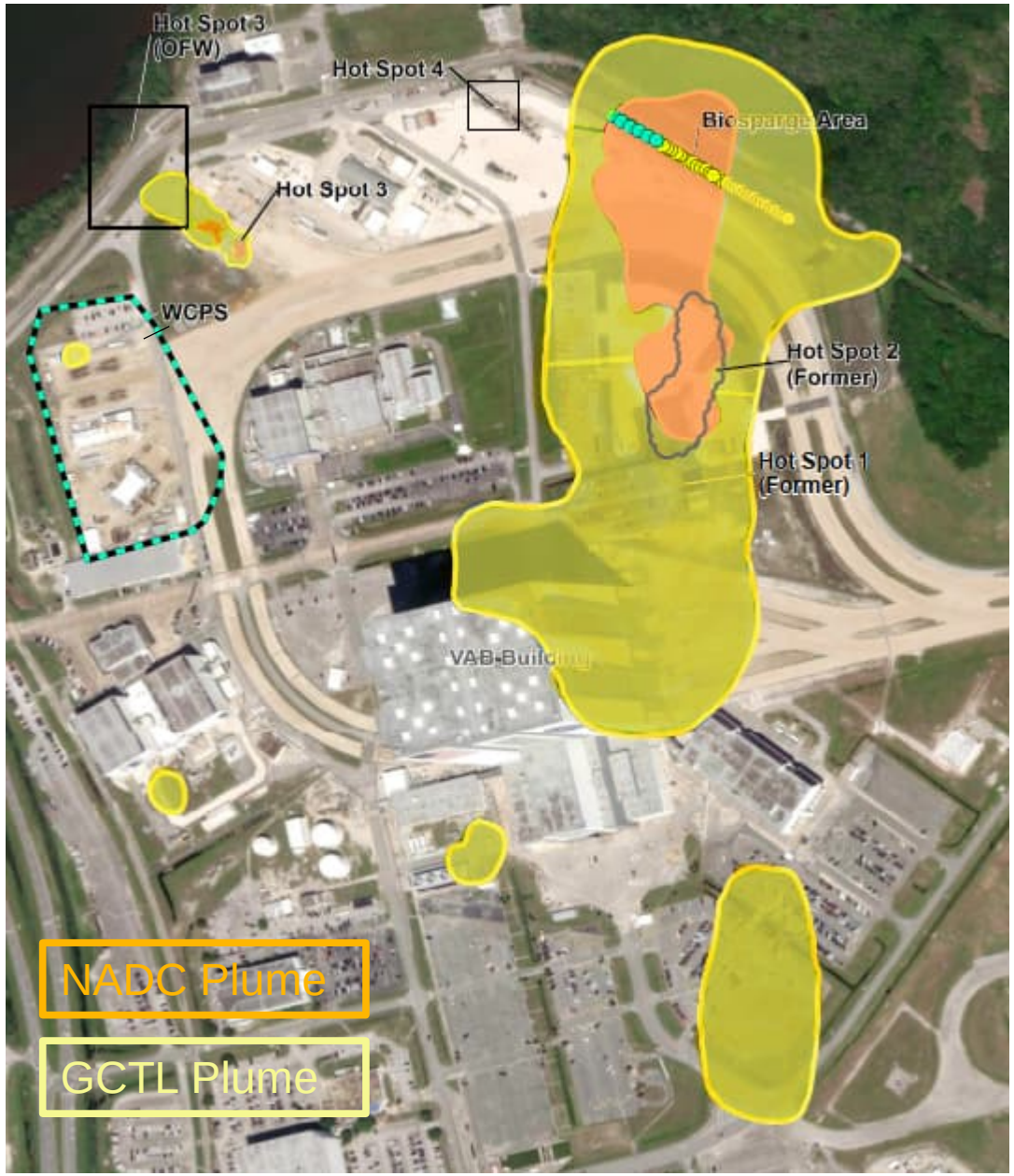


Isopleths based on 2012 & 2013 groundwater data

MLP/VAB, SWMU 056 Overview

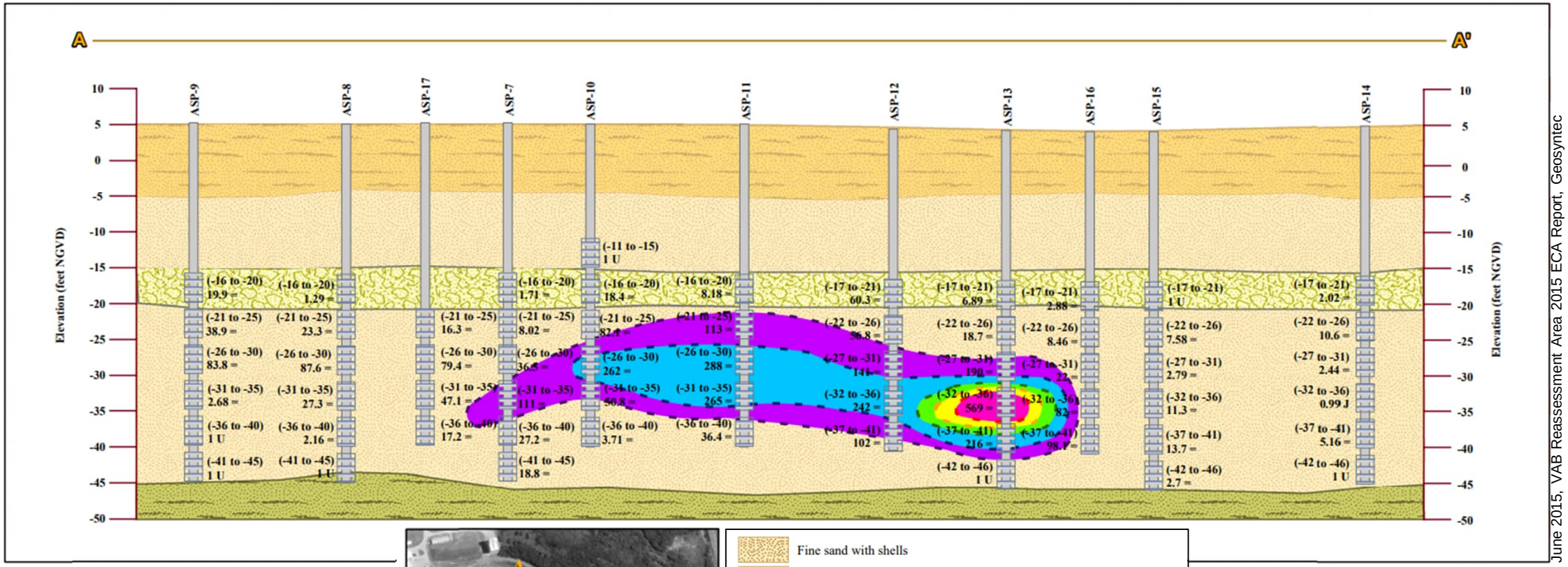
Current Site Conditions

- **Groundwater Contaminants of Concern (COCs):** Chlorinated volatile organic compounds (CVOCs) to include trichloroethene (TCE), cis-1,2-dichlorethylene (cDCE), trans-1,2-dichloroethylene (tDCE), and vinyl chloride (VC)
- **Horizontal extent:**
  - ~40 acres groundwater plume (previously 65 acres) with COC concentrations greater than Groundwater Cleanup Target Levels (GCTLs); also referred to as the low concentration plume (LCP)
  - ~7 acres groundwater plume with COC concentrations greater than NADCs; also referred to as the high concentration plume (HCP)
- **Vertical extent:** Varies by area within SMWU #056 (detailed in subsequent slides)
- **Land Use Control:** In place to prohibit use of groundwater. Remains in effect until land use change or concerns are mitigated, or evidence no longer a concern.



MLP/VAB, SWMU 056 Overview

Biosparge Barrier Lithology



June 2015, VAB Reassessment Area 2015 ECA Report, Geosyntec



Fine sand with shells

Fine sand with varying among (up to 40%) of fragmented shells

Fragmented shell with sand

Sand with varying % of shells, silt, and clay

Inferred 500 ug/L vinyl chloride isopleth

Inferred 400 ug/L vinyl chloride isopleth

Inferred 300 ug/L vinyl chloride isopleth

Inferred 200 ug/L vinyl chloride isopleth

Inferred 100 ug/L vinyl chloride isopleth

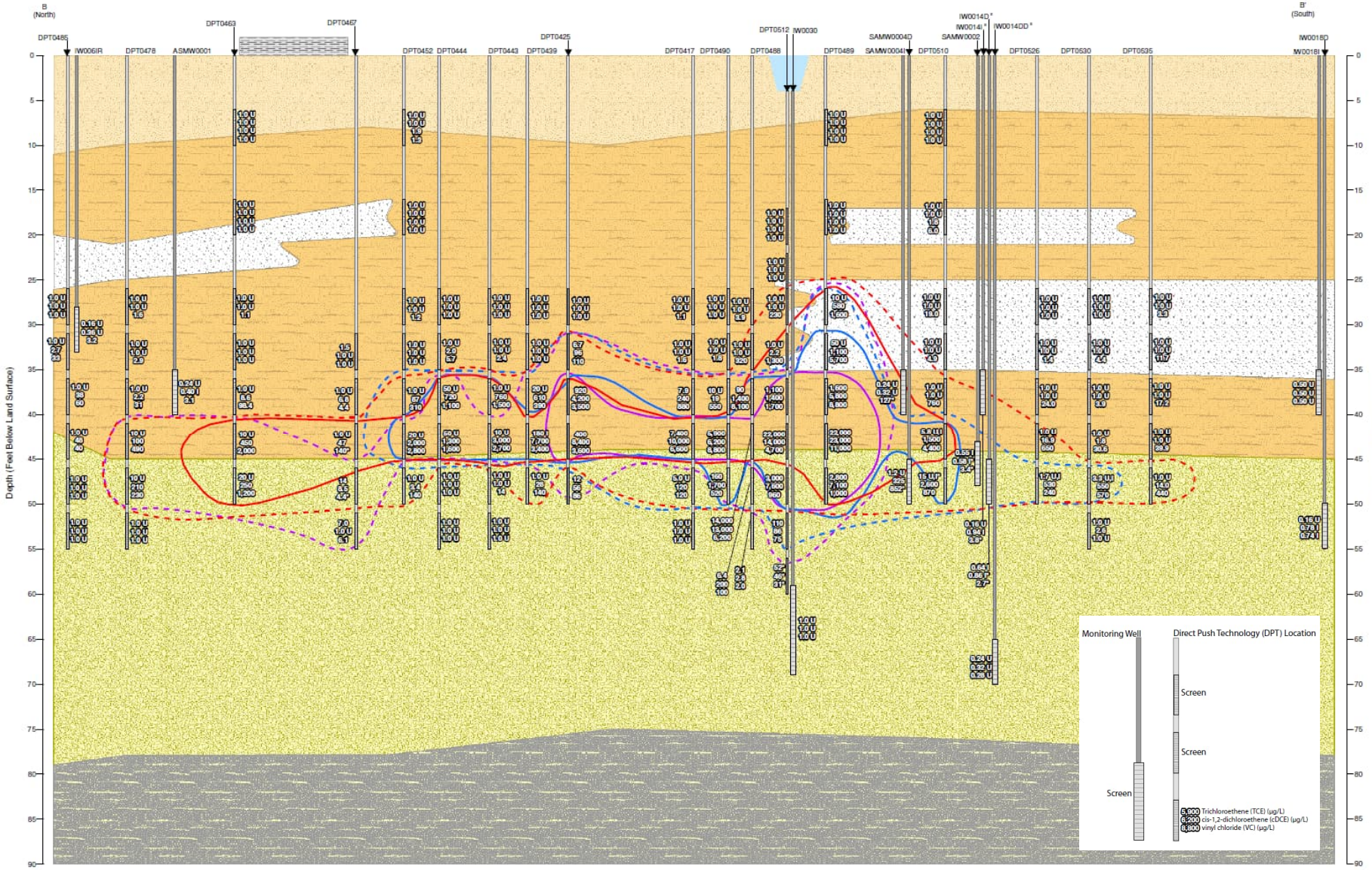
Direct Push well location

Lithologic Transect

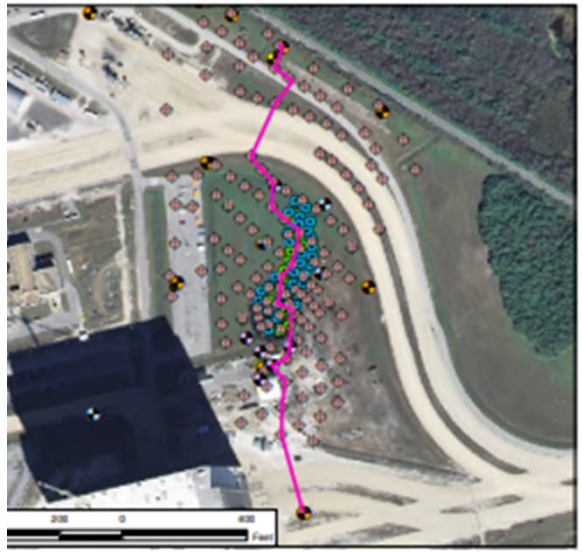
- Delineation Results from VAB Reassessment (2012)
- Vinyl chloride was not detected below the 51 to 55 ft bls direct push drilling sampling interval

MLP/VAB, SWMU 056 Overview

Former Hot Spot 1 Area and Former Hot Spot 2 Area Lithology



Isopleths based upon 2009 and 2010 sampling results



Legend

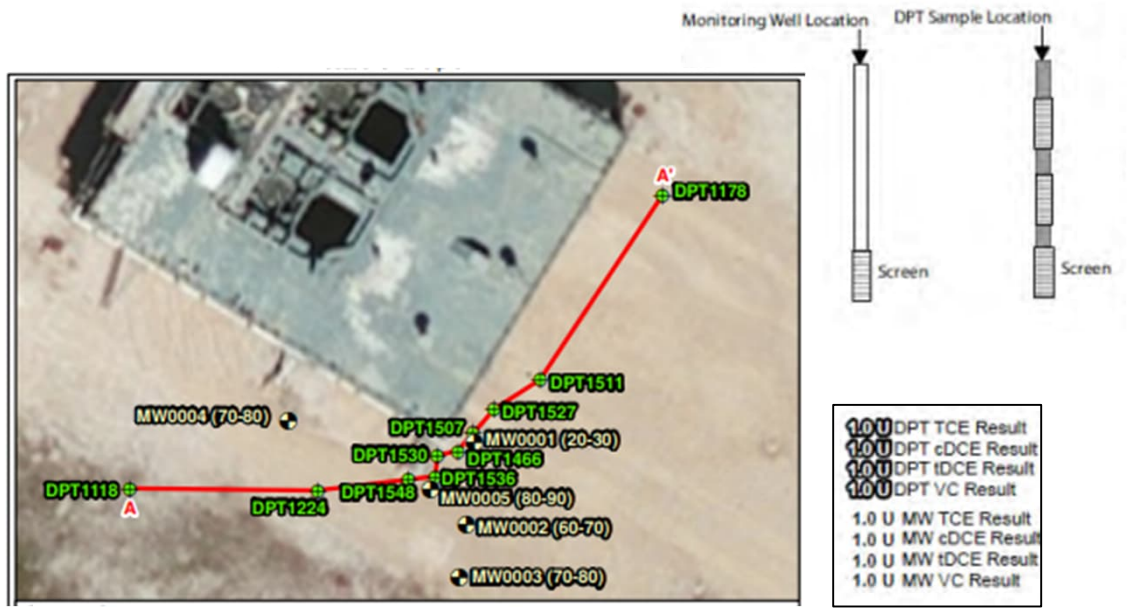
- Fine SAND with silt
- Fragmented SHELLS wtih sand
- Fine SAND with shell fragments
- SAND with varying % shells, silt with clay
- CLAY with interbedded thin sand lenses
- Retention Pond (approximate location)
- Crawlerway (approximate location)
- 3 µg/L TCE Isopleth
- 300 µg/L TCE Isopleth
- 70 µg/L cDCE Isopleth
- 700 µg/L cDCE Isopleth
- 100 µg/L VC Isopleth
- 1,000 µg/L VC Isopleth
- 1 µg/L VC Isopleth

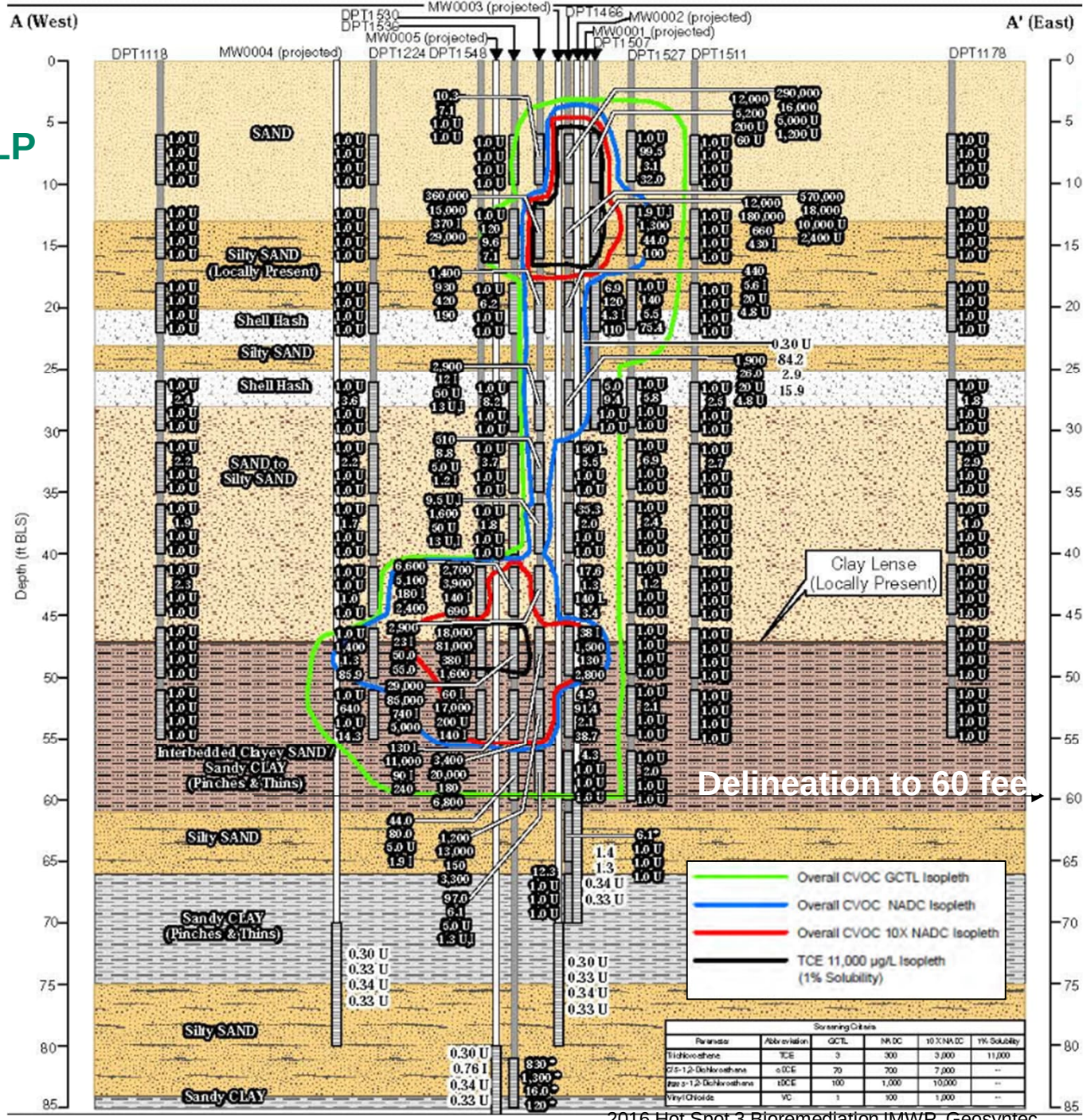
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MLP/VAB, SWMU 056 Overview

Hot Spot 3 Area Lithology – SW Corner of West MLP

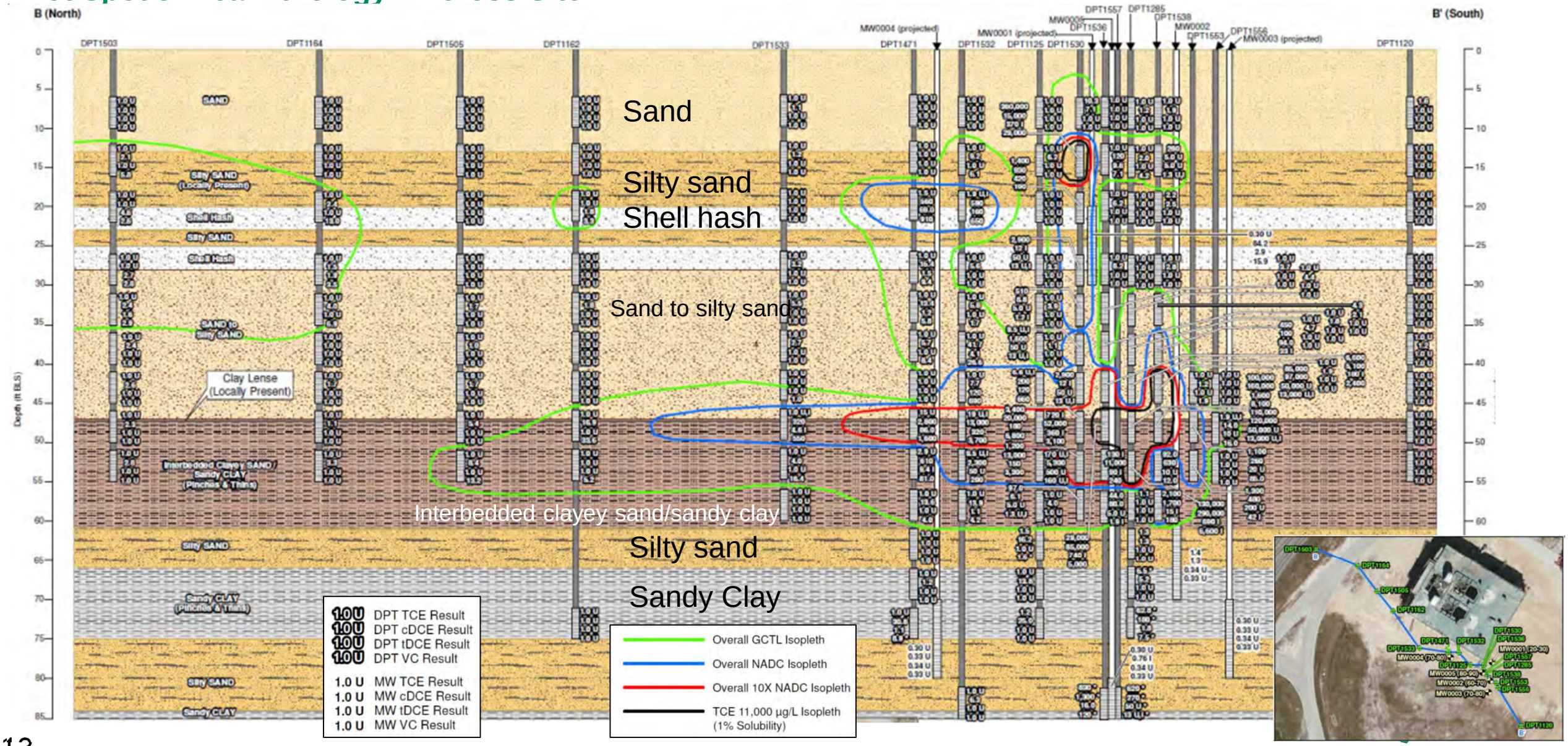
- Overall CVOC delineation following RFI and VAB Reassessment (2012) and Site Characterization (2015)
  - Delineated TCE, cDCE, tDCE, VC both horizontally and vertically
  - GCTLs, NADC, 10xNADC, including TCE Source Zone (SZ) area (1% solubility for TCE [11,000 µg/L])





MLP/VAB, SWMU 056 Overview

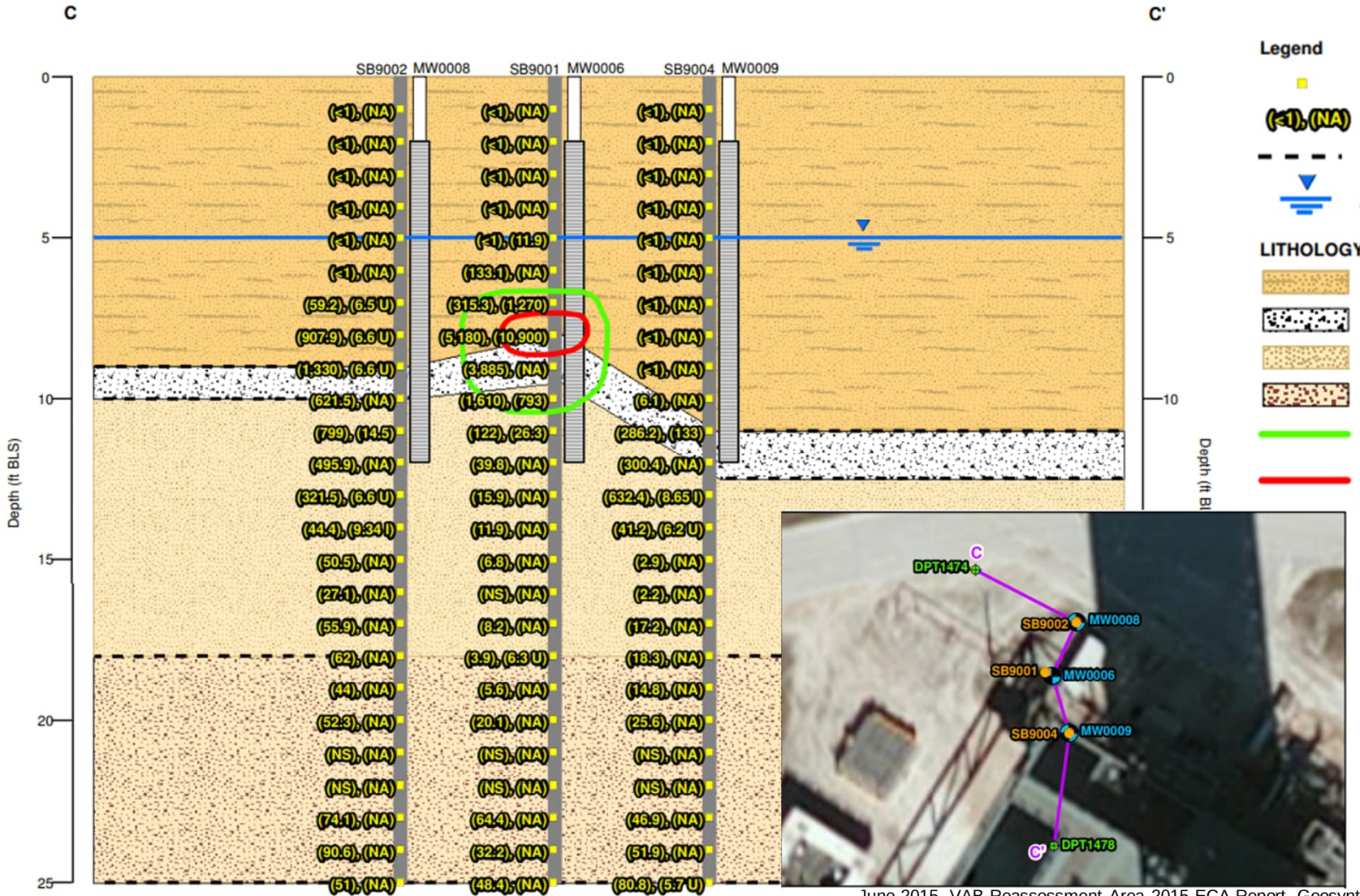
Hot Spot 3 Area Lithology – Across Site



MLP/VAB, SWMU 056 Overview

Hot Spot 4 Lithology

- Delineation Results from VAB Reassessment (2012) – Soil Boring Screening Results



June 2015, VAB Reassessment Area 2015 ECA Report, Geosyntec

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MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

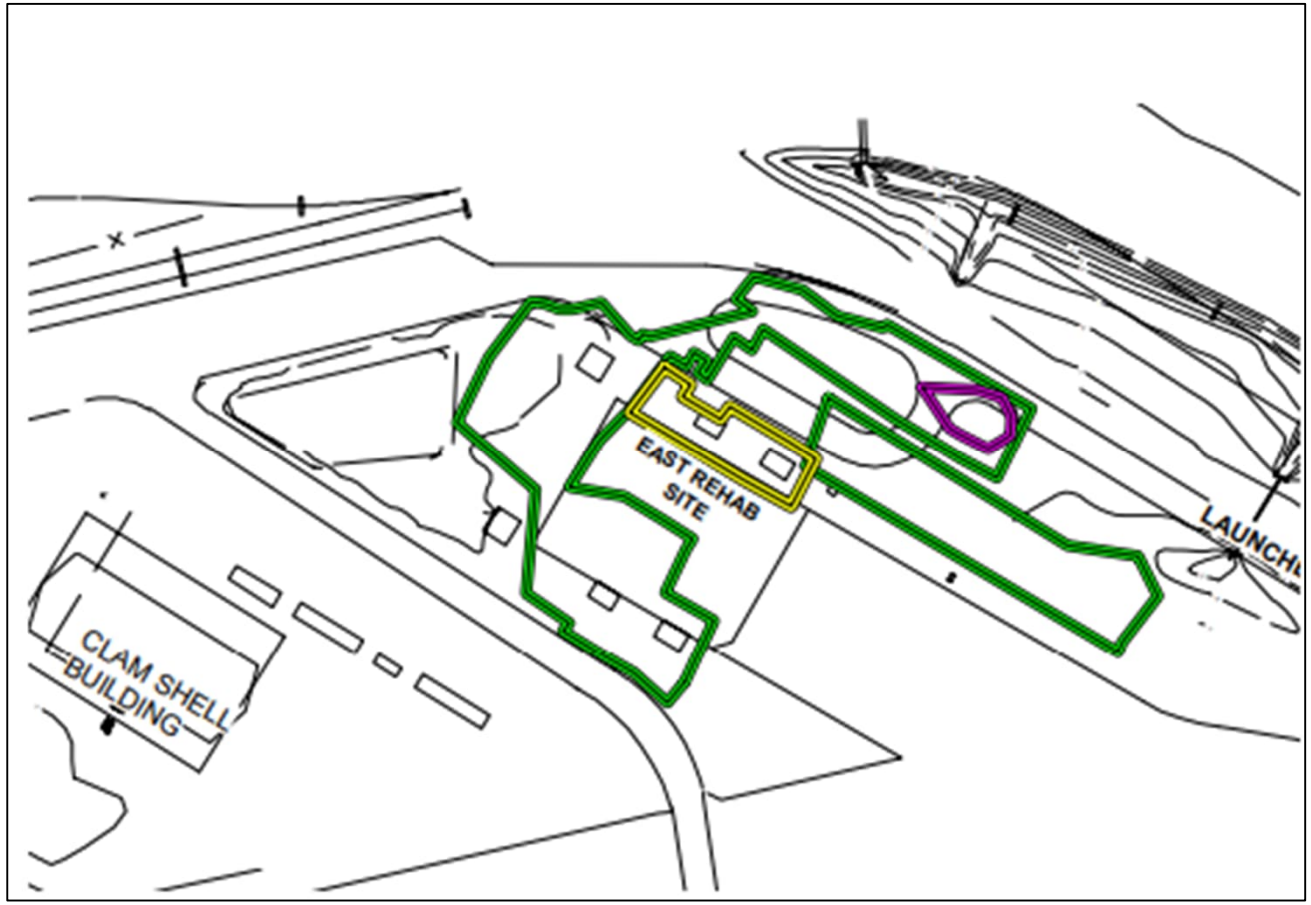
- **1999 and 2000 Interim Measures (IM)** excavated approximately 4,400 cubic yards of PCB and zinc-impacted soils to 1.5 ft bls and to 4.5 ft bls from eastern MLP area (FDEP approved IM Report on December 13, 2000).



PCB 0 to 1.5 ft bls

Zinc 0 to 1.5 ft bls

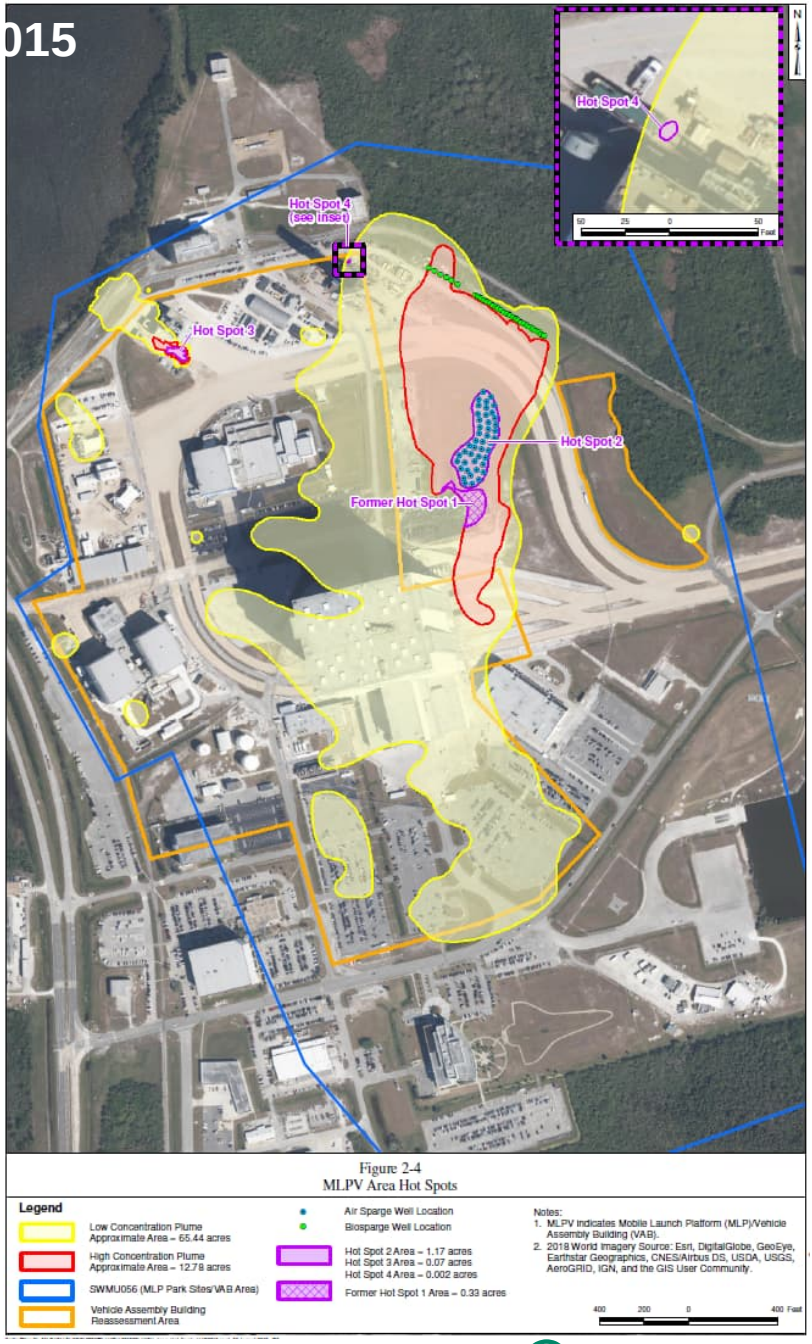
PCB 0 to 4.5 ft bls



MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

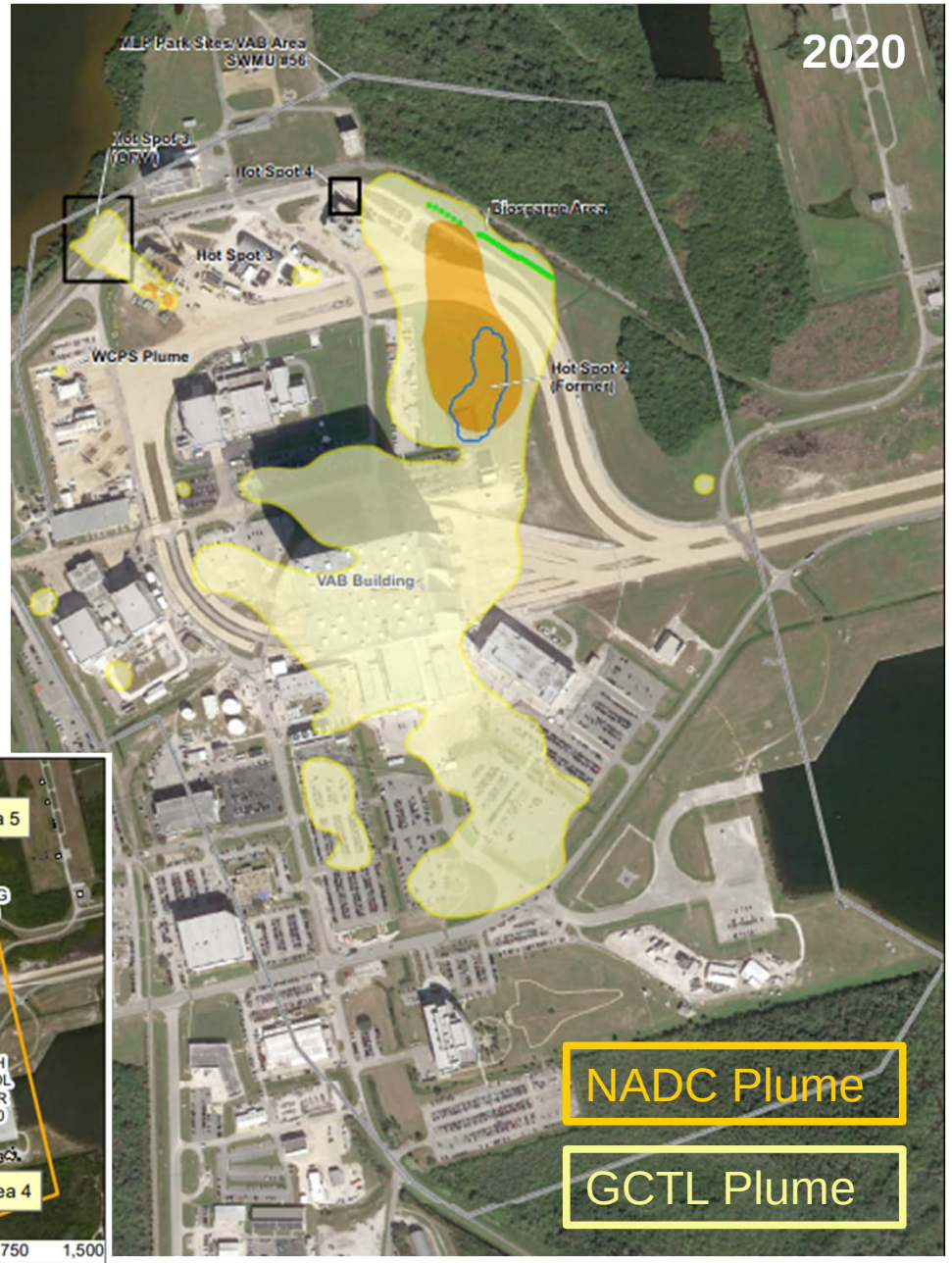
- **2005:** Long-term groundwater monitoring (LTM) of the low concentration dissolved plume was initiated under the VAB LTM Program and data was provided under separate cover than MLP/VAB reports. Sampling and reporting were later combined with MLP/VAB site activities in 2020. The most recent results were submitted in the 2020 CMI and IM Annual Status Report.
- **2006 to 2009:** Implemented enhanced bioremediation of the Hot Spot 1 area
  - Biostimulation using ethyl lactate within the Hot Spot 1 TCE source zone area
  - Corrective action objective was achieved
  - This area is now referred to as former Hot Spot 1 area and continues to be sampled as part of the VAB LTM program
- **2005 – On-going:** Initiated operation of the biosparge barrier system
  - System installed to prevent migration of the NADC vinyl chloride plume
  - Expansion of the biosparge system occurred in February 2016
- **2012 to 2018:** Air sparging implemented within the Hot Spot 2 area
  - Treatment area was the area with TCE greater than 300 µg/L and cDCE greater than 7,000 µg/L
  - Corrective action objectives were achieved
  - This is area now referred to as the former Hot Spot 2 area
  - Semi-annual groundwater sampling is on-going



MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

- **2015 – 2020:** A passive light non-aqueous phase liquid (LNAPL) skimmer installed at Hot Spot 4.
  - LNAPL detected in MW006 during VAB reassessment in 2014
  - Groundwater impacts have remained below GCTLs since 2015
  - Groundwater monitoring has been discontinued
  - MW0010 to be resampled prior to requesting site closure without controls
- **2017**: Bioremediation implemented in Hot Spot 3.
  - Treatment area was the area where concentrations of CVOCs were greater than their respective FDEP 10XNADC
  - Performance monitoring suspended in 2019 in support of mission operations
  - DPT performance monitoring was performed in 2021
- **2017 - 2018:** Excavated soils from six areas identified during reassessment of the VAB area.





MLP/VAB, SWMU 056 Overview

Current Site Conditions

- **Surface Water or Sediment:** No impacts
- **Soil Land Use Control:** Polychlorinated biphenyl (PCB) impacted soil beneath concrete pads and in proximity to crawlerway. Soil land use control is in place to prevent residential exposure of surface soil in the area of Transformers SS846, SWS708, and SS848.

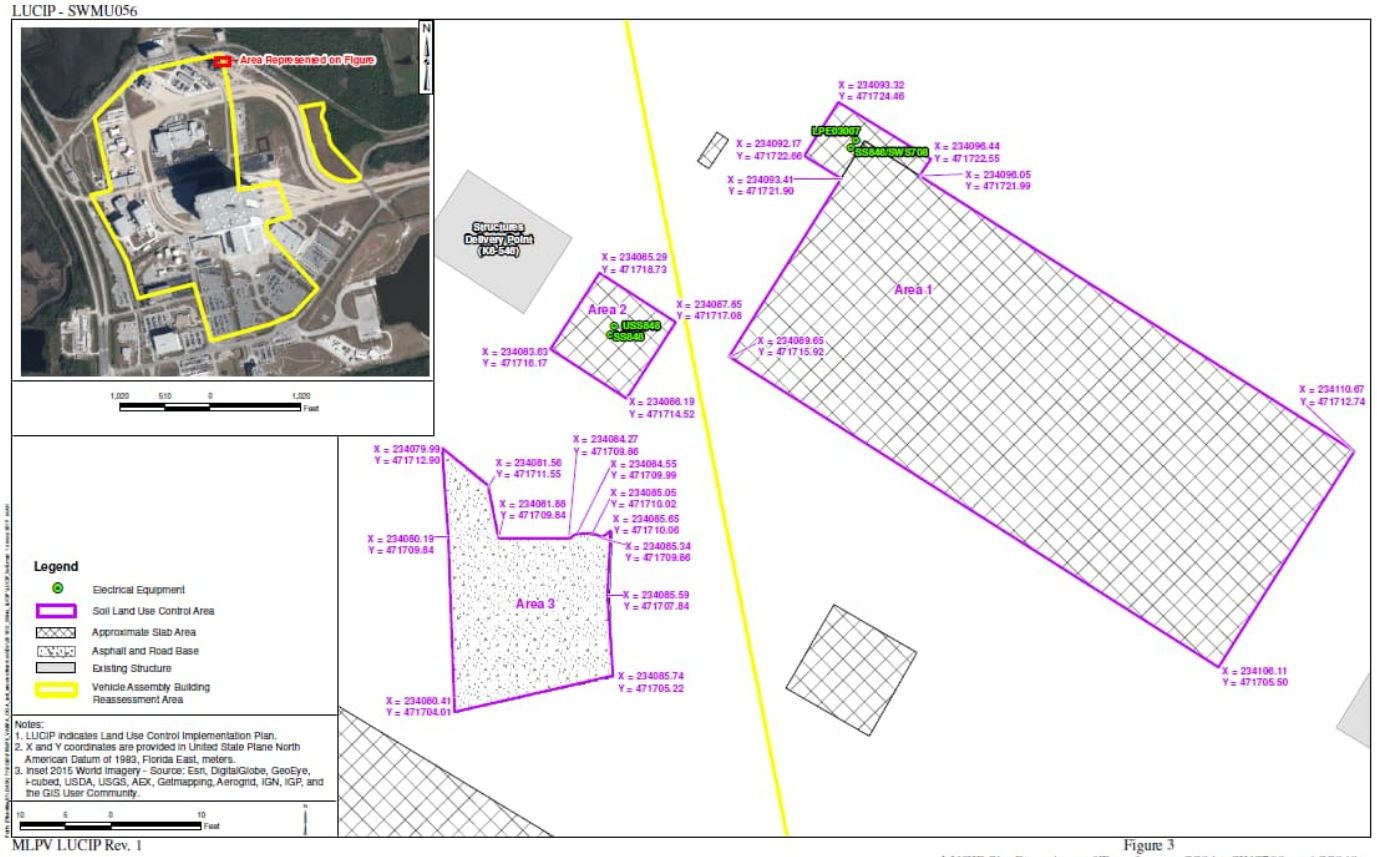


Figure 3
LUCIP Site Plan- Area of Transformers SS846, SWS708, and SS848

Biosparge Barrier for Mitigation of the HCP

Biosparge Barrier for Mitigating the HCP

Current Biosparge Area System Layout

- System Objectives
  - System installed in 2005 and expanded in 2016 to address areas of VC HCP (concentrations greater than 100 µg/L)
  - Create zone of elevated dissolved oxygen (DO) to promote aerobic biooxidation of VC
  - Operate until plume collapse is observed



Legend

- Air Sparge Monitoring Well Location (screen interval [ft BLS])
- Biosparge Monitoring Well Location (screen interval [ft BLS])
- Long Term Monitoring Program Monitoring Well Location (screen interval [ft BLS])
- Abandoned Monitoring Well Location (screen interval [ft BLS])
- Other Monitoring Well Location (screen interval [ft BLS])
- Piezometer Location (screen interval [ft BLS])
- Biosparge Well Location
- Biosparge Expansion Well Location
- Air Sparge Well Location, Leg 3
- Air Sparge Well Location, Leg 4
- Junction Box
- Sparge Manifold Location (not to scale)
- Equipment Building
- Biosparge Header Pipe - Leg 1
- Biosparge Header Pipe - Leg 2
- Biosparge Expansion Piping - 2" Sch. 80 PVC
- Biosparge Expansion Piping - 1" Sch. 80 PVC
- Air Sparge Piping - 2, 4" SCH 80 PVC pipes
- Air Sparge Piping - 2, 4" High-Density Polyethylene (HDPE) pipes under Crawler Track
- Air Sparge Piping - 1" Flexhose
- Air Sparge Piping - 1" SCH 80 PVC from Manifold to Well
- Temporary Construction Fencing

Notes:
1. ft BLS indicates feet below land surface.
2. PVC indicates polyvinyl chloride.
3. Biosparge header piping placement is approximate.
4. Source of 2015 aerial: Florida Department of Transportation Aerial Photo Lookup System website.

Biosparge Barrier for Mitigating the HCP

Biosparge Area System Timeline

- (Recap) December 2020 – System off following fire damage
- (Recap) November 2021 - New equipment trailer on site
- April 2022 - Electrical connections completed
- June 2 and 3, 2022 - Pre-startup activities and developed sparge wells.
- June 20, 2022 - System started



Target Operation for Compressor

- Legs 1, Leg 2, and Leg 5 alternate 8 hrs. per day, for a total of 24 hours/day (Leg 3 and Leg 4 are connected to the air sparge system in former Hot Spot 2 area and has been inactive since April 25, 2018)

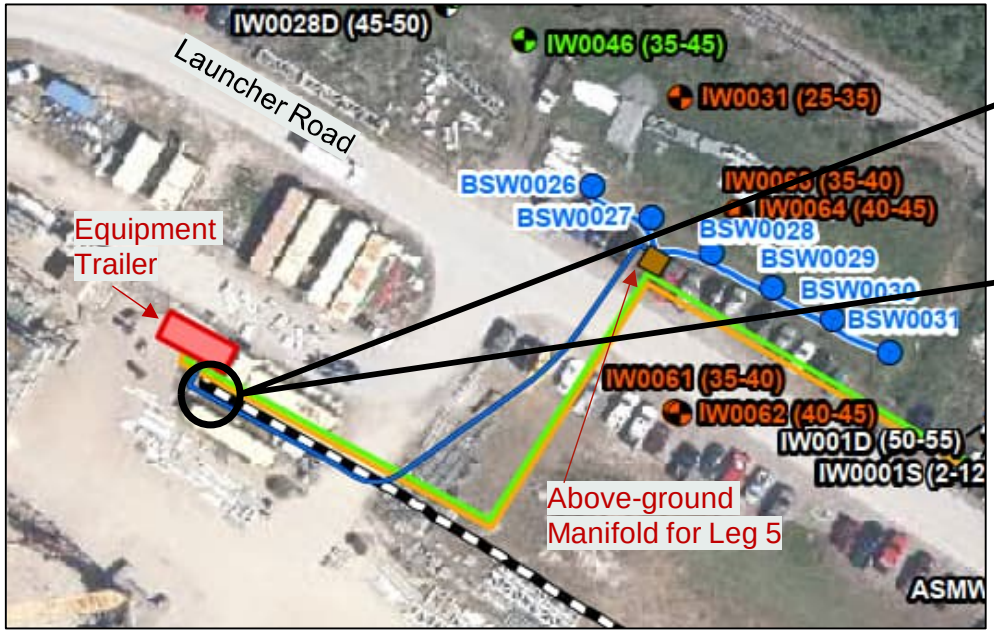
- Maintain operation air flow rate of 3 to 5 standard cubic feet per minute (SCFM) per well

Biosparge Barrier for Mitigating the HCP

Biosparge System Transfer Pipe Investigation

- July 2022: Low flow observed to Leg 5 of biosparge system, between trailer and the above ground manifold. Leg 5 turned off and Legs 1 and 2 programmed to alternate 12 hours/day.
  - September 2022, First investigation: hand dug to transfer line from east side of Launcher Road to above-ground manifold. No damage was observed.
  - December 2022, Second investigation: hand dug to transfer line directly adjacent to west side of Launcher road and to the base of stub-ups at the trailer. No damage was observed.
  - February 2023, Third investigation: Scoped remaining length of the transfer line with a camera. Pipe break approximately 11 feet south of trailer. Piping was replaced and Zone 5 flow rates were balanced.





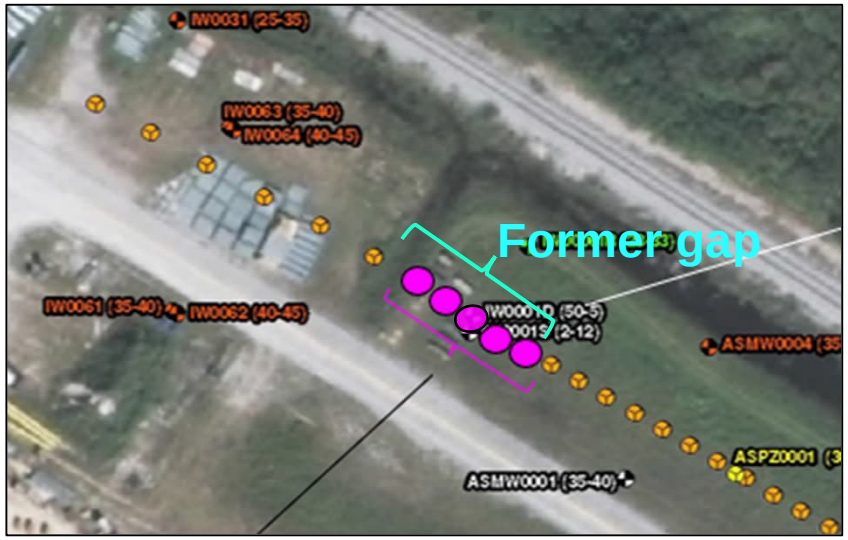


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Biosparge Barrier for Mitigating the HCP

2023 Biosparge System Expansion

- 2023 System Expansion: Five BSWs installed in February 2023
  - Installed to bridge gap between existing sparge walls and aid in mitigating plume behavior downgradient of Former Hot Spot 2
  - Between BSW31 and ASW01
  - Zone/Leg 1: BSW35 and BSW36 (Screened 48-50 ft bls)
  - Zone/Leg 2: BSW32 through BSW34 (Screened 48-50 ft bls)





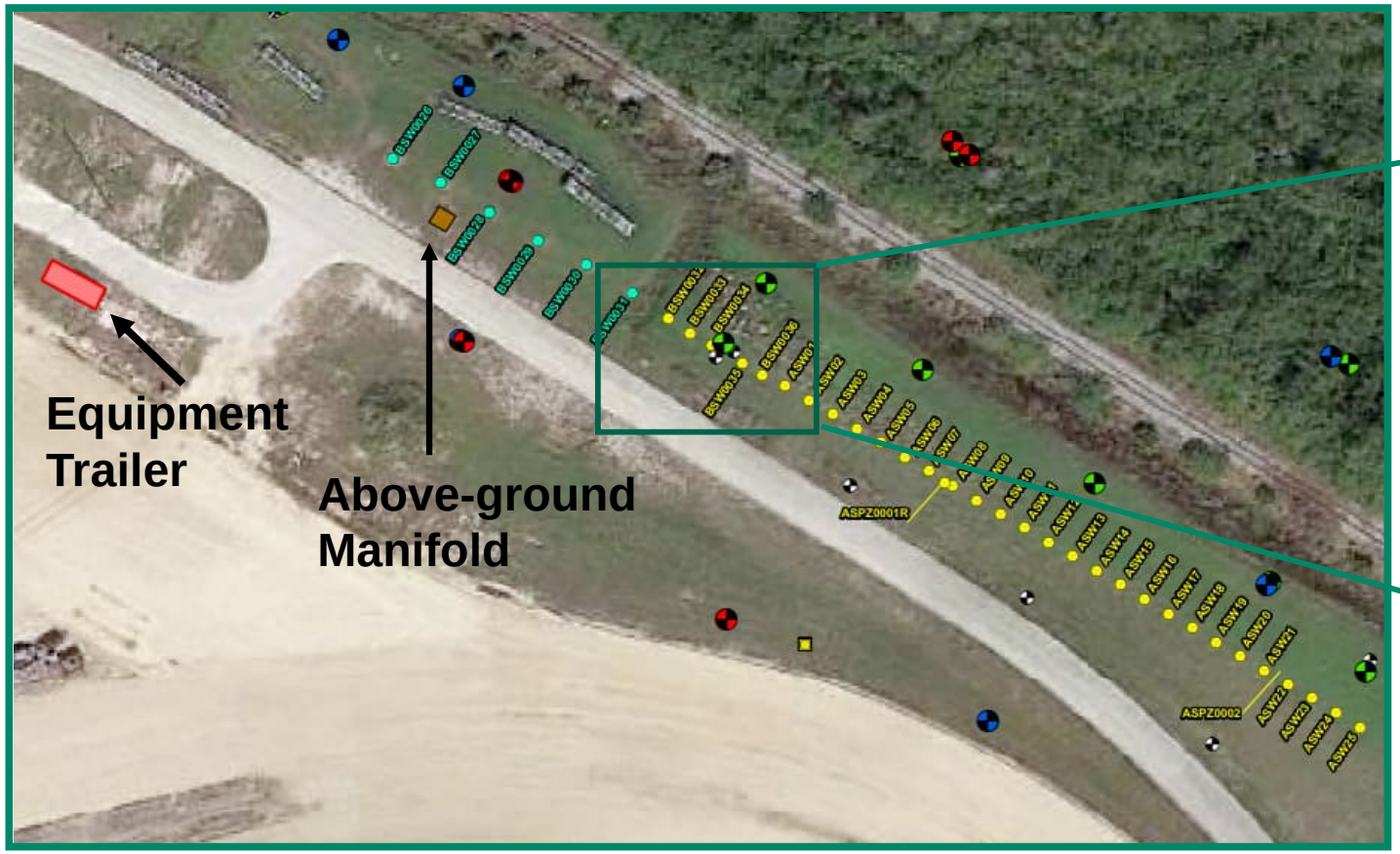


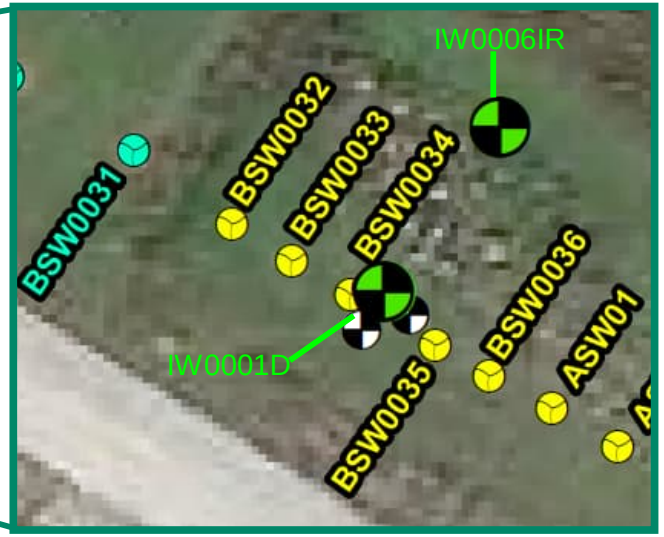


Biosparge Barrier for Mitigating the HCP

Biosparge System Overview – OM&M

- New System Layout: 36 biosparge wells (BSW)/air sparge wells (ASW) over 510 linear feet
  - Zone/Leg 1: ASW01 through ASW13, and new wells BSW35 and BSW36 (Screened 48-50 ft bls)
  - Zone/Leg 2: ASW14 through ASW25 and new wells BSW32 through BSW34 (Screened 48-50 ft bls)
  - Zone/Leg 5: BSW26 through BSW31 (Screened 46-48 ft bls)





2023 Biosparge Expansion Wells
(BSW0032 through BSW0036)

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Biosparge Barrier for Mitigating the HCP

Biosparge System Overview – OM&M

- Monthly Operation, Maintenance, and Monitoring (OM&M) Activities: Performed June 21, 2022 through April 18, 2023
  - Equipment maintenance per manufacturer's specifications or as needed
  - Daily system telemetry monitoring
  - Collect equipment shed readings operational data
  - Biosparge field readings
  - Pressure, temperature, and flow to air sparge well/biosparge well treatment wells
  - DO, temperature, and oxidation-reduction potential (ORP) measurements from selected piezometers and monitoring wells
- Non-routine Maintenance and Repairs Performed:
  - Modem and Programmable Logic Controller (PLC) troubleshooting for remote access/readings
  - Leg 5 investigation to determine cause of pressure loss (discussed earlier)
  - Flow meter and pressure gauge repair/replacement
  - Performed 4,000 hour service on air compressor April 18, 2023: changed oil, oil filter, air filter, and air-oil separator

Biosparge Barrier for Mitigating the HCP

Biosparge System Performance Summary 2022 through April 2023

- Biosparge Well Parameters
  - Baseline DO at treatment wall: 0.09 mg/L (Based on static March 2022 performance monitoring average data from downgradient ASMW0004 through ASMW0006)
  - Average DO in upgradient performance wells ASMW0001 through ASMW0003: 5.79 mg/L
  - Downgradient wells ASMW0004 through ASMW0006 could not be accessed in the area from June 2022 through February 2023.
    - Average DO from March and April 2023: 4.76 mg/L
- System Manifold Readings
  - System Design Air Flowrate: 3 to 5 SCFM range
  - Flow range for June 2022 (Legs 1 & 2): Up to 5.30 standard cubic feet per meter (SCFM)
    - Subsequent readings were not taken from July 2022 through February 2023 due to restricted access
  - Total flow range for February through April 2023 (Legs 1 & 2): 1.20 to 7.40 SCFM. Wells balanced to within design flows after initial readings.
  - Total flow range for March through April 2023 (Leg 5): 2.00 to 4.20 SCFM
- System Pressure Readings:
  - System Design Pressure rate: 18 to 23 pressure per square inch (psi)
  - Pressure range for June 2022 (Legs 1 & 2): 18.80 to 23.10 psi
    - Subsequent readings were not taken from July 2022 through February 2023 due to restricted access
  - Pressure range for February through April 2023 (Legs 1 & 2): 18.90 to 23.60 psi
  - Pressure range for March through April 2023 (Leg 5): 19.00 to 23.50 psi

Biosparge Barrier for Mitigating the HCP

Biosparge System Performance Summary 2022 through April 2023

- System Operational Time
  - Intentional Operational Time this Reporting Period: 301 days(Excludes Intentional Shutoffs)
  - Total actual run time: 265 days / 88% run time
  - Downtime: BS well installation, Groundwater Sampling event, general maintenance, and troubleshooting

- O&M visits performed this Reporting Period:
  - 2022: June 21, July 12, August 16, September 13, October 11, November 15, and December 12
  - 2023: January 16, February 14, March 14, and April 18

- Unplanned site visits performed this Reporting Period:
  - July 5, 2022: Investigation of pressure loss to Leg 5 following telemetry warning
  - August 2, 2022: Flow meter repair, compressor maintenance and PLC troubleshooting
  - September 22-23, 2022: Phase I of Leg 5 low flow investigation
  - December 9, 2022: Phase II of Leg 5 low flow investigation
  - February 16, 2023: Phase III of Leg 5 low flow investigation and pipe repair. Leg 5 adjusted to run 2 hours/day for 2 weeks
  - March 2, 2023: Check system after startup, balance flow to Leg 5, and adjust zone operating time back to alternating 8 hours/day

Biosparge Barrier for Mitigating the HCP

Performance Monitoring 2022 and Spring 2023

Semi-annual sampling performed March 14 and 15, 2022

- The September 2022 semi-annual sampling was canceled due to delayed monitoring well installation which took place throughout the fall and winter of 2022, and early 2023.
- 15 wells sampled in March 2022
- Select CVOC analysis: TCE, cDCE, tDCE, and VC
- Data from monitoring wells located in this area that are sampled under a separate sampling plan (LCP LTM) were included in data evaluations to provide additional insight to plume conditions
  - Includes 11 newly installed monitoring wells, and 1 replacement monitoring well, and 3 existing monitoring wells (See tables below)

New Well Location	Screen interval (ft bls)	New Well Location	Screen interval (ft bls)
MW0094	35 to 45	MW0104	47 to 57
MW0095	25 to 35	MW0105	47 to 57
MW0096	35 to 45	MW0106	25 to 35
MW0097	35 to 45	MW0107	35 to 45
MW0102	25 to 35	MW0108	35 to 45
MW0103	35 to 45	IW0002IR	28 to 33

Existing Well Location	Screen interval (ft bls)
IW0001D	50 to 55
IW0027I	28 to 33
IW0047	35 to 45

LCP LTM wells analyzed for Select CVOCs: cDCE, tDCE, and VC

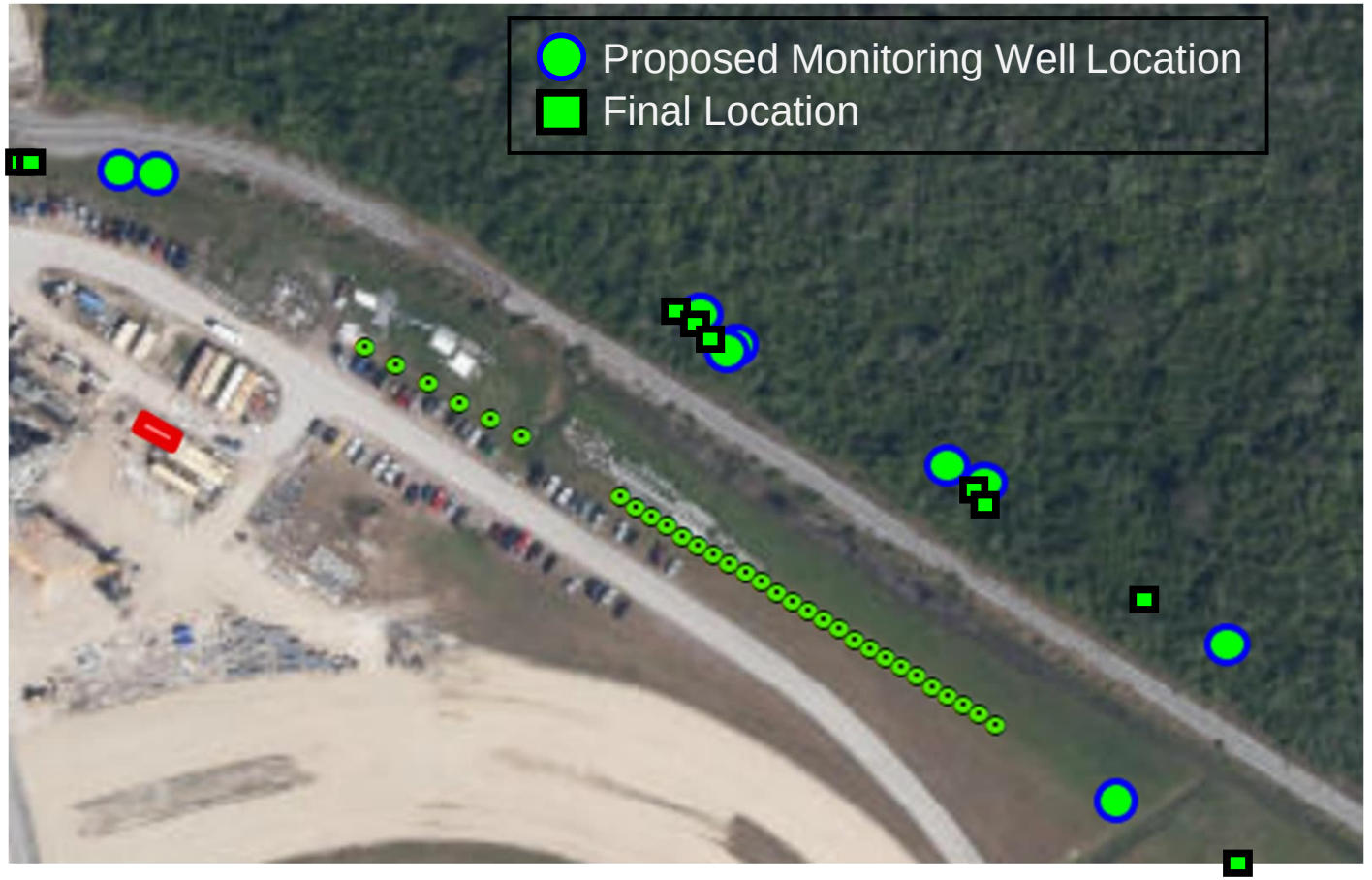
2022 Sampling and Analysis Plan

Area Monitored	Location	Screen interval (ft bls)	Frequency	Analytical Parameters
Biosparge Area	IW0006IR	28 to 33	Semi-Annual March 2022 and September 2022	TCE cDCE tDCE VC
	IW0028I	28 to 33		
	IW0046	35 to 45		
	IW0057	40 to 50		
	IW0058	45 to 50		
	IW0059	45 to 50		
	IW0060	40 to 50		
	ASMW0004	35 to 40		
	ASMW0005	35 to 40		
	ASMW0006	35 to 40		
	IW0031	25 to 35		
	IW0061	35 to 40		
	IW0062	40 to 45		
	IW0063	35 to 40		
	IW0064	40 to 45		

Biosparge Barrier for Mitigating the HCP

Monitoring well Installation

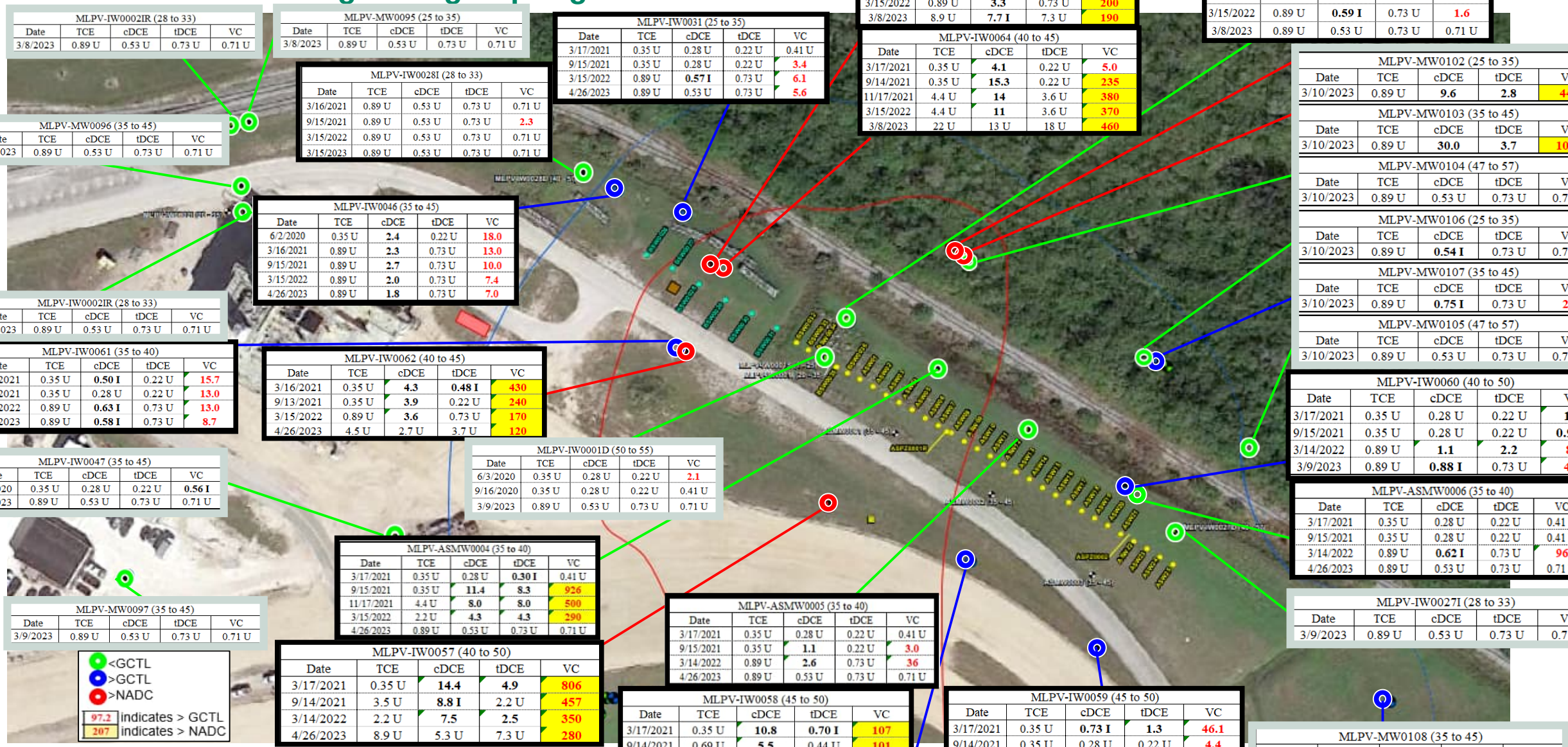
- Nine additional monitoring wells installed downgradient and at each end of the biosparge barrier as part of the LCP LTM network that is sampled biennially.
- Objectives:
  - Wells will serve to monitor performance and plume behavior.
  - Evaluate remedial alternatives for upgradient portion of the HCP



Monitoring well locations shifted based on wetland conditions or drill rig access.

Biosparge Barrier for Mitigating the HCP

Performance Monitoring through Spring 2023



MLPV-IW0002IR (28 to 33)

Date	TCE	cDCE	tDCE	VC
3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-MW0095 (25 to 35)

Date	TCE	cDCE	tDCE	VC
3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0028I (28 to 33)

Date	TCE	cDCE	tDCE	VC
3/16/2021	0.89 U	0.53 U	0.73 U	2.3
9/15/2021	0.89 U	0.53 U	0.73 U	0.71 U
3/15/2022	0.89 U	0.53 U	0.73 U	0.71 U
3/15/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0031 (25 to 35)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
9/15/2021	0.35 U	0.28 U	0.22 U	3.4
3/15/2022	0.89 U	**0.57 I**	0.73 U	6.1
4/26/2023	0.89 U	0.53 U	0.73 U	5.6

MLPV-IW0063 (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	**1.3**	0.22 U	**1.0**
9/14/2021	0.35 U	**4.4**	022 U	185
11/17/2021	2.2 U	**3.0**	1.8 U	190
3/15/2022	0.89 U	**3.3**	0.73 U	200
3/8/2023	8.9 U	**7.7 I**	7.3 U	190

MLPV-IW0064 (40 to 45)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	**4.1**	0.22 U	5.0
9/14/2021	0.35 U	**15.3**	0.22 U	235
11/17/2021	4.4 U	**14**	3.6 U	380
3/15/2022	4.4 U	**11**	3.6 U	370
3/8/2023	22 U	13 U	18 U	460

MLPV-IW0006IR (28 to 33)

Date	TCE	cDCE	tDCE	VC
3/16/2021	0.89 U	**0.77 I**	0.73 U	3.7
9/15/2021	0.89 U	0.53 U	0.73 U	1.8
3/15/2022	0.89 U	**0.59 I**	0.73 U	1.6
3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-MW0102 (25 to 35)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	**9.6**	**2.8**	440

MLPV-MW0103 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	**30.0**	**3.7**	1000

MLPV-MW0104 (47 to 57)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-MW0106 (25 to 35)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	**0.54 I**	0.73 U	0.71 U

MLPV-MW0107 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	**0.75 I**	0.73 U	21

MLPV-MW0105 (47 to 57)

Date	TCE	cDCE	tDCE	VC
3/10/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-MW0096 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0046 (35 to 45)

Date	TCE	cDCE	tDCE	VC
6/2/2020	0.35 U	**2.4**	0.22 U	18.0
3/16/2021	0.89 U	**2.3**	0.73 U	13.0
9/15/2021	0.89 U	**2.7**	0.73 U	10.0
3/15/2022	0.89 U	**2.0**	0.73 U	7.4
4/26/2023	0.89 U	**1.8**	0.73 U	7.0

MLPV-IW0002IR (28 to 33)

Date	TCE	cDCE	tDCE	VC
3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0061 (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/16/2021	0.35 U	**0.50 I**	0.22 U	15.7
9/13/2021	0.35 U	0.28 U	0.22 U	13.0
3/15/2022	0.89 U	**0.63 I**	0.73 U	13.0
4/26/2023	0.89 U	**0.58 I**	0.73 U	8.7

MLPV-IW0062 (40 to 45)

Date	TCE	cDCE	tDCE	VC
3/16/2021	0.35 U	**4.3**	**0.48 I**	430
9/13/2021	0.35 U	**3.9**	0.22 U	240
3/15/2022	0.89 U	**3.6**	0.73 U	170
4/26/2023	4.5 U	2.7 U	3.7 U	120

MLPV-IW0001D (50 to 55)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	0.28 U	0.22 U	2.1
9/16/2020	0.35 U	0.28 U	0.22 U	0.41 U
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0060 (40 to 50)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	0.28 U	0.22 U	**1.3**
9/15/2021	0.35 U	0.28 U	0.22 U	**0.90 I**
3/14/2022	0.89 U	**1.1**	**2.2**	88
3/9/2023	0.89 U	**0.88 I**	0.73 U	4.6

MLPV-IW0047 (35 to 45)

Date	TCE	cDCE	tDCE	VC
6/2/2020	0.35 U	0.28 U	0.22 U	**0.56 I**
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-ASMW0004 (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	0.28 U	**0.30 I**	0.41 U
9/15/2021	0.35 U	**11.4**	**8.3**	926
11/17/2021	4.4 U	**8.0**	**8.0**	500
3/15/2022	2.2 U	**4.3**	**4.3**	290
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-ASMW0006 (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
3/14/2022	0.89 U	**0.62 I**	0.73 U	96
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-ASMW0005 (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
9/15/2021	0.35 U	**1.1**	0.22 U	3.0
3/14/2022	0.89 U	**2.6**	0.73 U	36
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0027I (28 to 33)

Date	TCE	cDCE	tDCE	VC
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-MW0097 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0057 (40 to 50)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	**14.4**	**4.9**	806
9/14/2021	3.5 U	**8.8 I**	2.2 U	457
3/14/2022	2.2 U	**7.5**	**2.5**	350
4/26/2023	8.9 U	5.3 U	7.3 U	280

MLPV-IW0058 (45 to 50)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	**10.8**	**0.70 I**	107
9/14/2021	0.69 U	**5.5**	0.44 U	101
3/14/2022	0.89 U	**9.4**	**1.1**	88
3/9/2023	4.5 U	**5.7**	3.7 U	90

MLPV-IW0059 (45 to 50)

Date	TCE	cDCE	tDCE	VC
3/17/2021	0.35 U	**0.73 I**	**1.3**	46.1
9/14/2021	0.35 U	0.28 U	0.22 U	4.4
3/14/2022	0.89 U	**0.73 I**	**1.1**	37
3/9/2023	0.89 U	0.53 U	0.73 U	8.4

MLPV-MW0108 (35 to 45)

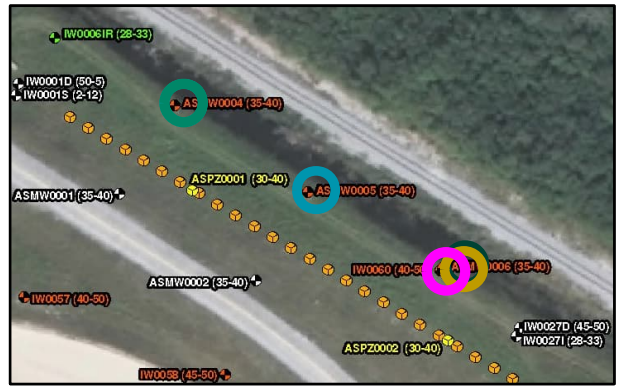
Date	TCE	cDCE	tDCE	VC
3/9/2023	0.89 U	**1.1**	0.73 U	25

<GCTL
>GCTL
>NADC
97.2 indicates > GCTL
207 indicates > NADC

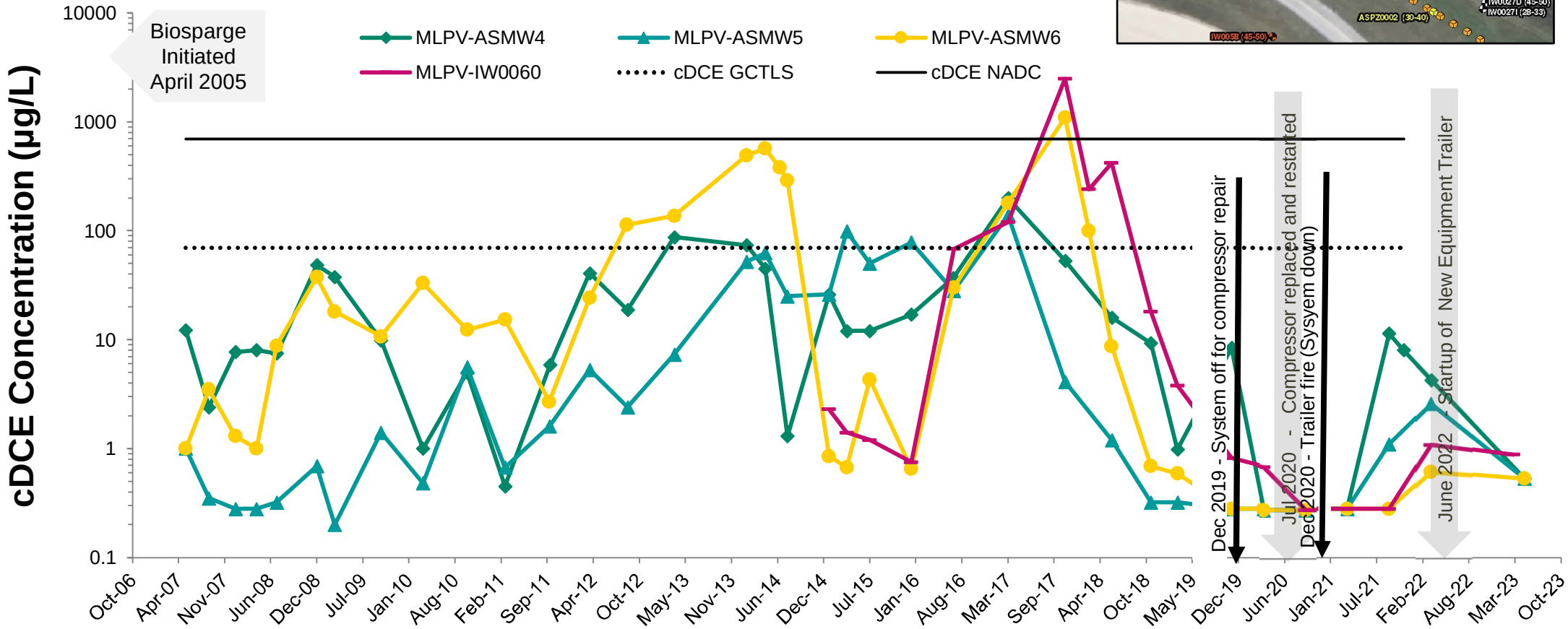
Indicates LCP well

Biosparge Barrier for Mitigating the HCP

Performance Monitoring through Spring 2023



Biosparge Barrier Trend Graph for cDCE

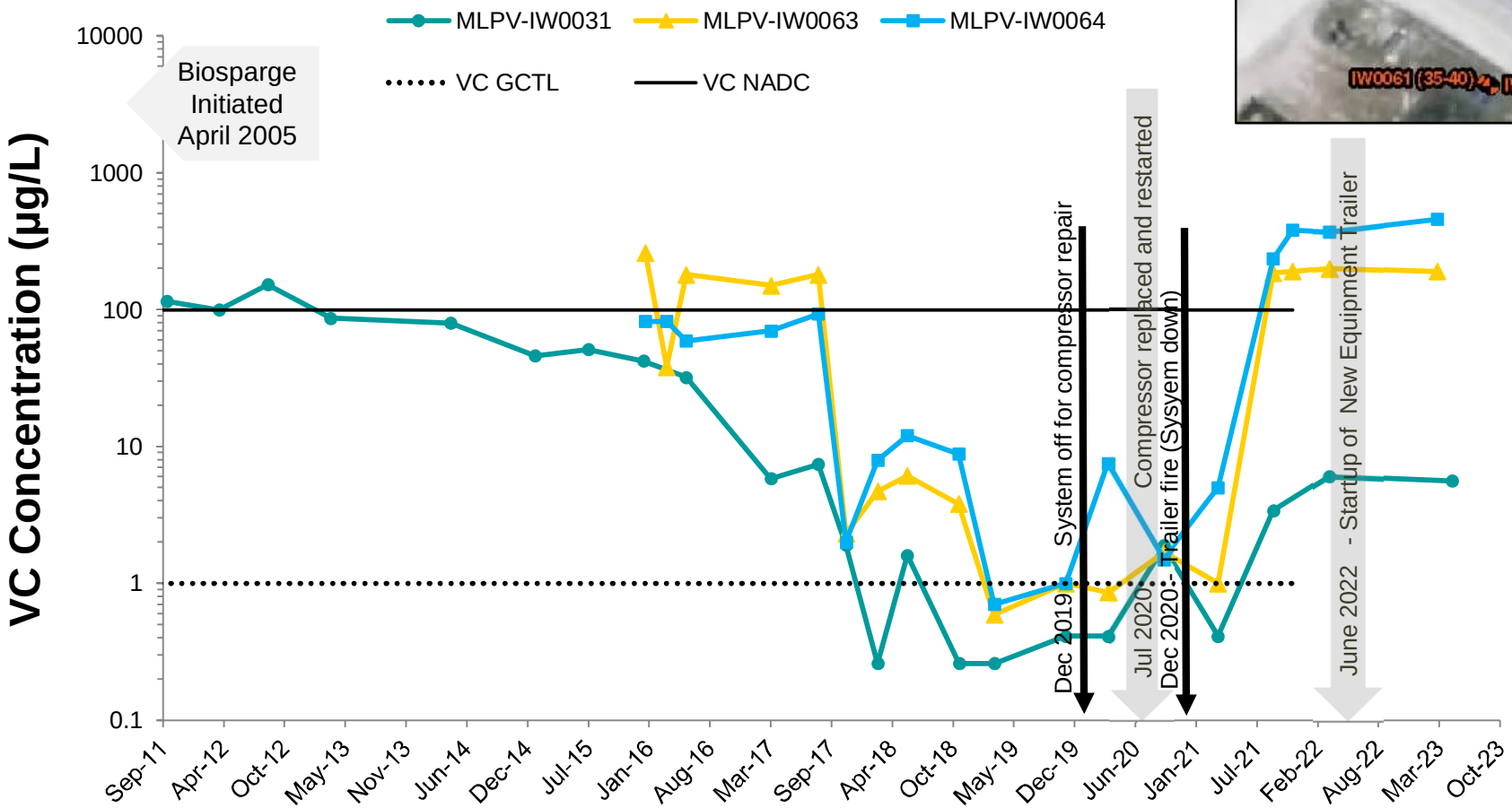


Biosparge Barrier for Mitigating the HCP

Performance Monitoring through Spring 2023



Biosparge Barrier Expansion Trend Graph for VC



Biosparge Barrier for Mitigating the HCP

Performance Monitoring – Summary of Current Semi-annual Analytical Results

Original Biosparge Area (southernmost barrier) - Sampled IW0006IR, ASMW0004, ASMW0005, ASMW0006, IW0057, IW0058, IW0059, IW0060

- **Previously (September 2021)**
  - VC concentrations less than NADC in performance wells, except one well upgradient of barrier: IW0057 (935 µg/L)
  - VC concentrations exceeded GCTL in wells upgradient of barrier: IW0058 (70.0 µg/L) and IW0059 (39.4 µg/L)
  - VC concentrations less than GCTL in performance wells downgradient of barrier, except ASMW0004 (8.7 µg/L) and ASMW0006 (1.7 µg/L)
  - Localized increase follows system being shut down pending compressor installation. System was reinstalled in late July 2020 and operated through mid-December 2020.
  - Remaining contaminant concentrations were less than GCTLs
- **March and April 2023**
  - VC concentrations less than NADC in performance wells, except one well upgradient of barrier: IW0057 (280 µg/L)
  - VC concentrations exceed GCTL in performance wells upgradient of barrier: IW0058 (90 µg/L) and IW0059 (8.4 µg/L)
  - VC concentrations decreased to below GCTL in wells downgradient of barrier, except IW0060 (4.6 µg/L)
  - Additional supporting data: VC concentrations in LCP LTM wells downgradient of the barrier exceed the NADC from 25 to 45 feet bls in MW0102 (440 µg/L) and MW0103 (1000 µg/L) and exceed GCTL at 35 to 45 feet bls in MW0107 (21 µg/L). VC concentrations in MW0108, southeast of the barrier, exceeds GCTLs at 25 µg/L.
  - Remaining contaminant concentrations are less than GCTLs

Biosparge Barrier for Mitigating the HCP

Performance Monitoring – Summary Current Semi-annual Analytical Results

Expansion Biosparge Area (northernmost barrier) – Sampled IW0028I, IW0031, IW0046, IW0061, IW0062, IW0063, and IW0064

- **Previously (September 2021):**
  - VC concentrations exceeded GCTL in one performance well upgradient of barrier: IW0061 (18.4 µg/L)
  - VC concentrations exceeded GCTL in performance wells downgradient of barrier: IW0031 (1.9 µg/L), IW0063 (1.7 µg/L), and IW0064 (1.5 µg/L)
  - Increase follows system being shut down pending compressor installation. System was reinstalled in late July 2020 and operated until mid-December 2020.
  - Remaining contaminant concentrations were less than GCTLs
- **Current (March and April 2023)**
  - VC concentrations exceeded GCTL at a reduced concentration in one well upgradient of barrier: IW0061 (8.4 µg/L)
  - VC concentrations exceeded GCTL in wells downgradient of barrier: IW0031 (5.6 µg/L) and IW0046 (7.0 µg/L)
  - VC concentrations exceeded NADC upgradient in one performance well IW0062 (120 µg/L)
  - VC concentrations exceeded NADC in wells downgradient of barrier: IW0063 (190 µg/L), and IW0064 (460 µg/L)
  - VC concentrations in IW0028I are below GCTLs and confirm plume boundary to the northwest.
  - Additional supporting data: VC concentrations in LCP LTM wells to the west and northwest were below GCTL or below method detection limits and also confirm plume boundaries from 25 to 45 feet bls. (IW002IR, IW0047, MW0094, MW0095, and MW0096).
  - Remaining contaminant concentrations are less than GCTLs

Biosparge Barrier for Mitigating the HCP

Test Consensus

- Continue operation of biosparge system until the HCP in both the former Hot Spot 2 and biosparge areas show signs of full plume collapse
- Continue performance monitoring on a semi-annual basis (as presented) for selected CVOCs: TCE, cDCE, tDCE, and VC
- Transition MW0102, MW0103, and MW0107 from the LCP sampling plan to semi-annual performance monitoring

2023 Sampling and Analysis Plan

Area Monitored	Location	Screen interval (ft bls)	Frequency	Analytical Parameters
Biosparge Area	IW0006IR	28 to 33	Semi-Annual March 2023 and September 2023	TCE cDCE tDCE VC
	IW0028I	28 to 33		
	IW0046	34 to 45		
	IW0057	40 to 50		
	IW0058	45 to 50		
	IW0059	45 to 50		
	IW0060	40 to 50		
	ASMW0004	35 to 40		
	ASMW0005	35 to 40		
	ASMW0006	35 to 40		
	IW0031	25 to 35		
	IW0061	35 to 40		
	IW0062	40 to 45		
	IW0063	35 to 40		
	IW0064	40 to 45		
	*MW0102	25 to 35		
	*MW0103	35 to 45		
	*MW0107	35 to 45		

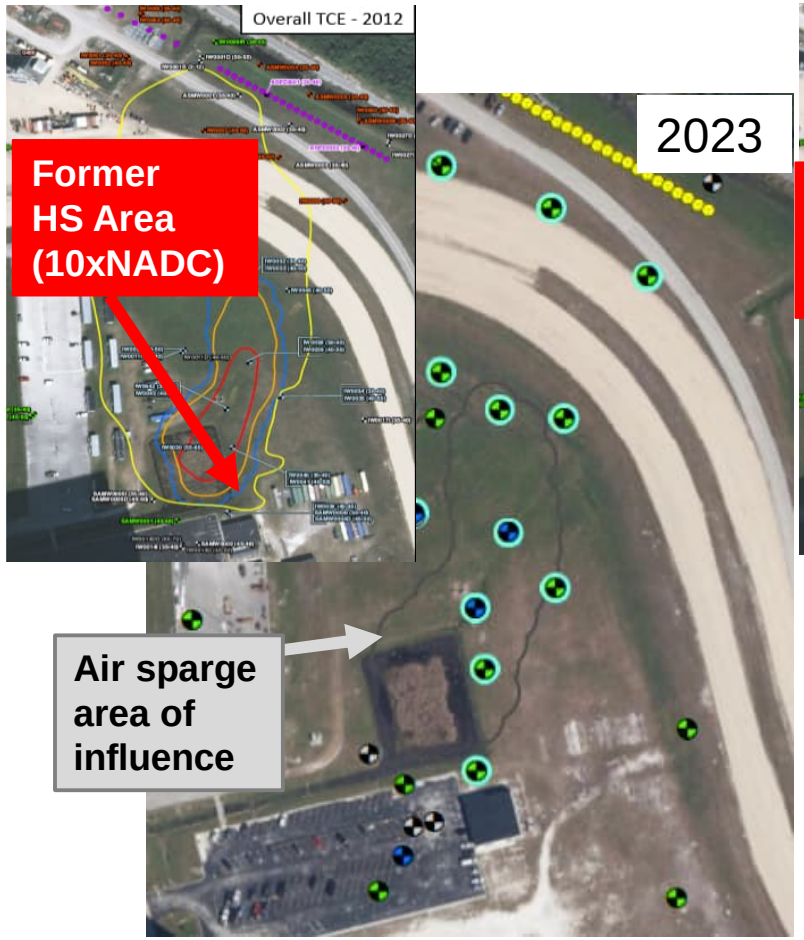
* = Transferred from LCP LTM

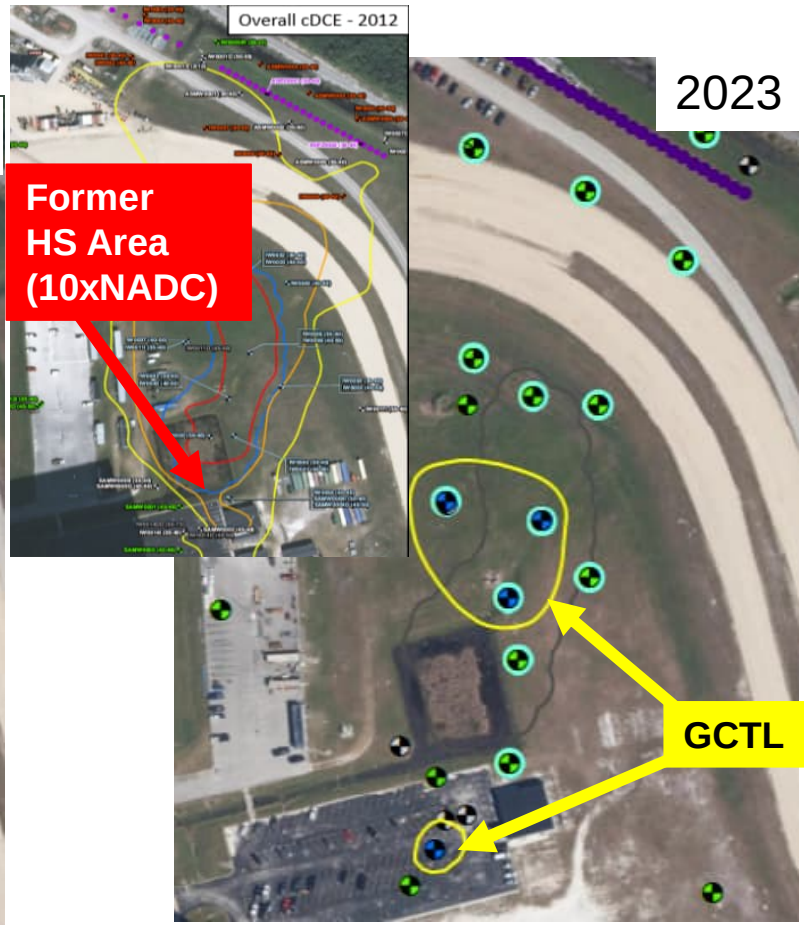
HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

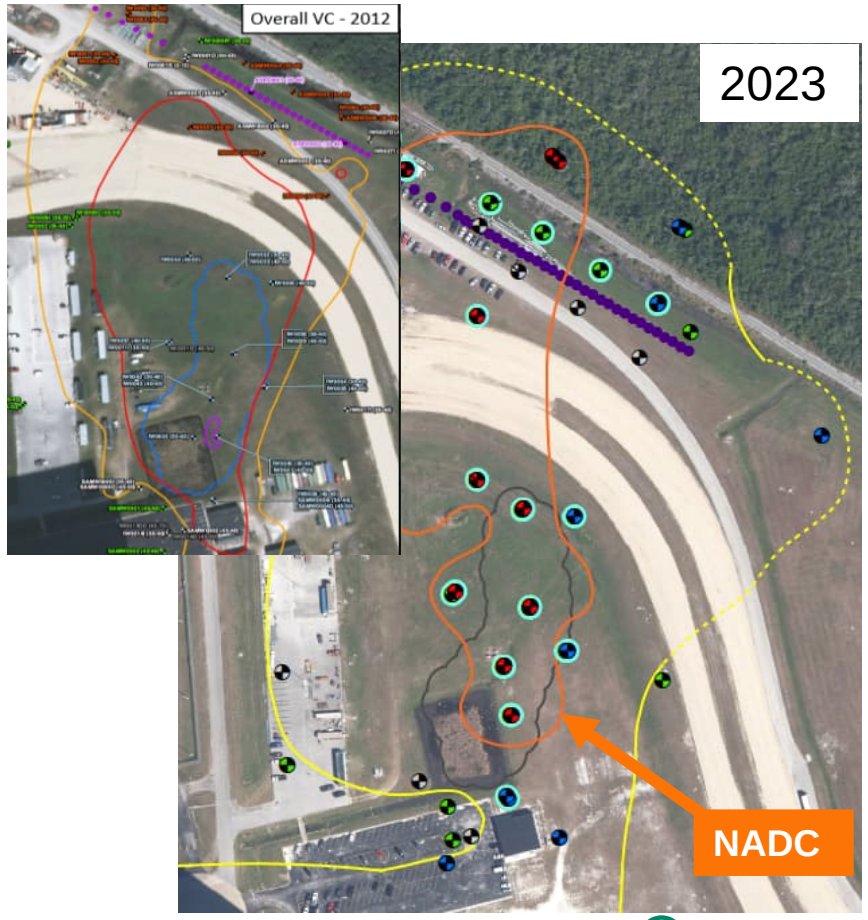
HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Current Site Conditions

- System operated from 2012 to 2018
- Using data from monitoring wells and DPT groundwater samples (2016-2021), a 90% reduction of overall CVOC mass was observed after air sparge treatment. TCE is no longer present.
- IGM conducted since 2018







Historical Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Lithology 2022

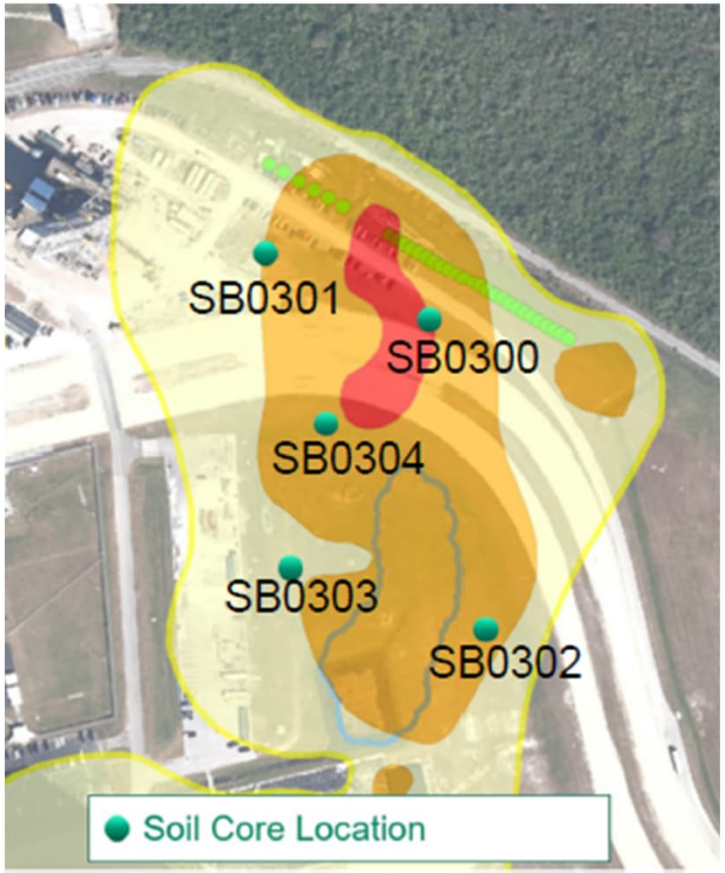
- November 2 through 17, 2022
  - Performed soil cores at five locations to get lithologic descriptions to 60 feet bls for soil permeability analysis to gain an understanding of current soil characteristics in the low permeability soil layer and to aid in the Remediation Alternatives Evaluation (RAE).



SB0304 (15 – 45 feet bls)



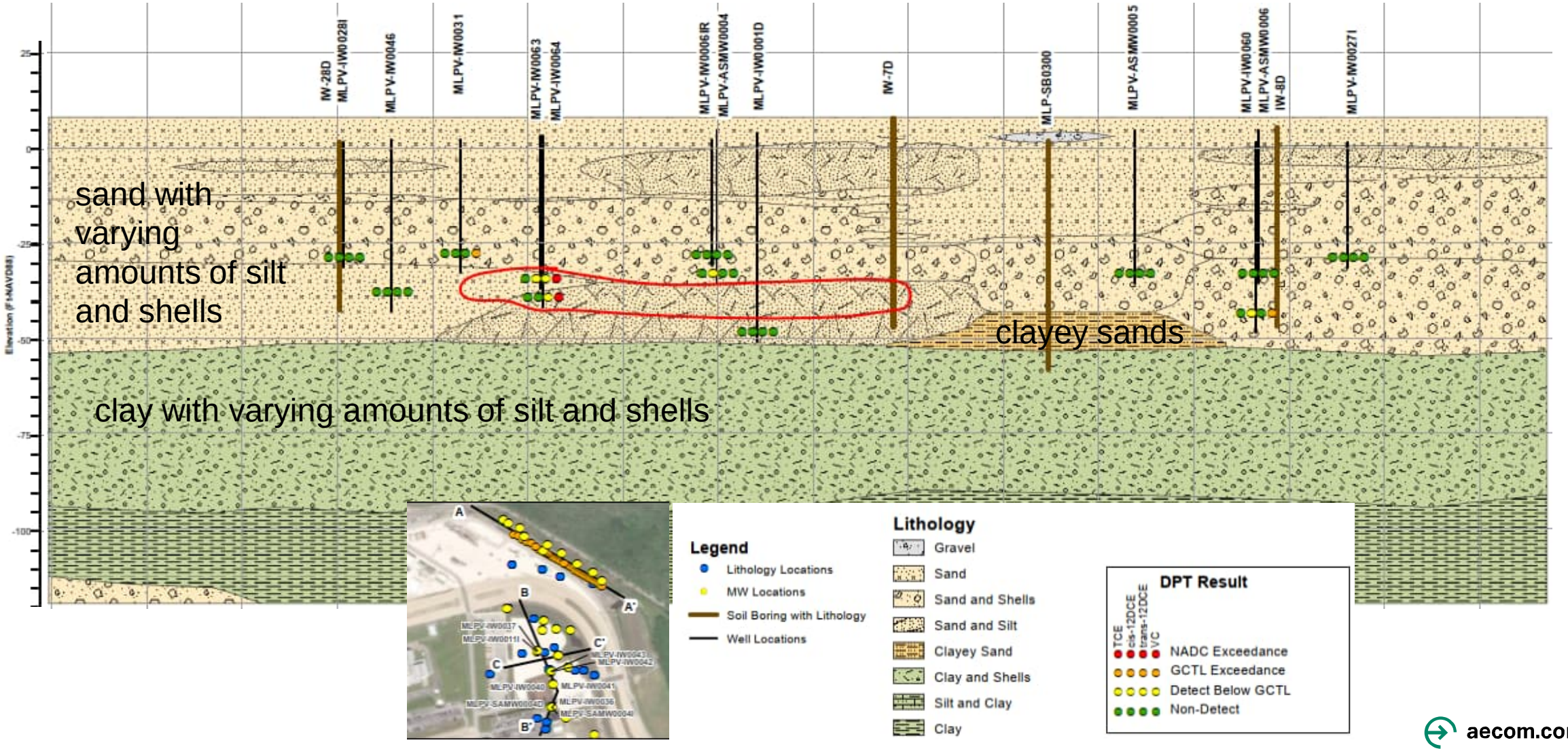
SB0303 (55 – 60 feet bls)



HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Lithology 2022

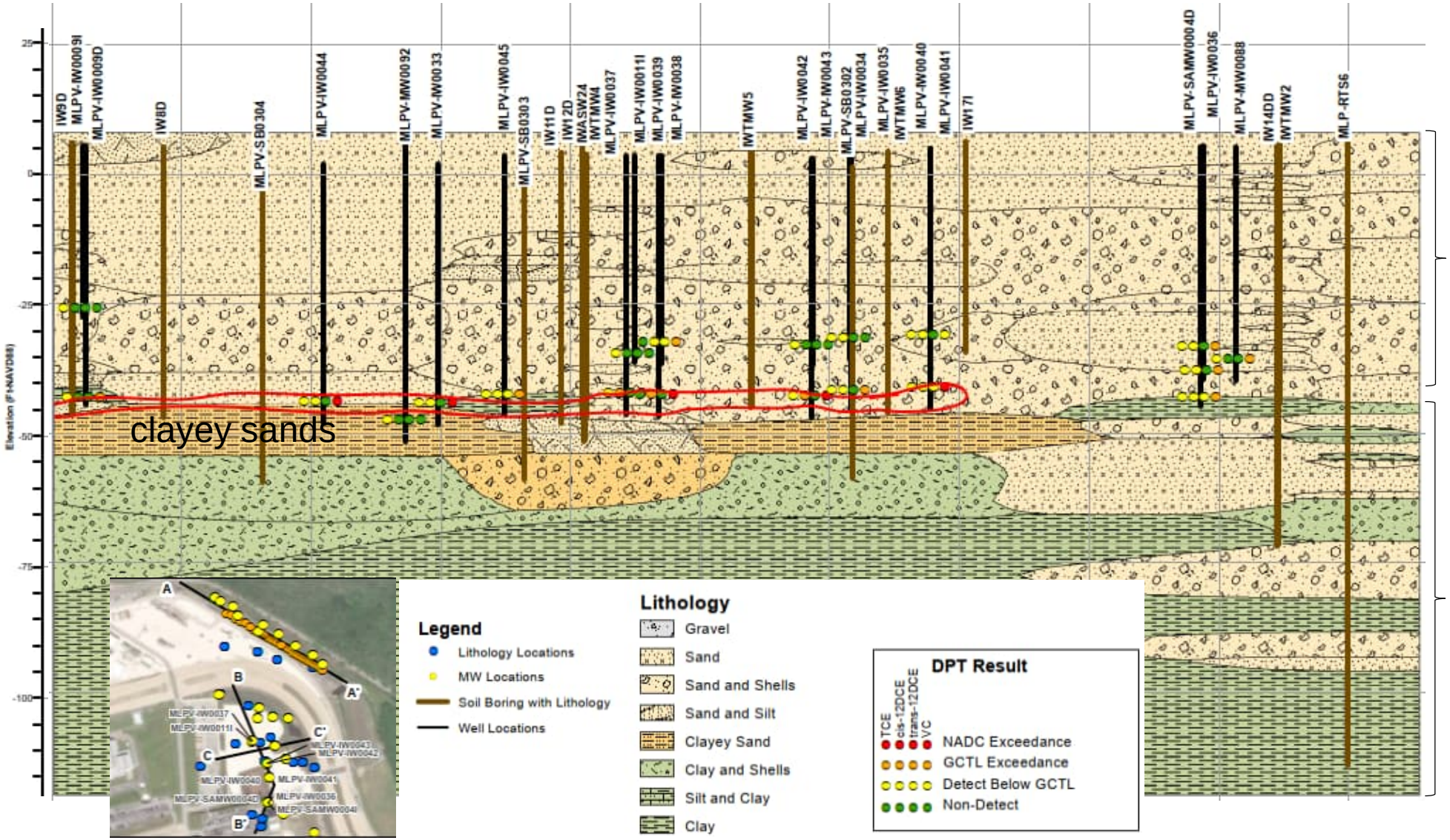
Cross section
A – A’



HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Lithology 2022

Cross section
B – B’



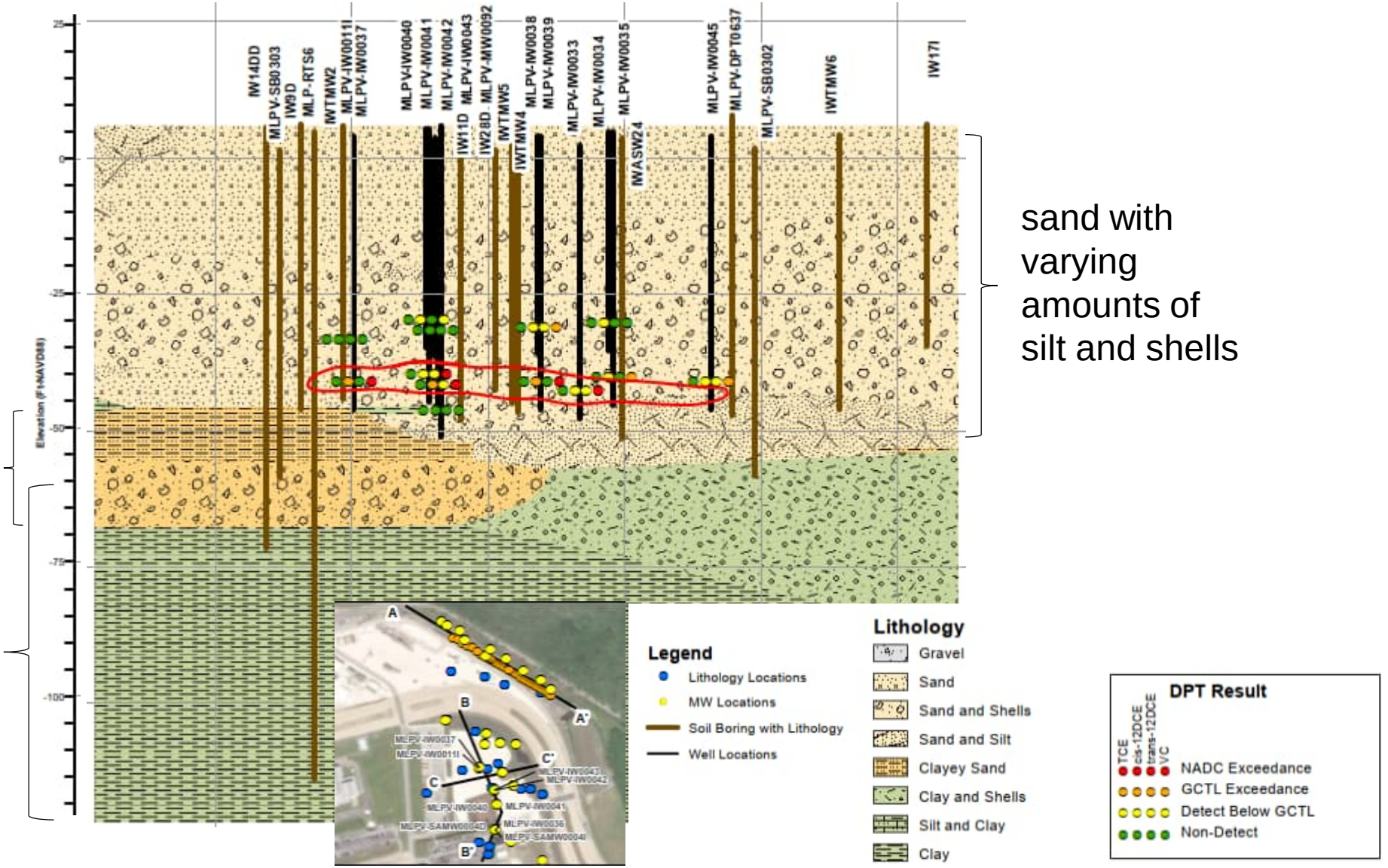
sand with varying amounts of shells

Clay with varying amounts of silt and shells and intermittent lenses of sand and shells

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Lithology 2022

Cross section
C – C’



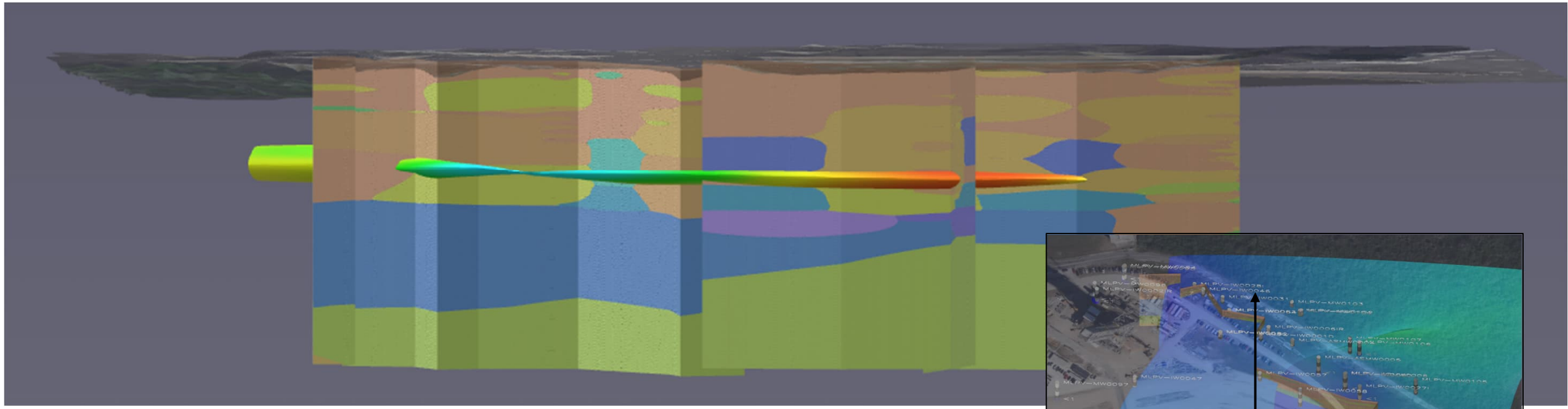
clayey sands

Clay with varying amounts of silt and shells

sand with varying amounts of silt and shells

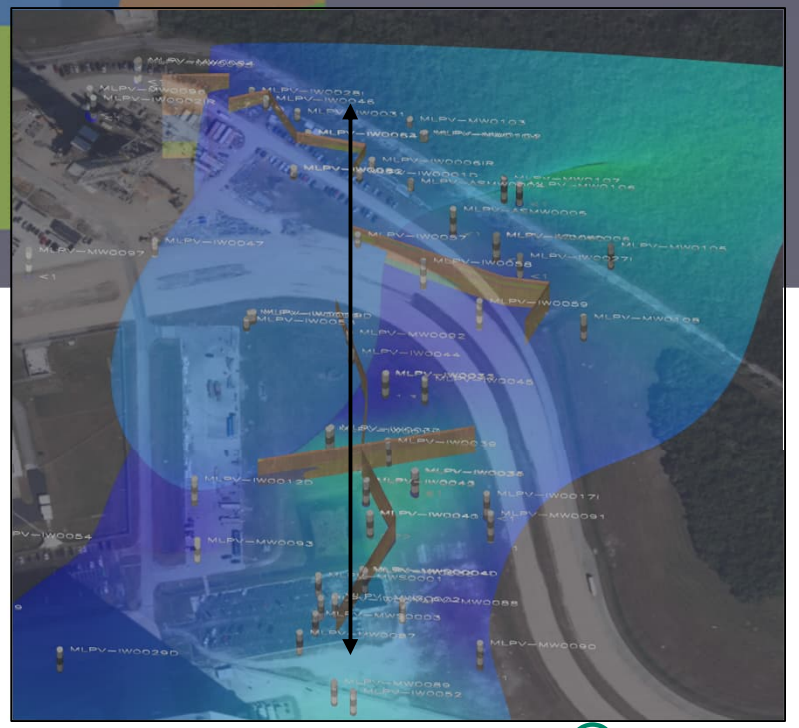
HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Environmental Visualization System (EVS) Modeling



VC above NADC

- EVS confirmed observations by groundwater data and soil samples.
- Wells screened from 40 to 50 feet bls most likely represent groundwater conditions from 40 to 45 feet bls because of lithology changes around 45 feet bls from sand to clayey sand



VC above GCTLs

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM through Spring 2023

- 2022 sampling performed March 15 and 16
  - 9 wells were accessible and sampled on March 2022
  - The remaining 8 wells were sampled on April 21, 2022
- 2023 sampling completed in March and April
- Sampled for select CVOC analysis: cDCE, tDCE, and VC
- Evaluation of the former HS2 area includes data from surrounding monitoring wells sampled under the LCP LTM Plan.
  - Includes an additional 8 existing monitoring wells and 5 newly installed monitoring wells (see table below, sampled for the same CVOCs)

New Well Location	Screen Interval (feet bls)	Existing Well Location	Screen Interval (feet bls)
MLPV-MW0087	47 to 57	MLPV-IW0009I	28 to 33
MLPV-MW0088	35 to 45	MLPV-IW0009D	45 to 50
MLPV-MW0091	47 to 57	MLPV-IW0012D	(45-50)
MLPV-MW0092	47 to 57	MLPV-IW0014I	35 to 40
MLPV-MW0093	35 to 45	MLPV-IW0017I	35 to 40
		MLPV-IW0053	35 to 45
		MLPV-SAMW0001	43 to 48
		MLPV-SAMW0003	43 to 48

2022 Sampling and Analysis Plan

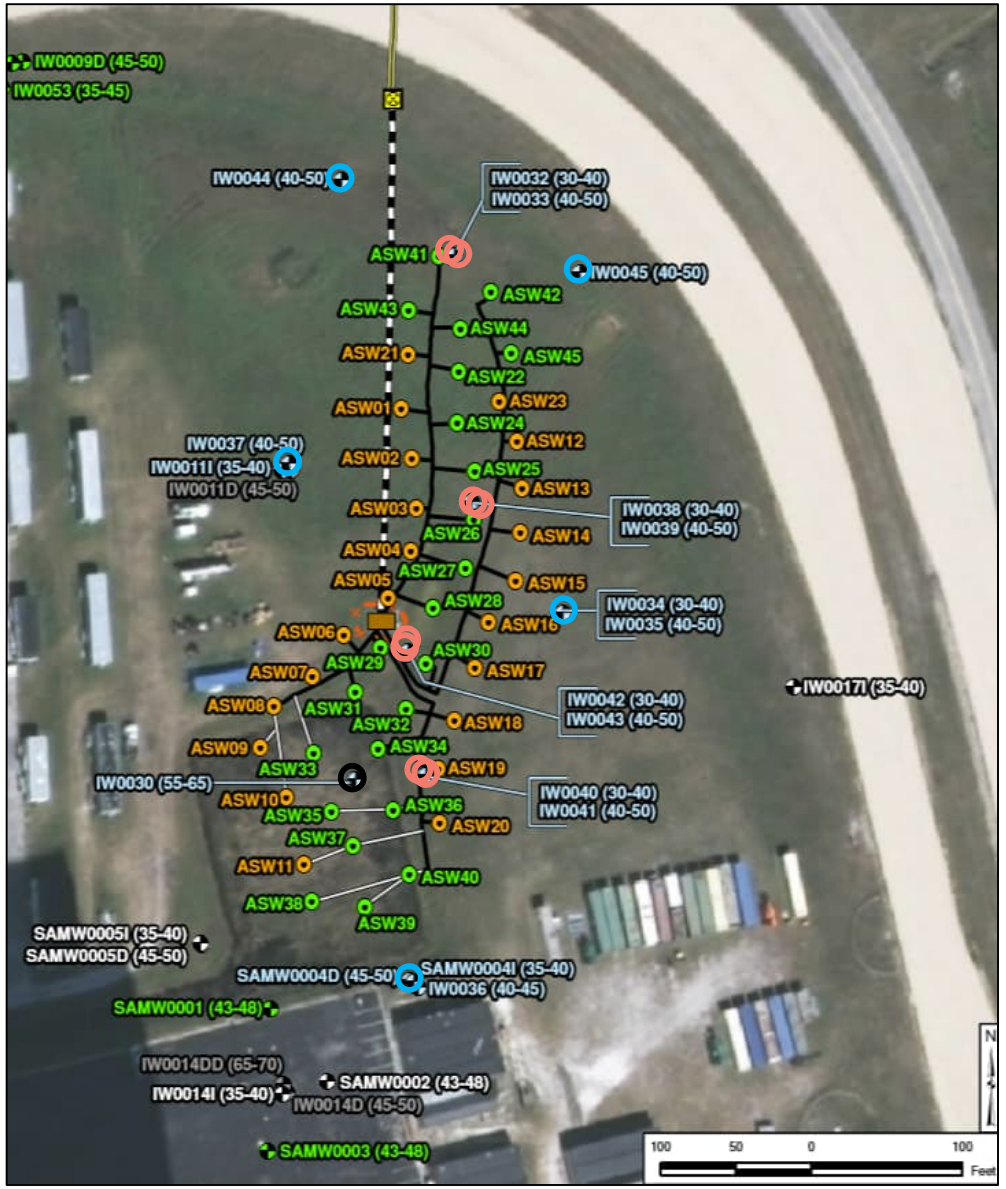
Area Monitored	Location	Screen Interval (feet bls)	Frequency	Analytical Parameters
Air Sparge Area	MLPV-IW0011I	35 – 40	Semi-Annual	cDCE tDCE VC
	MLPV-IW0032	30 – 40	Annual	
	MLPV-IW0033	40 – 50	Semi-Annual	
	MLPV-IW0034	30 – 40	Semi-Annual	
	MLPV-IW0035	40 – 50	Semi-Annual	
	MLPV-IW0036	40 – 45	Semi-Annual	
	MLPV-IW0037	40 – 50	Semi-Annual	
	MLPV-IW0038	30 – 40	Annual	
	MLPV-IW0039	40 – 50	Semi-Annual	
	MLPV-IW0040	30 – 40	Annual	
	MLPV-IW0041	40 – 50	Semi-Annual	
	MLPV-IW0042	30 – 40	Annual	
	MLPV-IW0043	40 – 50	Semi-Annual	
	MLPV-IW0044	40 – 50	Semi-Annual	
	MLPV-IW0045	40 – 50	Semi-Annual	
	MLPV-SAMW0004D	45 – 50	Semi-Annual	
	MLPV-SAMW0004I	35 – 40	Semi-Annual	

Annual: March / Semi-annual: March and September

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Wells

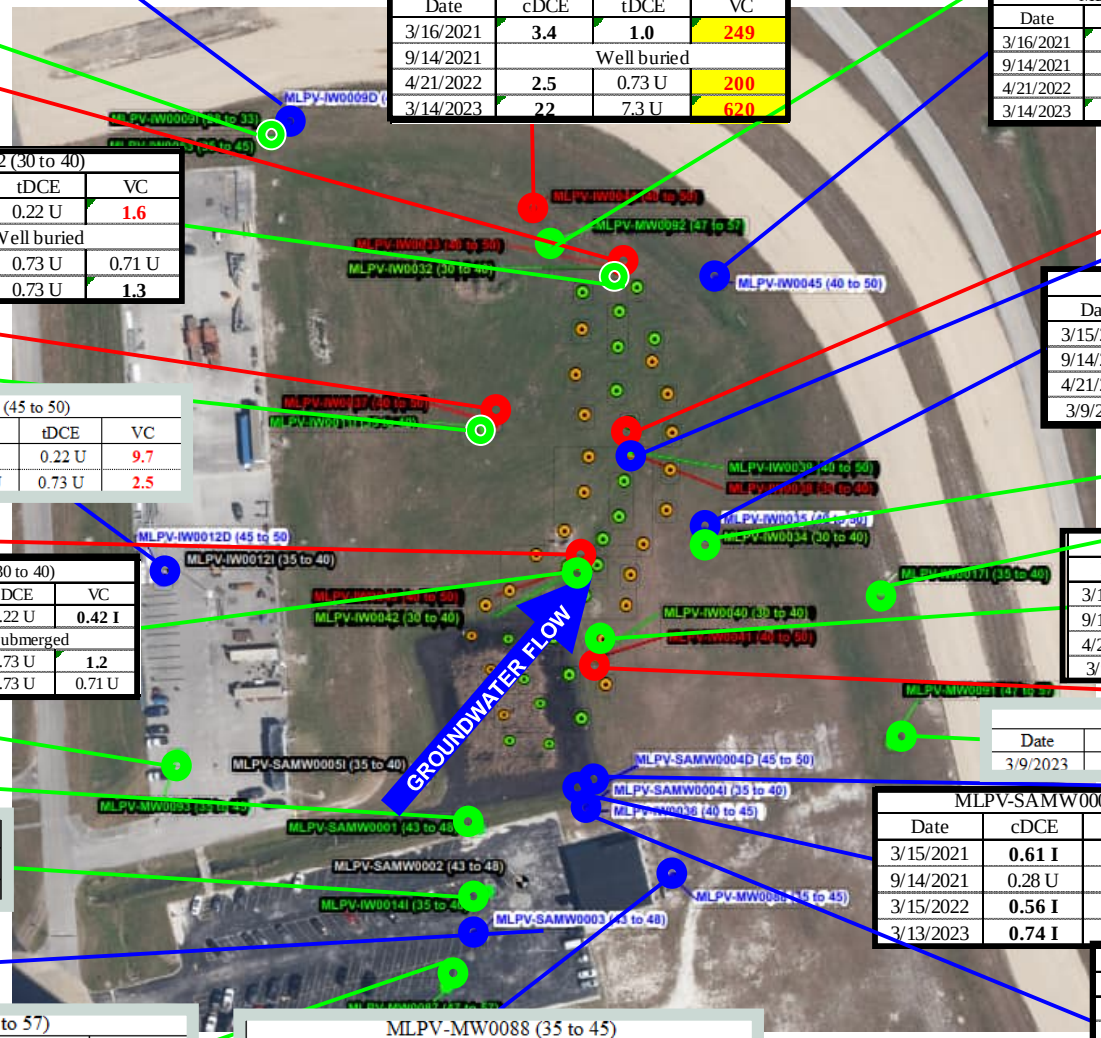
- Centerline – ⭕
- Periphery – ⭕
- Well IW0030 (screened 55-65 ft bls), located beneath the AS treatment area, was previously removed from sampling schedule since concentrations remained below GCTLs



Note: LCP wells not illustrated.

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Wells through Spring 2023



<GCTL
>GCTL
>NADC
97.2 indicates > GCTL
207 indicates > NADC

Indicates LCP well

MLPV-IW0009I (28 to 33)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	**0.33 I**	0.22 U	**0.72 I**
3/14/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0009D (45 to 50)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	**1.4**	0.22 U	**32.6**
3/13/2023	0.89 U	0.53 U	0.73 U	**23**

MLPV-MW0092 (47 to 57)

Date	TCE	cDCE	tDCE	VC
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0039 (40 to 50)

Date	cDCE	tDCE	VC
3/15/2021	**161**	**6.5**	**236**
9/14/2021	**76.9**	**3.3**	**191**
3/16/2022	**140**	**5.4**	**160**
4/26/2023	**150**	4.2 I	**270**

MLPV-IW0033 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**49.6**	**6.3**	**471**
9/14/2021	Well buried		
4/21/2022	**100**	**9.8**	**950**
3/14/2023	**57**	18 U	**560**

MLPV-IW0044 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**3.4**	**1.0**	**249**
9/14/2021	Well buried		
4/21/2022	**2.5**	0.73 U	**200**
3/14/2023	**22**	7.3 U	**620**

MLPV-IW0045 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**75.8**	**7.8**	**295**
9/14/2021	Well buried		
4/21/2022	**6.3**	**0.95 I**	**92**
3/14/2023	**11**	**1.6**	**59**

MLPV-IW0038 (30 to 40)

Date	cDCE	tDCE	VC
3/15/2021	**1.2**	0.22 U	**2.3**
3/16/2022	**0.63 I**	0.73 U	**1.1**
4/26/2023	**0.85 I**	0.73 U	**1.8**

MLPV-IW0037 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**138**	**0.71 I**	**269**
9/13/2021	**25.1**	**0.47 I**	**99.3**
4/21/2022	**100**	**0.73 U**	**200**
3/9/2023	**79 Q**	0.73 U	**170 Q**

MLPV-IW0032 (30 to 40)

Date	cDCE	tDCE	VC
3/16/2021	**0.84 I**	0.22 U	**1.6**
9/14/2021	Well buried		
4/21/2022	0.53 U	0.73 U	0.71 U
3/14/2023	0.53 U	0.73 U	**1.3**

MLPV-IW0035 (40 to 50)

Date	cDCE	tDCE	VC
3/15/2021	**3.2**	**2.5**	**124**
9/14/2021	Well buried		
4/21/2022	0.53 U	0.73 U	0.71 U
3/9/2023	**2.1**	0.73 U	**78**

MLPV-IW0034 (30 to 40)

Date	cDCE	tDCE	VC
3/15/2021	**0.41 I**	0.22 U	0.41 U
9/14/2021	0.28 U	0.22 U	0.41 U
3/15/2022	**0.62 I**	0.73 U	**0.92 I**
3/9/2023	**0.54 I**	0.73 U	0.71 U

MLPV-IW0011I (35 to 40)

Date	cDCE	tDCE	VC
3/16/2021	0.28 U	0.22 U	**0.46 I**
9/13/2021	0.28 U	0.22 U	0.41 U
4/21/2022	0.53 U	0.73 U	0.71 U
3/9/2023	0.53 U	0.73 U	0.71 U

MLPV-IW0012D (45 to 50)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	**0.44 I**	0.22 U	**9.7**
3/14/2023	0.89 U	0.53 U	0.73 U	**2.5**

MLPV-IW0017I (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/14/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0043 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**249**	**3.7 I**	**180**
9/14/2021	Well submerged		
3/16/2022	**98**	**2.6**	**88**
3/14/2023	**170**	3.7 U	**280**

MLPV-IW0042 (30 to 40)

Date	cDCE	tDCE	VC
3/16/2021	**1.2**	0.22 U	**0.42 I**
9/14/2021	Well submerged		
3/16/2022	**0.63 I**	0.73 U	**1.2**
3/14/2023	0.53 U	0.73 U	0.71 U

MLPV-IW0040 (30 to 40)

Date	cDCE	tDCE	VC
3/15/2021	**0.50 I**	0.22 U	0.41 U
9/14/2021	Well buried		
4/21/2022	**0.64 I**	0.73 U	0.71 U
3/9/2023	**0.93 I**	0.73 U	**0.72 I**

MLPV-IW0041 (40 to 50)

Date	cDCE	tDCE	VC
3/16/2021	**113**	**3.3**	**259**
9/14/2021	**1.9 I**	**0.92 I**	**146**
3/15/2022	**26**	**2.2**	**150**
3/9/2023	**53**	**1.4**	**130**

MLPV-MW0093 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/15/2023	0.89 U	0.53 U	0.73 U	**0.85 I**

MLPV-MW0091 (47 to 57)

Date	TCE	cDCE	tDCE	VC
3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-SAMW0001 (43 to 48)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	0.28 U	0.22 U	0.41 U
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-SAMW0004I (35 to 40)

Date	cDCE	tDCE	VC
3/15/2021	**0.61 I**	**0.41 I**	**19.4**
9/14/2021	0.28 U	0.22 U	**15.5**
3/15/2022	**0.56 I**	0.73 U	**15**
3/13/2023	**0.74 I**	0.73 U	**12**

MLPV-SAMW0004D (45 to 50)

Date	cDCE	tDCE	VC
3/15/2021	**2.4**	**0.59**	**14.6**
9/14/2021	**0.65 I**	**0.67 I**	**5.0**
3/16/2022	**2.3**	**0.94 I**	**17**
3/13/2023	**1.9**	**1.2**	**18**

MLPV-IW0014I (35 to 40)

Date	TCE	cDCE	tDCE	VC
3/14/2023	0.89 U	0.53 U	0.73 U	**0.98 I**

MLPV-SAMW0003 (43 to 48)

Date	TCE	cDCE	tDCE	VC
6/3/2020	0.35 U	0.28 U	**2.9**	**3.3**
3/16/2023	0.89 U	**95**	**6.1**	**67**

MLPV-IW0036 (40 to 45)

Date	cDCE	tDCE	VC
3/15/2021	**0.47 I**	0.22 U	**24.9**
9/14/2021	**0.60 I**	0.22 U	**32.3**
3/16/2022	**1.4**	0.73 U	**44**
4/26/2023	**0.84 I**	0.73 U	**29**

MLPV-MW0087 (47 to 57)

Date	TCE	cDCE	tDCE	VC
3/13/2023	0.89 U	0.53 U	0.73 U	0.71 U

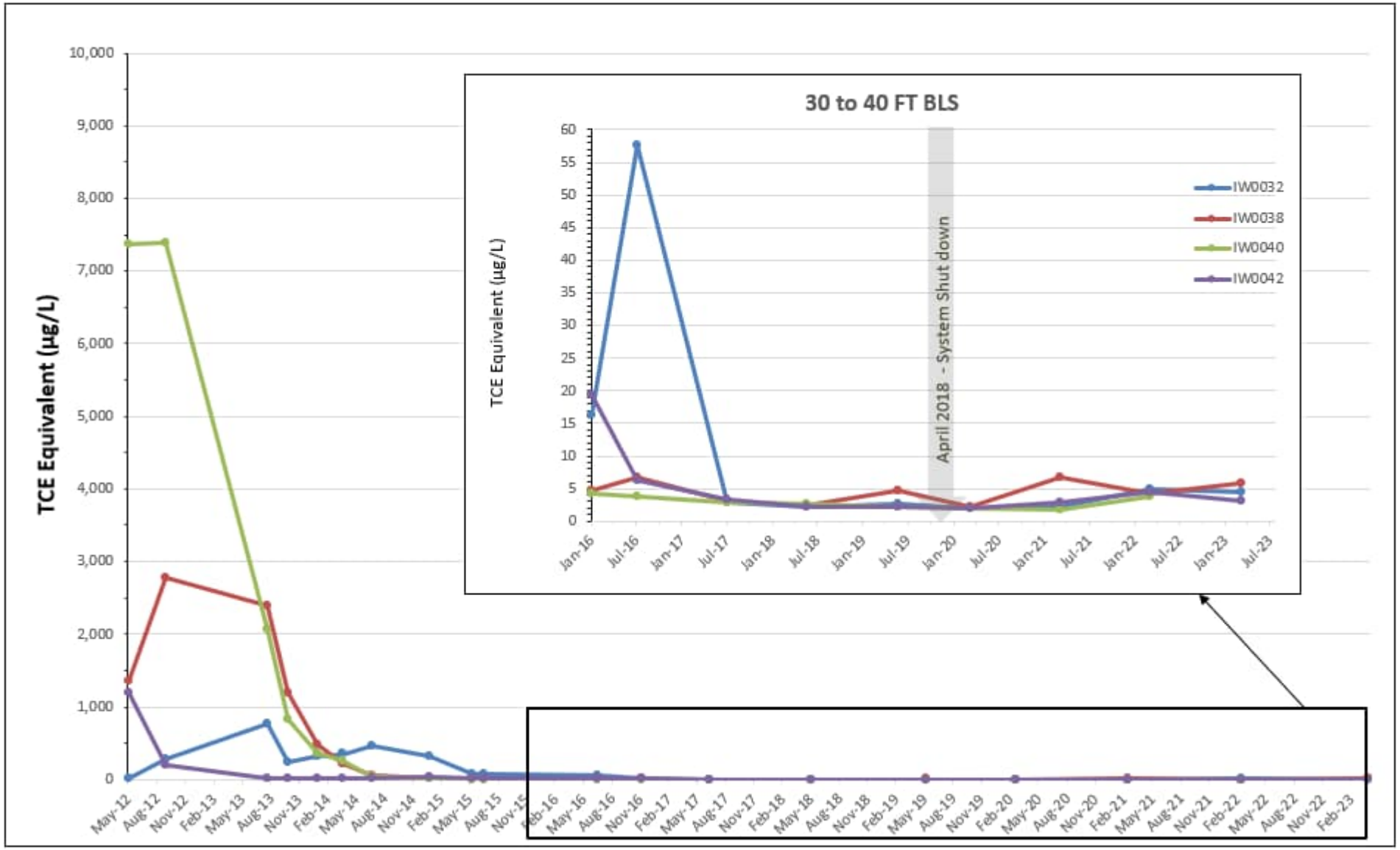
MLPV-MW0088 (35 to 45)

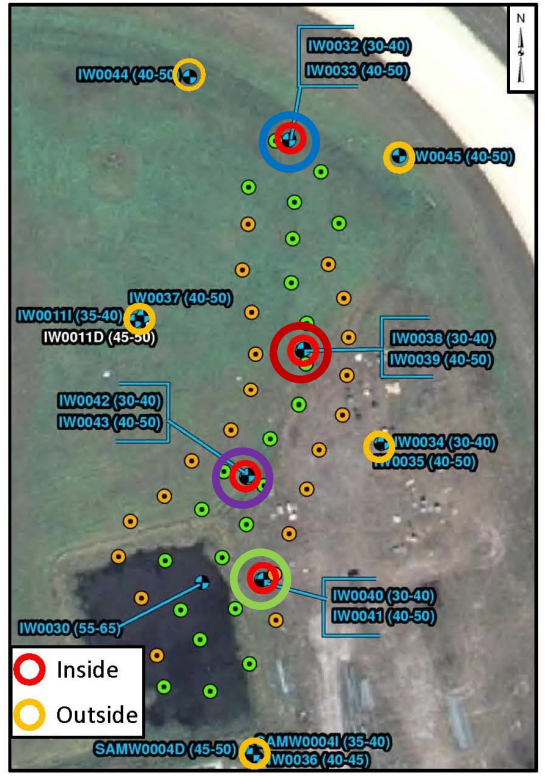
Date	TCE	cDCE	tDCE	VC
3/14/2023	0.89 U	0.53 U	0.73 U	**2.3**

aecom.com

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM through Spring 2023

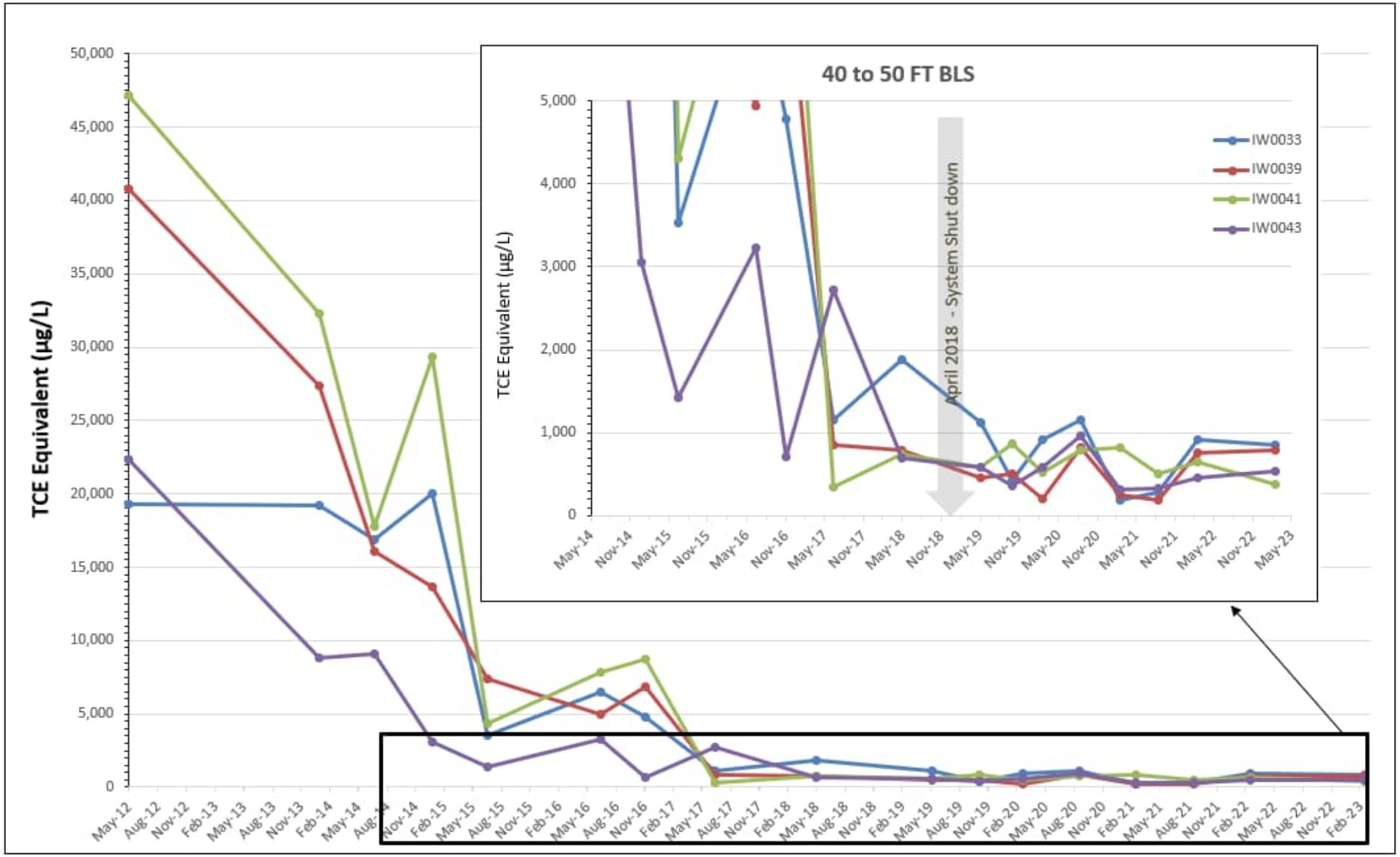


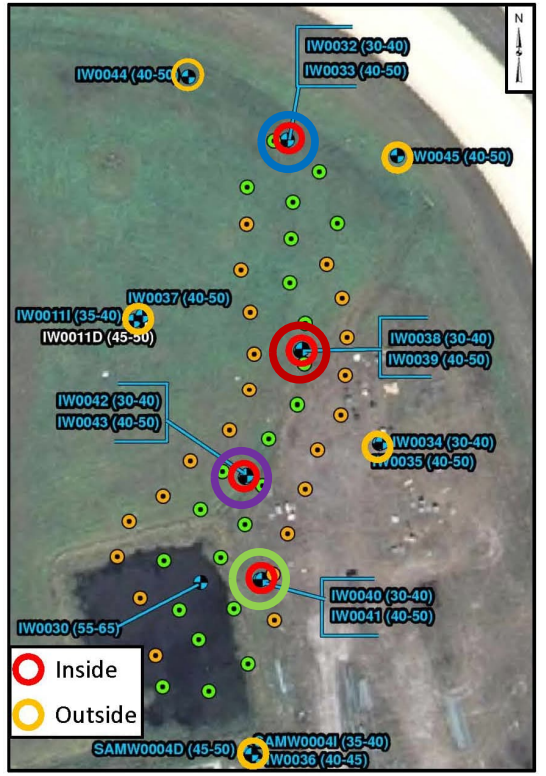


- Steady or increasing concentrations
- IW0038 fluctuates

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM through Spring 2023





- Reduction exhibited in sampled wells during reporting period
- Overall decreasing or stable trend since 2018

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Spring 2023 - Summary

- **30-40 ft bls:**
  - cDCE: less than GCTL in all wells except IW0039 (150 µg/L).
  - tDCE: less than GCTL
  - VC: IW0039 (270 µg/L) exceeded NADC;
    - IW0038 (1.8 µg/L) and SAMW0004I (12 µg/L) exceeded GCTL only - relatively unchanged concentrations.
- **40-50 ft bls:**
  - cDCE: IW0037 (79 µg/L), IW0039 (150 µg/L), and IW0043 (170 µg/L) exceeded GCTL. IW0045 (11 µg/L) is now below GCTL.
  - tDCE: less than GCTL
  - VC: IW0033 (560 µg/L), IW0037 (170 µg/L), IW0039 (270 µg/L), IW0041 (130 µg/L), IW0043 (280 µg/L), IW0044 (620 µg/L), exceeded NADC;
    - IW0036 (29 µg/L), IW0045 (59 µg/L), and SAMW004D (18 µg/L) exceeded GCTL only, which is relatively unchanged while a decreasing or stable trend is observed in IW0036 and IW0045 decreased below NADC or the first time since October 2019.
- **LCP wells 35-45 ft bls:**
  - VC: MW0088 (2.3 µg/L) south, IW0009D (23 µg/L) northwest, and IW0012D (2.5 µg/L) west of HS2 exceed GCTL.
  - VC in the remaining LCP wells are below GCTLS and confirm the HCP has been isolated and provide GCTL boundary data to the east and southwest.

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Test Consensus

- Continue interim groundwater monitoring
  - Next semi-annual event will be scheduled for Fall of 2023
- Evaluate the sampling plan one year after implementation of the selected technology from the RAE

2023 Sampling and Analysis Plan

Area Monitored	Location	Screen Interval (ft bls)	Frequency	Analytical Parameters
Air Sparge Area	MLPV-IW0032	30 – 40	Annual	cDCE tDCE VC
	MLPV-IW0038	30 – 40	Annual	
	MLPV-IW0040	30 – 40	Annual	
	MLPV-IW0042	30 – 40	Annual	
	MLPV-IW0011I	35 – 40	Semi-Annual	
	MLPV-IW0033	40 – 50	Semi-Annual	
	MLPV-IW0034	30 – 40	Semi-Annual	
	MLPV-IW0035	40 – 50	Semi-Annual	
	MLPV-IW0036	40 – 45	Semi-Annual	
	MLPV-IW0037	40 – 50	Semi-Annual	
	MLPV-IW0039	40 – 50	Semi-Annual	
	MLPV-IW0041	40 – 50	Semi-Annual	
	MLPV-IW0043	40 – 50	Semi-Annual	
	MLPV-IW0044	40 – 50	Semi-Annual	
	MLPV-IW0045	40 – 50	Semi-Annual	
	MLPV-SAMW0004D	45 – 50	Semi-Annual	
	MLPV-SAMW0004I	35 – 40	Semi-Annual	

Annual: Spring / Semi-annual: Spring and Fall

Hot Spot 3

Hot Spot 3

Current Site Conditions

- Adjacent and underneath western MLP structure
  - HCP present with CVOC (TCE, cDCE, and VC)
  - Bioremediation implemented as an IM
- South of OFW (this area discussed in next section) where VC LCP is monitored separately from HS3



Figure: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

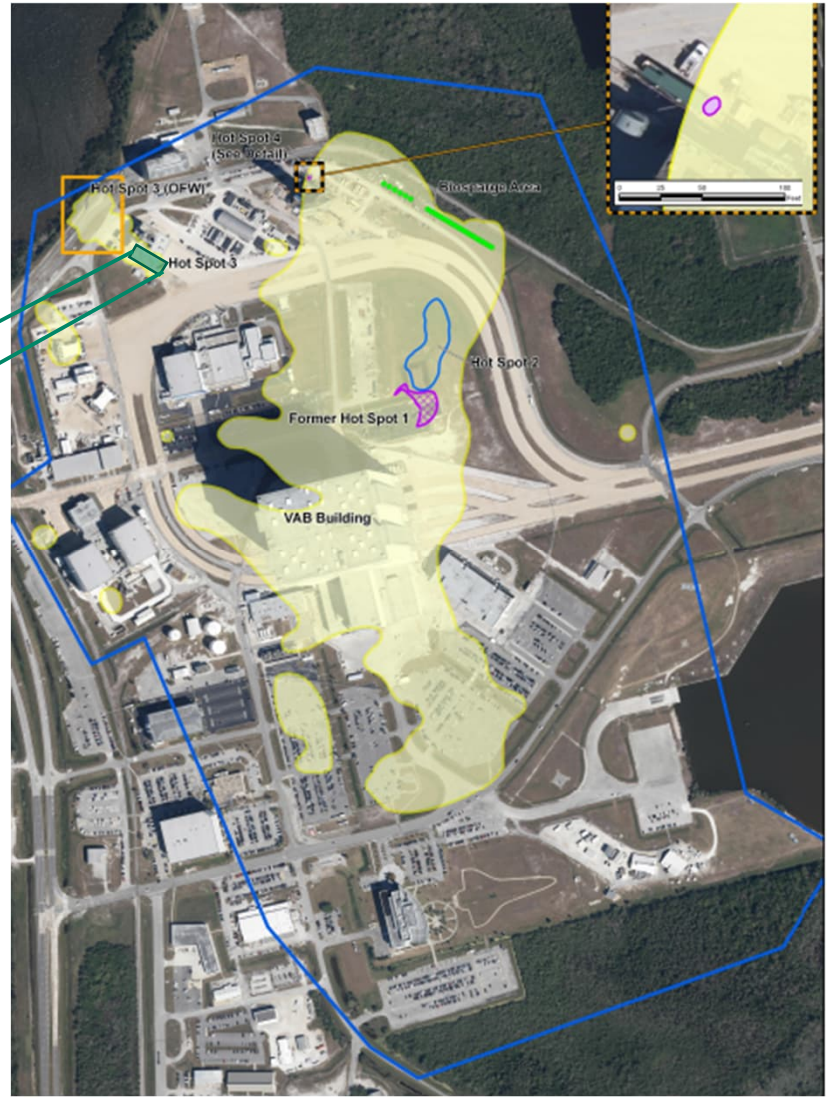


Figure: AECOM MLP/VAB SWMU 056, 2019 CMI and IM Annual Report

Hot Spot 3

Historical Site Conditions

- **2017:** Delineated CVOC Plumes

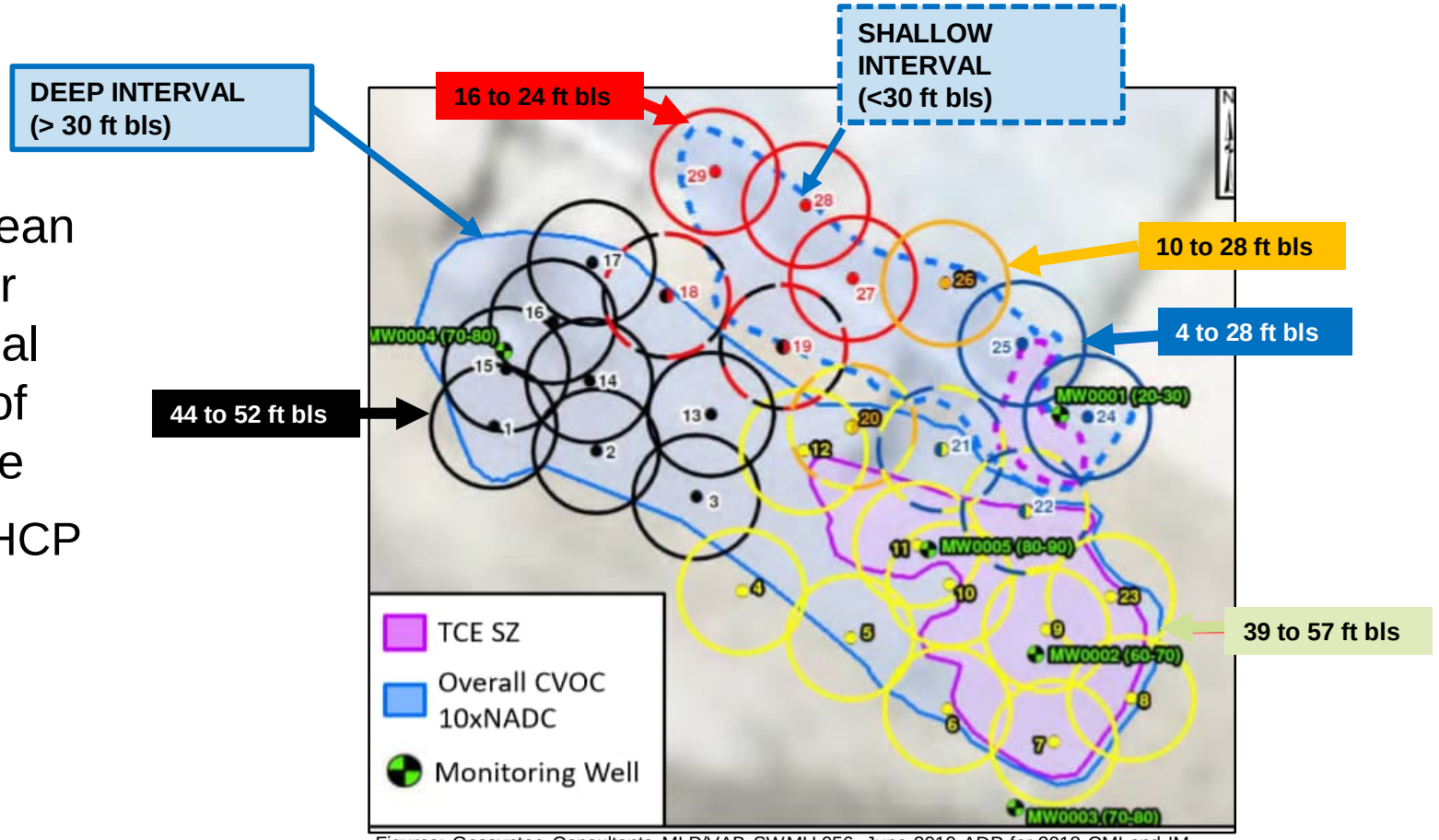


Hot Spot 3

Historical Interim Measures/Remediation

July 17 to August 15, 2017
Bioremediation IM implemented

- Injections using SRS®-SD (a slow release, small droplet, neutral pH, emulsified vegetable oil [EVO, soybean oil]) as an electron donor solution for biostimulation, paired with a microbial culture (KB-1) for bioaugmentation of complete TCE degradation to ethene
- Treatment area: TCE SZ and CVOC HCP
- 29 DPT injection locations
- Followed by performance monitoring



Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

Hot Spot 3

Historical Interim Measures/Remediation

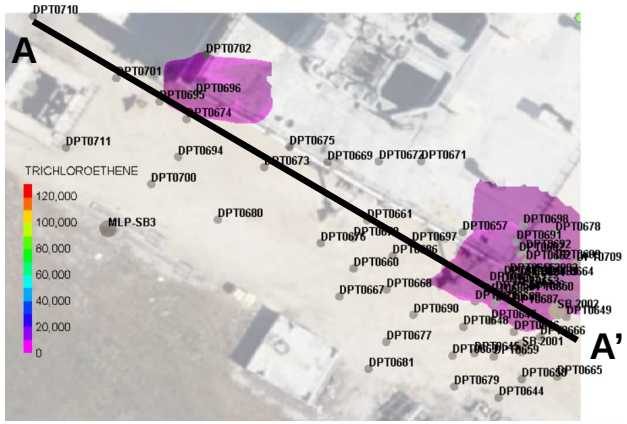
- **2019** DPT groundwater sampling indicated ~80% to ~100% mass reduction for shallow intervals and ~94% mass reduction for deep intervals
- **2020** Lease terminated and site access reinstated
- **2021** DPT groundwater sampling performed to evaluate current site conditions within the previously treated area and need for bioremediation Interim Measures Work Plan (IMWP) Addendum for additional injections
  - Total of 188 samples collected from 62 locations and analyzed for CVOCs
  - 43 samples analyzed for geochemistry parameters: sulfate, sulfide, TOC, ethane, ethene, and methane

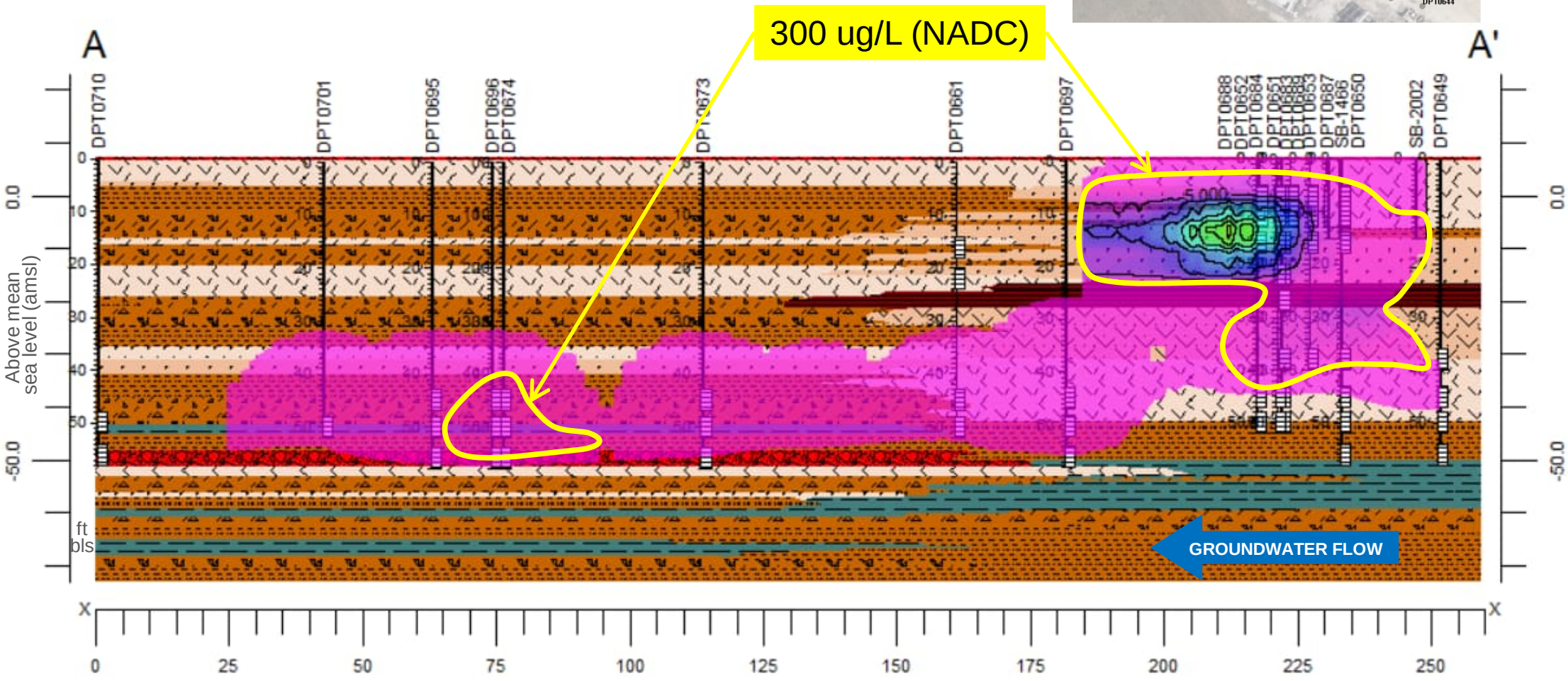
2021 DPT Sampling Locations



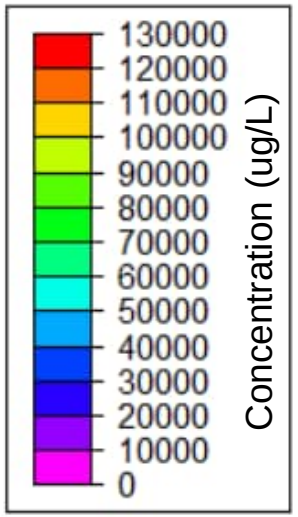
DPT Assessment Results – TCE (>3 ug/L)

- 11 samples >300 micrograms per liter (ug/L)
- Max=129,000 ug/L at DPT0683 between 9 – 13 ft bls







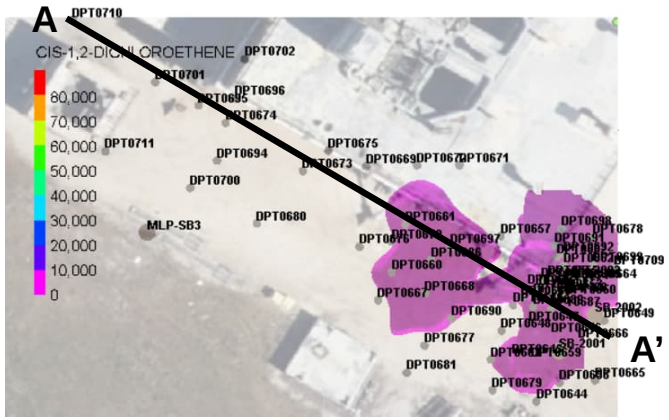


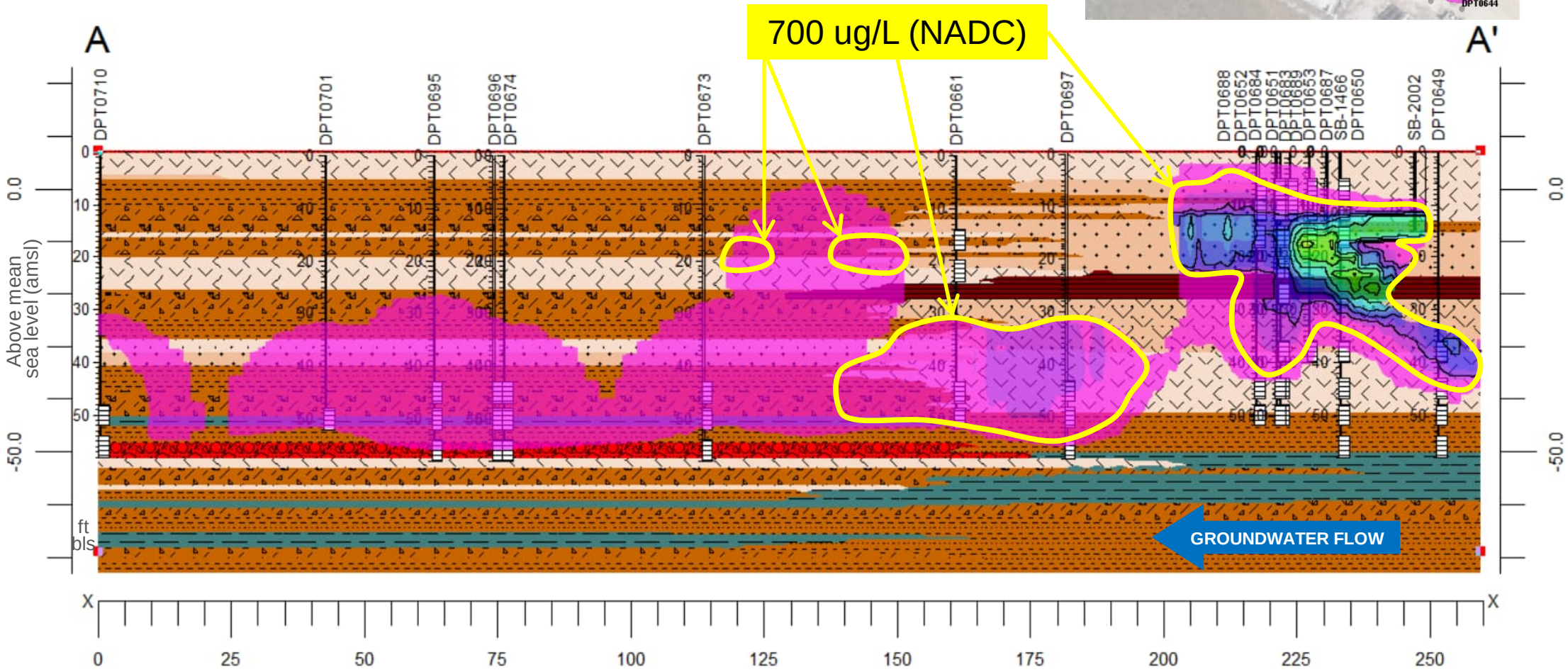
Note: Reporting Limits are included in the interpolated plume extents for all 3D models

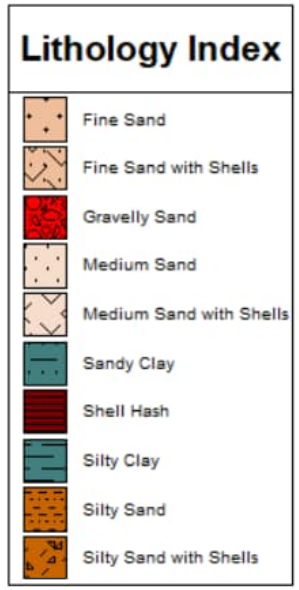
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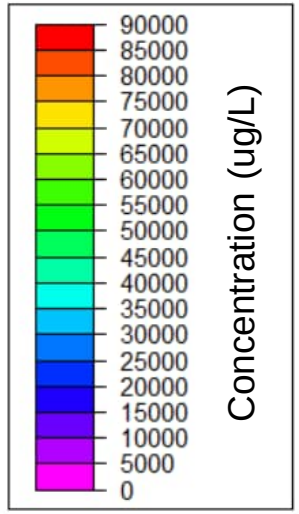
DPT Assessment Results – cDCE (>70 ug/L)

- 24 samples >700 ug/L
- Max=88,000 ug/L at DPT0653 between 14-18 ft bls





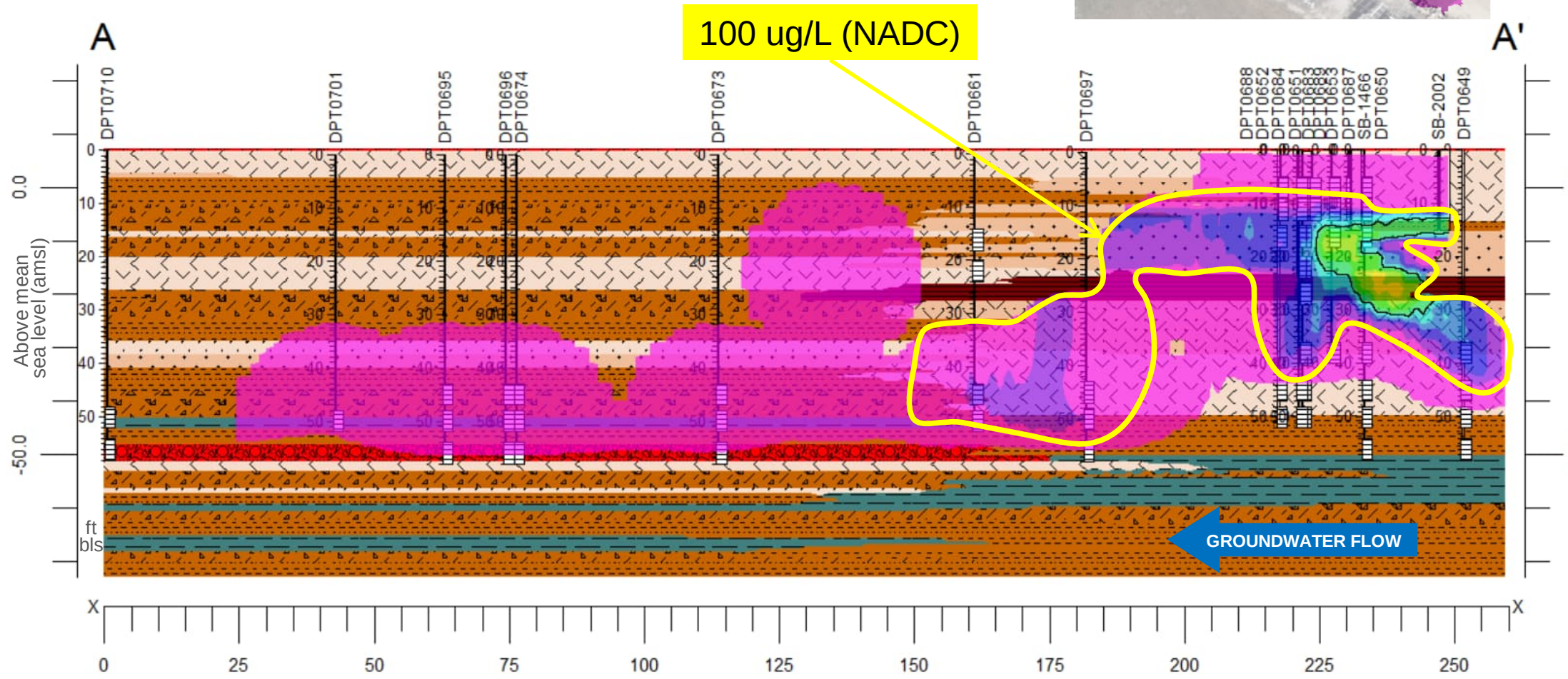


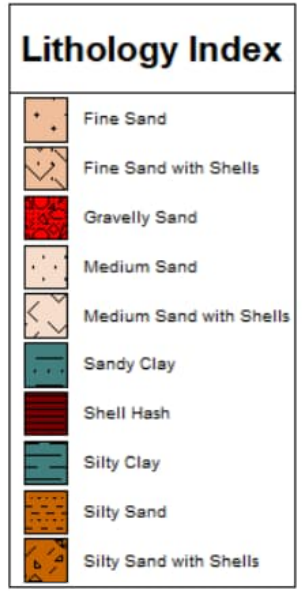


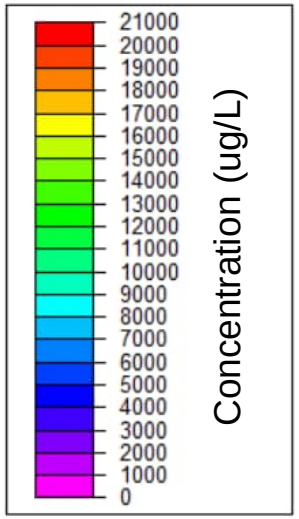
DPT Assessment Results – VC (>1 ug/L)

- 45 samples >100 ug/L
- Max=21,000 ug/L at DPT0653 between 14-18 ft bls









Hot Spot 3

Historical Interim Measures/Remediation

2021 DPT (continued)

- Dissolved CVOCs plumes were delineated to NADCs (GCTLs at some locations)
- Evaluation of remediation progress indicated:
    - EVO (SRS®-SD) injection decreased CVOC mass and plume footprints (source likely still present)
    - Redox and pH are appropriate for ongoing enhanced reductive dechlorination (ERD) but TOC is depleted and not optimal
    - High sulfate and low natural iron to control sulfide likely limits ERD and optimal use of TOC
    - High methane indicates non-optimal use of TOC by methanogens that limit ERD
- Recommendation to create optimal conditions for long-term CVOCs degradation that treats plumes and mass flux from the source
- Proposed remediation strategy that promotes in situ chemical reduction (ISCR) by emplacing a product that:
    - Enhances biotic and abiotic reduction of CVOCs for a long period (5 or more years)
    - Maintains optimal conditions by limiting methanogenesis and managing sulfate reduction and sulfide accumulation
- Hot Spot 3 results presented to KSCRT in September 2021. Team consensus was reached to proceed with IMWP for ISCR to treat key CVOCs (TCE, cDCE, and VC) exceeding their respective NADC.

Current Status

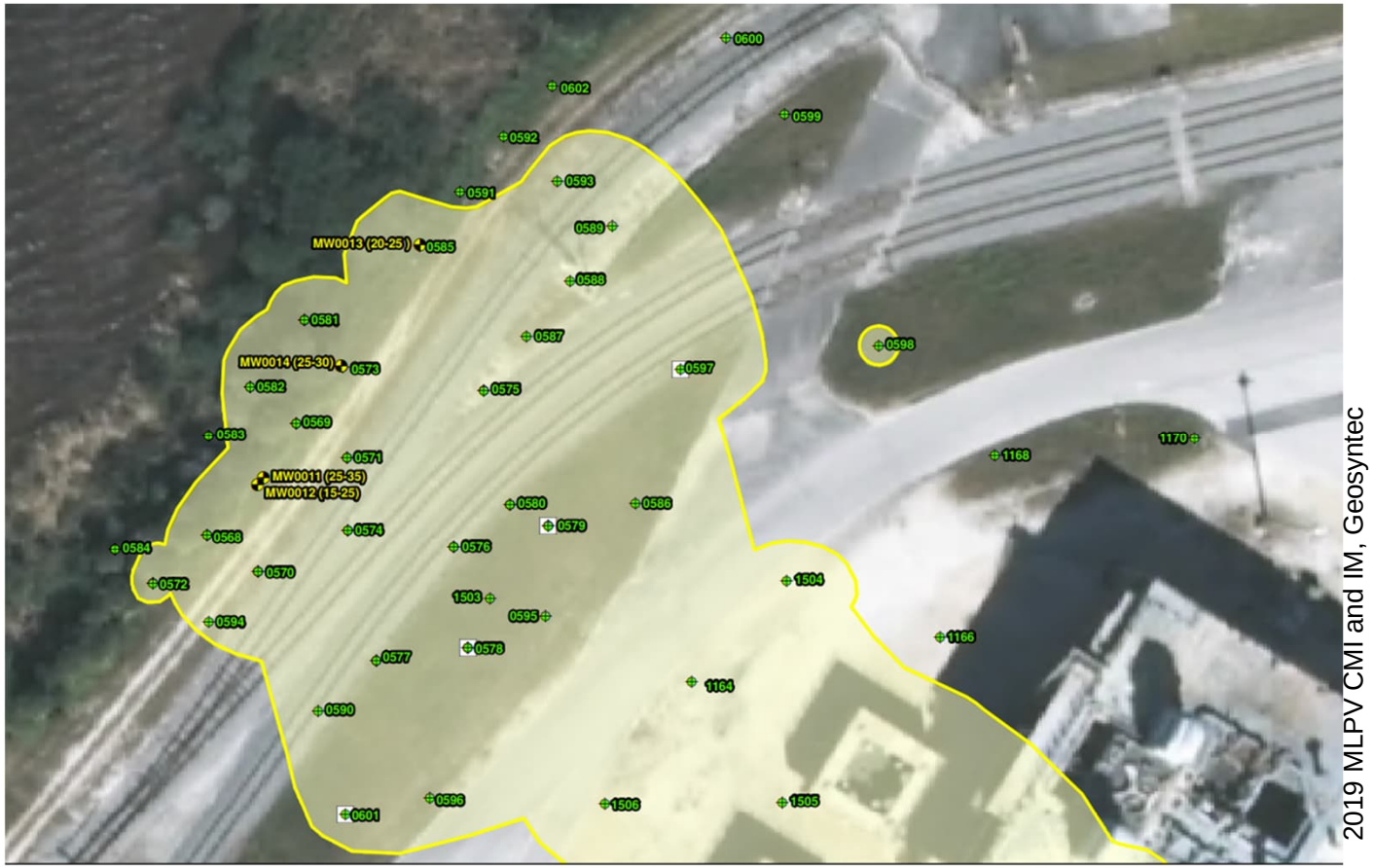
- IMWP is currently undergoing review

Hot Spot 3 OFW Area

Hot Spot 3 OFW Area

Historical Site Assessment

- **2015 through 2016** Monitoring wells installed to evaluate VC concentrations adjacent to the OFW
- **2016 through 2019** DPT groundwater sampling performed to evaluate the VC impacts adjacent to the OFW
- 2017 Upgradient bioremediation IM implemented for bioaugmentation of complete TCE degradation to ethene using emulsified vegetable oil paired with a microbial culture
  - 29 DPT injection locations
- **2018** started IGM; treatment of upgradient source (HS3) expected to reduce VC concentrations to less than GCTL.
- **2021 at upgradient Hot Spot 3:** DPT groundwater sampling performed to evaluate IM effectiveness.
  - 2022 Interim Measures Work Plan developed based on DPT data for in-situ chemical reduction treatment using Provect-IR with 60% zero valent iron solution.



2019 MLPV CMI and IM, Geosyntec

Hot Spot 3 OFW Area

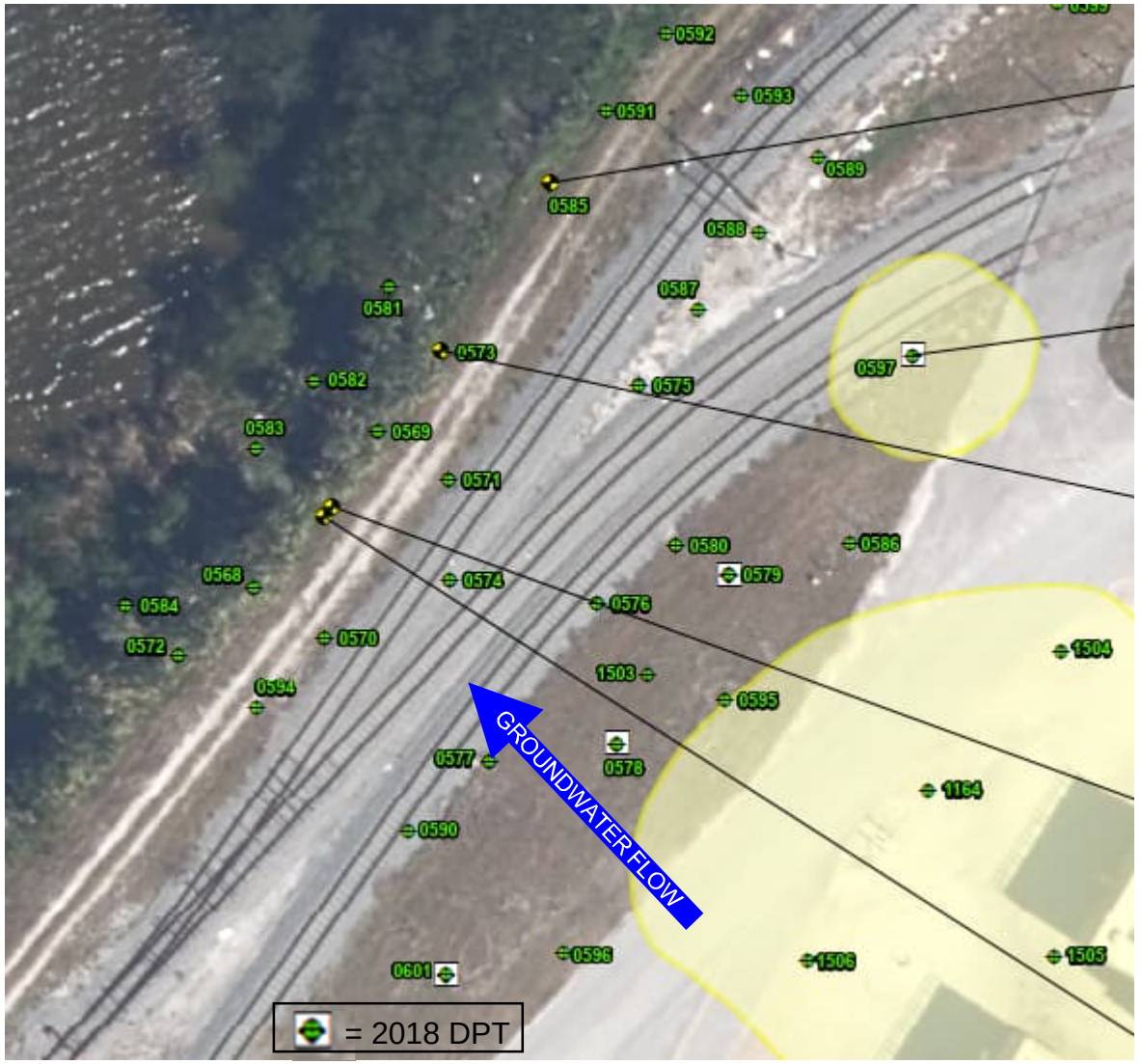
Summary of Annual Analytical Results

- Annual Performance Monitoring Well Sampling
  - December 14, 2022
  - MW0011, MW0012, MW0013, MW0014
  - CVOC analysis: TCE, cDCE, tDCE, VC

2022 Sampling and Analysis Plan

Area Monitored	Location	Screen Interval (feet bls)	Frequency	Analytical Parameters
Hot Spot 3 OFW Area	VABRA-MW0011	25 to 35	Annual (September)	CVOCs (TCE, cDCE, tDCE, VC)
	VABRA-MW0012	15 to 25		
	VABRA-MW0013	20 to 25		
	VABRA-MW0014	25 to 30		

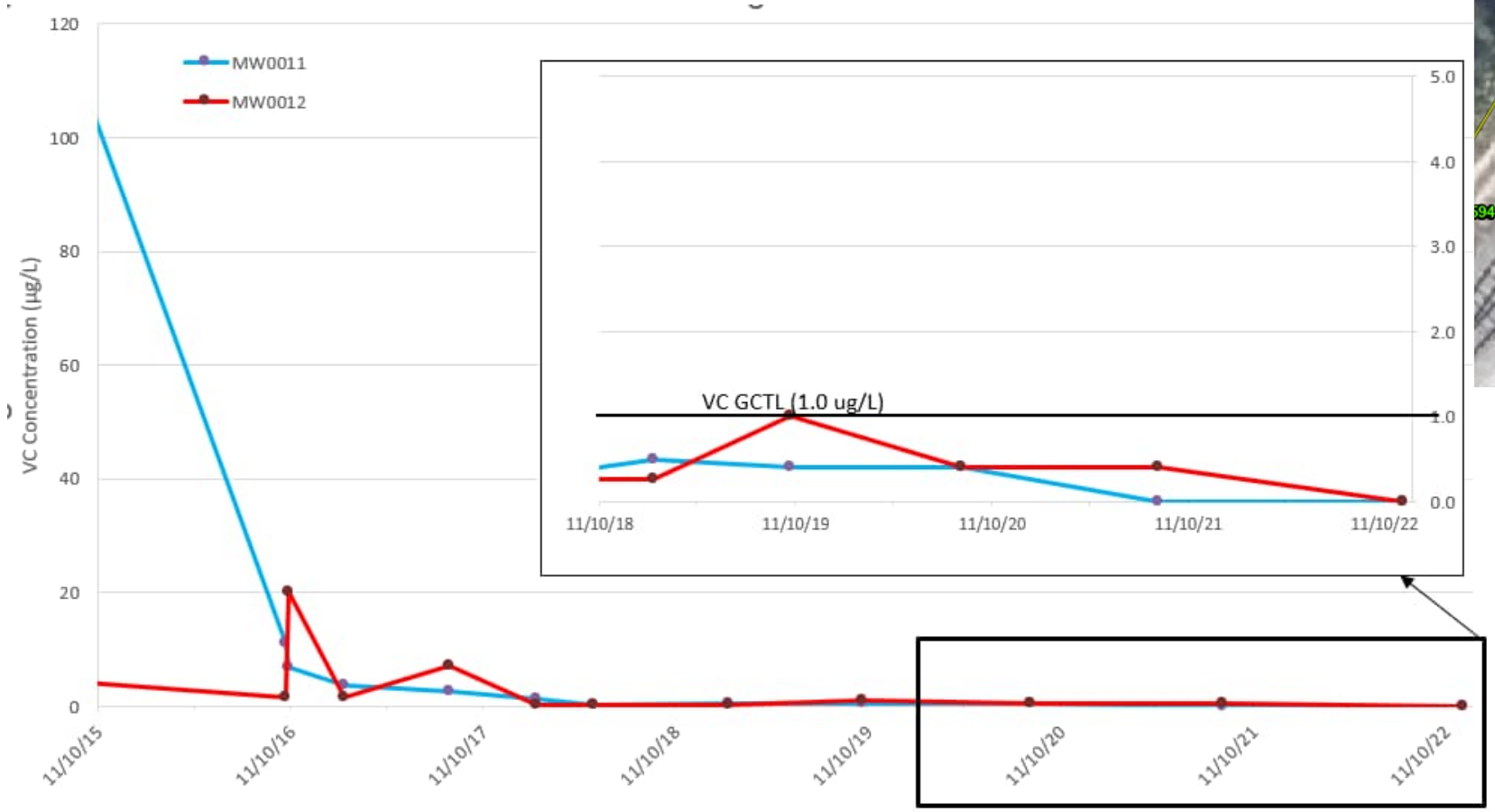
- CVOCs below GCTLs in every well
  - Plume was modified with consideration of 2018 DPT groundwater sampling locations that had no GCTL exceedances.
  - Additional monitoring wells will be installed as part of the HS3 IM to both evaluate the LCP and monitor substrate performance.

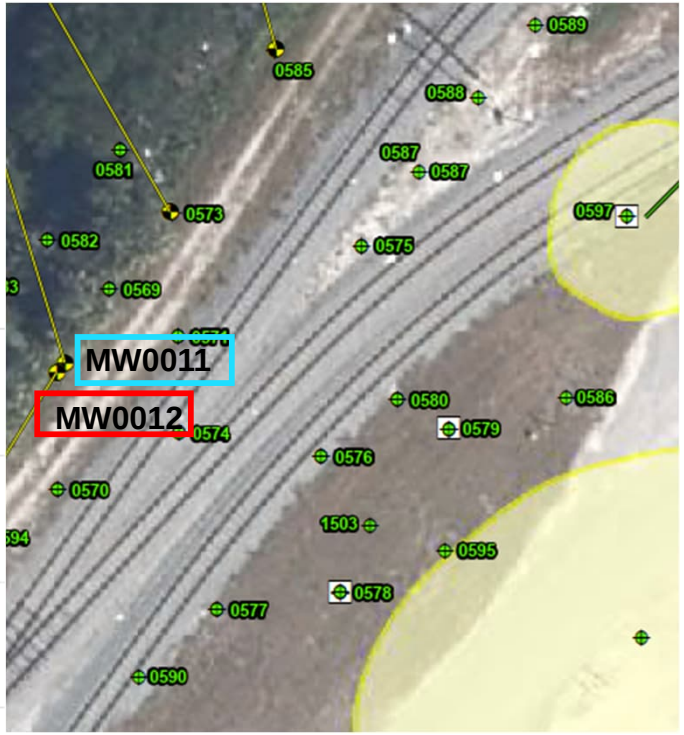


Hot Spot 3 OFW Area

VC Trend

- MW0011 (25 to 35 feet bls): CVOCs were below GCTLs
- MW0012 (15 to 25 feet bls): CVOCs were below GCTLs

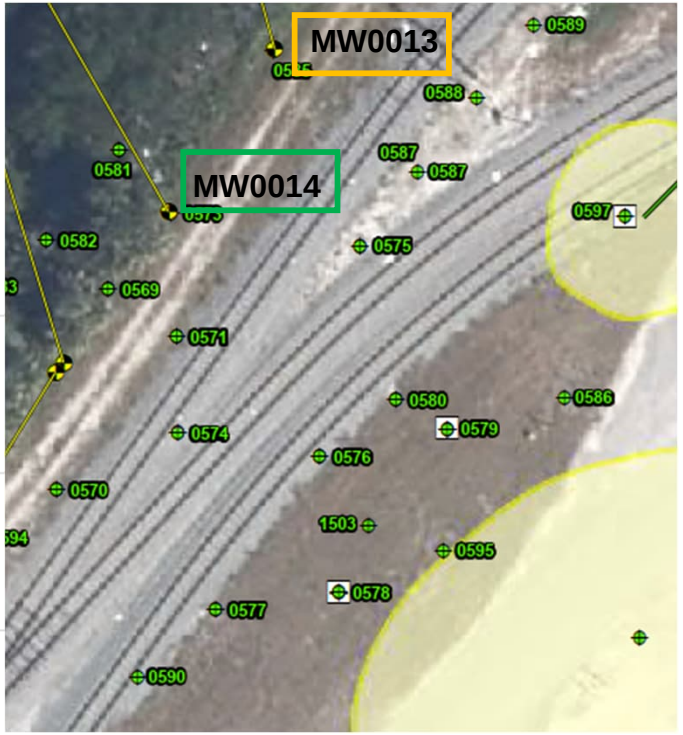


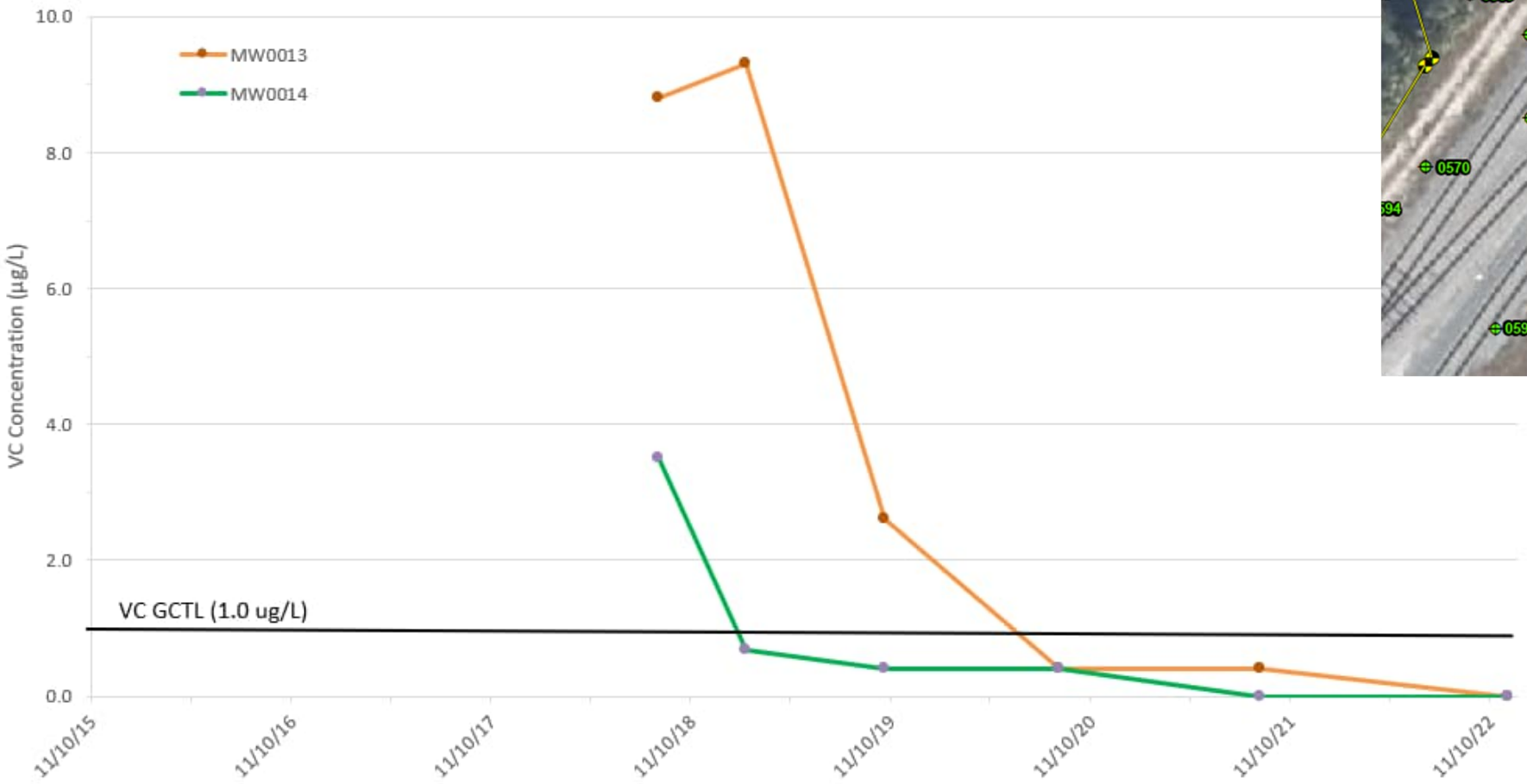


Hot Spot 3 OFW Area

VC Trend

- MW0012 (20 to 25 feet bls): CVOCs were below GCTLs
- MW0013 (25 to 30 feet bls): CVOCs were below GCTLs





Hot Spot 3 OFW Area

Test Consensus

Based on evaluation of analytical results from 2017 to present, recommend continued annual sampling to monitor groundwater quality downgradient of HS3 former and future treatment areas.

Test Consensus: Continue annual performance monitoring

2023 Sampling and Analysis Plan

System Monitored	Location	Screen Interval (feet bls)	Frequency	Analytical Parameters
Hot Spot 3 OFW Area	VABRA-MW0011	25 to 35	Annual (September)	CVOCs (TCE, cDCE, tDCE, VC)
	VABRA-MW0012	15 to 25		
	VABRA-MW0013	20 to 25		
	VABRA-MW0014	25 to 30		



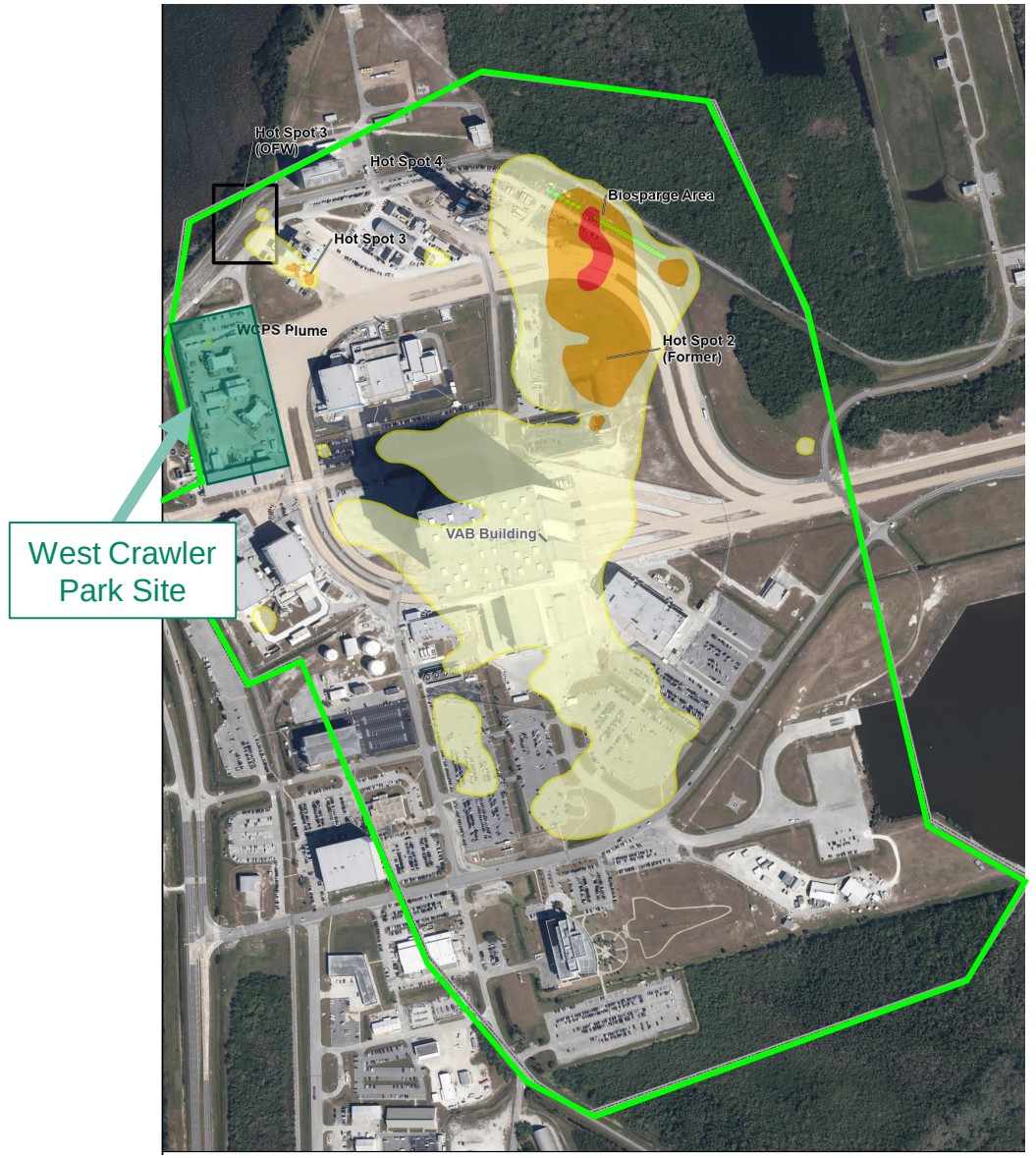
KSC EGIS Aerial

LCP LTM

LCP LTM

Previous Activities

- June 2020 biennial sampling performed
  - Modified with addition of four wells from the West Crawler Park Site (WCPS) area and northeast MLP area to complete data gaps as a follow-up to the 2019 ADP
  - Results indicated limited change in overall plume footprint since 2018
    - 2 to15 feet bls:
      - VC in shallow well WCPS-IW0001SR (49.5 µg/L) doubled since 2018. Resampled in September 2020 with three additional wells WCPS-IW002S, WCPS-IW0015S, and WCPS-IW0005S (screened 3 to 13 feet bls). Concentrations remained within the same order of magnitude. Data from periphery wells remained below GCTLs.
    - 15 to 40 feet bls: Overall decrease since 2018
    - 40 to70 feet bls: Overall decrease since March 2019



2021 MLPV CMI and IM Annual Report

LCP LTM

Monitoring Well Network Expansion

- An evaluation of the overall LTM program completed in 2022 resulted in adding 12 existing monitoring wells and 39 proposed monitoring wells to be installed throughout the SWMU for determining the current condition of the GCTL plume site-wide.
  - A total of 37 monitoring wells were installed from October 2022 through January 2023
  - 2 monitoring wells within the VAB perimeter remain to be installed.

Biennial Sampling and Analysis Plan

	Existing/ Proposed	Location	Screen Interval (ft bls)	Sampling method	Analytical Parameters
1	Existing Sampled (19)	MLPV-IW0009D	45 to 50	Low Flow	cDCE tDCE VC
2		MLPV-IW0009I	28 to 33		
3		MLPV-IW0012D	45 to 50		
4		MLPV-IW0018D	50 to 55		
5		MLPV-IW0020D	45 to 50		
6		MLPV-IW0029D	42 to 47		
7		MLPV-IW0047	35 to 45		
8		MLPV-IW0052	40 to 50		
9		MLPV-IW0053	35 to 45		
10		PRES-IW0009	40 to 50		
11		SATV-IW0009I	22 to 27		
12		VAB-IW0005D	52 to 57		
13		VABU-IW0001I	20 to 30		
14		WCPS-IW0001SR	2.5 to 12.5		
15		WCPS-IW0016	15 to 25		
16		MLPV-SAMW0001	43 to 48		
17		MLPV-SAMW0003	43 to 48		
18		MLPV-IW0002IR	28 to 33		
19		MLPV-IW0001D	50 to 55		
20	Existing Added (12)	WCPS-IW0005 S	2 to 12		
21		WCPS-IW0015 S	3 to 13		
22		MLPV-IW00027 I	28 to 33		
23		MLPV-IW0014 I	35 to 40		
24		MLPV-IW0017 I	35 to 40		
25		MLPV-IW0049	38 to 48		
26		MLPV-IW0056	30 to 40		
27		MLPV-IW0022D	48 to 55		
28		MLPV-IW0050	40 to 50		
29		MLPV-IW0051	45 to 55		
30		MLPV-IW0054	40 to 50		
31		MLPV-IW0055	40 to 50		

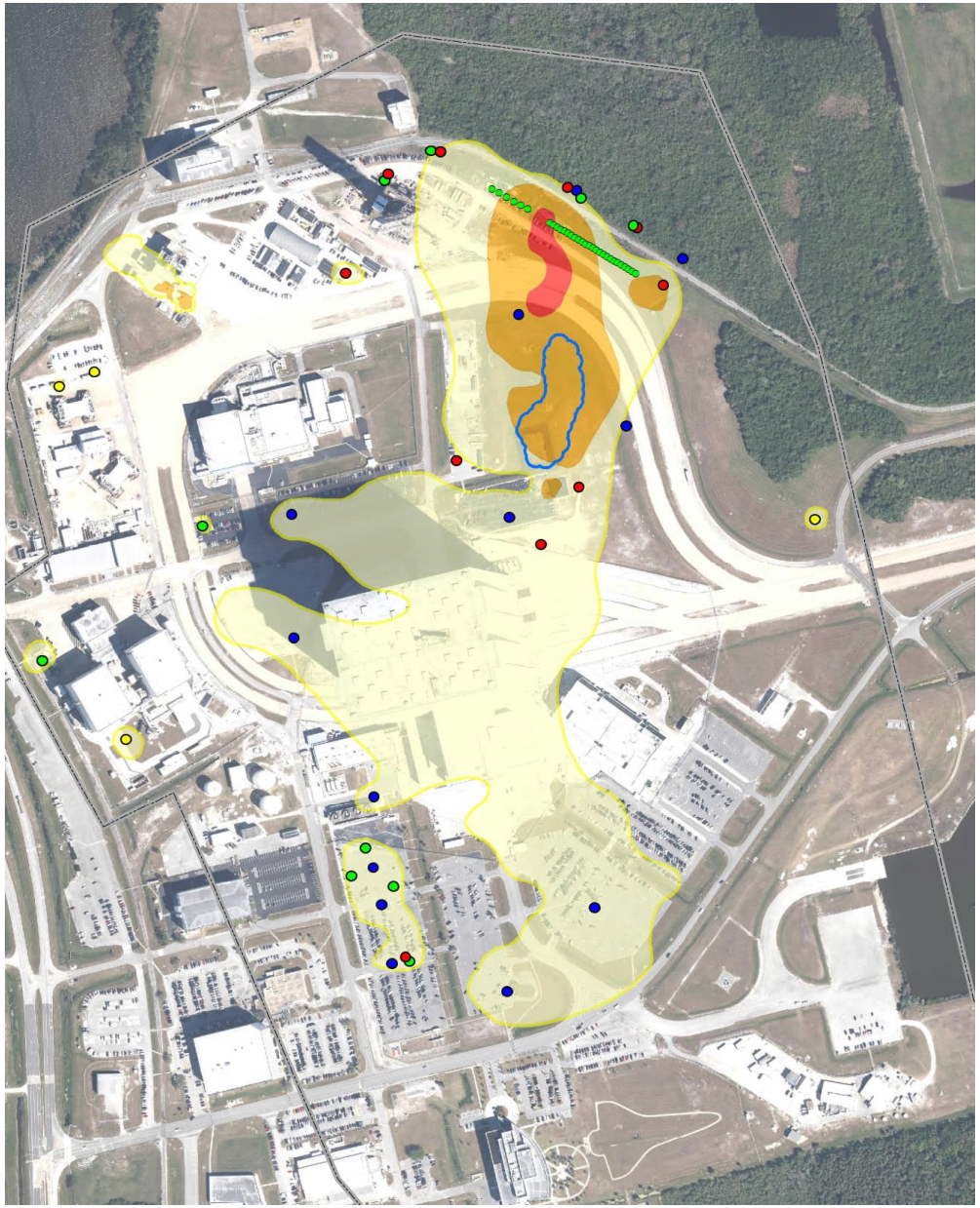
	Existing/ Proposed	Location	Screen Interval (ft bls)	Sampling method	Analytical Parameters
32	Proposed (39)	A1	1 to 10	Low Flow	cDCE tDCE VC
33		B1: WCPS-IW0002 SRR	3 to 13		
34		B3	15 to 25		
35		Z1	15 to 25		
36		C1	25 to 35		
37		C2	25 to 35		
38		C3	25 to 35		
39		~~C4: MLPV-IW0002 IR~~	~~28 to 33~~		
40		C5	20 to 30		
41		C6	25 to 35		
42		C7	25 to 35		
43		C8	25 to 35		
44		C9	25 to 35		
45		C10	20 to 30		
46		D1	35 to 45		
47		D2	35 to 45		
48		D3	35 to 45		
49		D4	35 to 45		
50		D5	35 to 45		
51		D6	35 to 45		
52		D7	35 to 45		
53		D8	35 to 45		
54		D9	35 to 45		
55		D10	35 to 45		
56		E1	47 to 57		
57		E2	47 to 57		
58		E3	47 to 57		
59		E4	47 to 57		
60		E5	47 to 57		
61		E6	40 to 50		
62		E7	40 to 50		
63		E8	45 to 55		
64		E9	47 to 57		
65		E10	47 to 57		
66		E11	47 to 57		
67		E12	47 to 57		
68		E13	47 to 57		
69		E14	47 to 57		
70		E15	47 to 57		

Note: MLPV-IW002I was part of the existing sampling plan and was reinstalled

LCP LTM

Biennial LTM Sampling 2023

- Sampling performed March 8 through March 21, 2023 for a total 67 wells
  - Wells IW0047, MW0097, MW0108, MW0110, and SAMW0001 were re-sampled on April 26, 2023 to confirm analytical results from the March sampling event
- CVOC analysis: cDCE, tDCE, and VC.

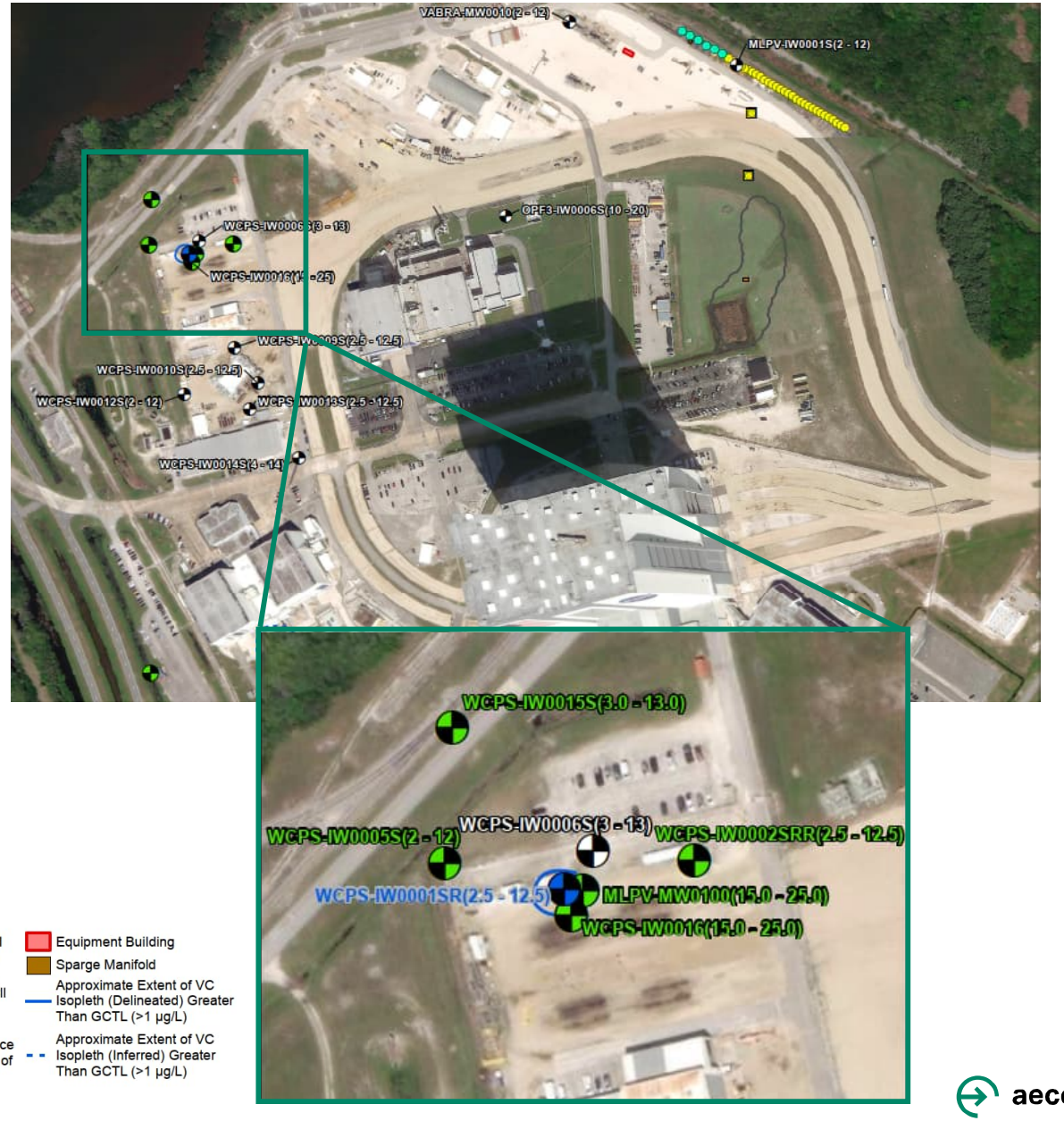


2021 MLPV CMI and IM Report – Proposed Locations

LCP LTM

Analytical Summary - 1 to 20 feet bls

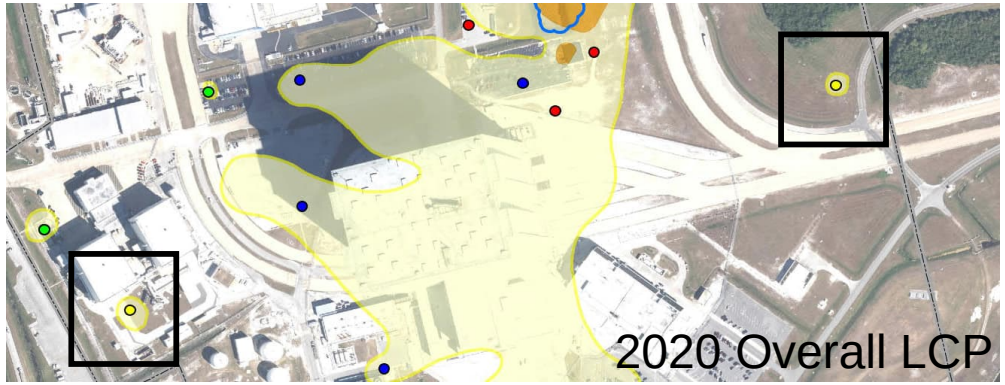
- WCPS Area
  - 6 wells sampled
  - VC exceeded GCTL in one well, IW0001SR (38 µg/L)
  - Contaminant concentrations below GCTL in remaining sampled wells, including two newly installed wells (MW0100 and IW0002SRR)
    - GCTL plume in WCPS area remains limited to well IW0001SR
    - Reduction of concentrations since 2020

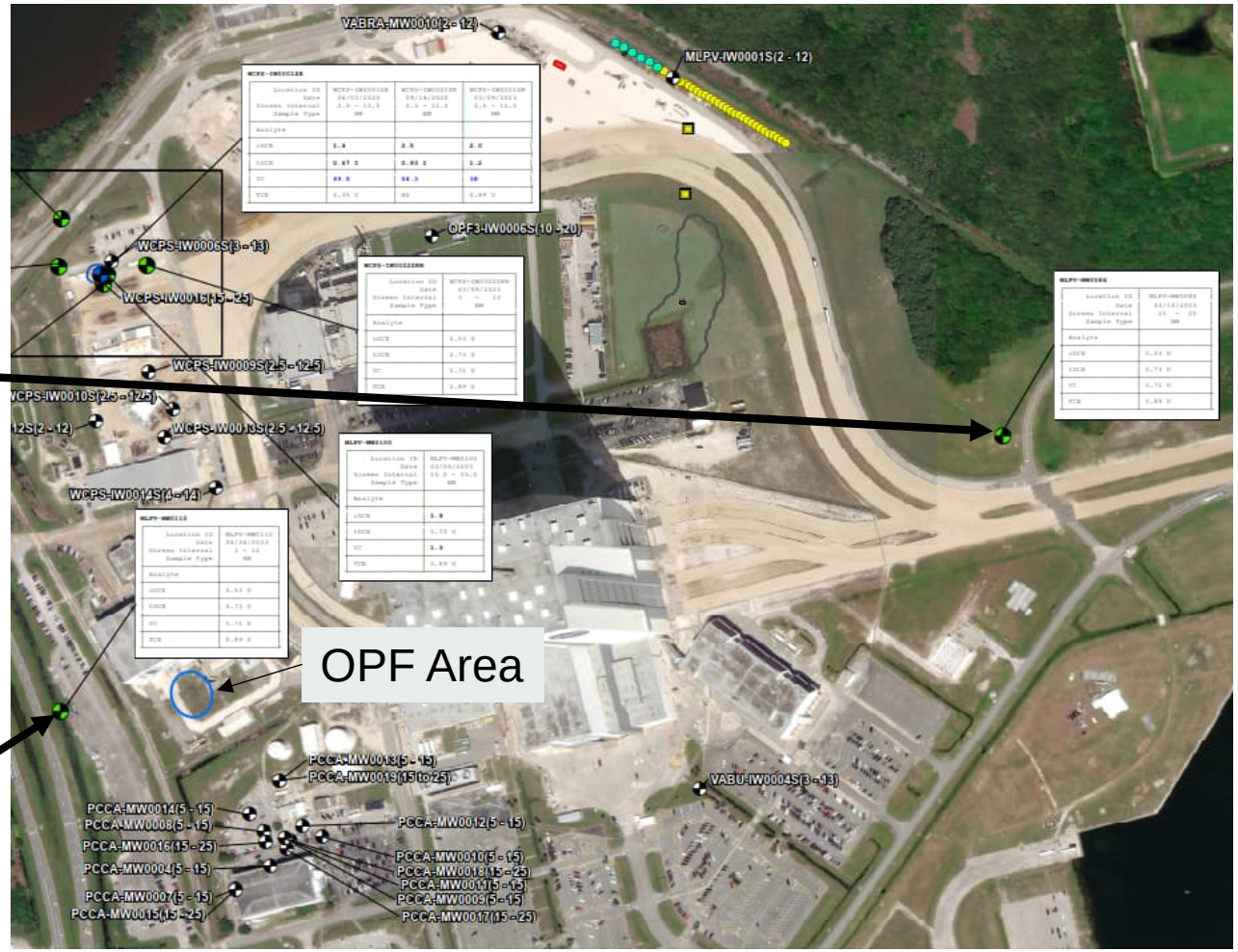


LCP LTM

Analytical Summary - 1 to 20 feet bls

- Isolated plume east of VAB
  - 1 newly installed well sampled (MW0086) indicated contaminant concentrations below GCTL
  - Confirmed collapse of isolated TCE plume
- West of VAB, south of the Orbiter Processing Facility (OPF)
  - Restricted access to facility where plume resides limited installation within the plume footprint. An alternate location serves to verify no westerly migration.
  - 1 newly installed well sampled (MW0110) indicated contaminant concentrations below GCTL





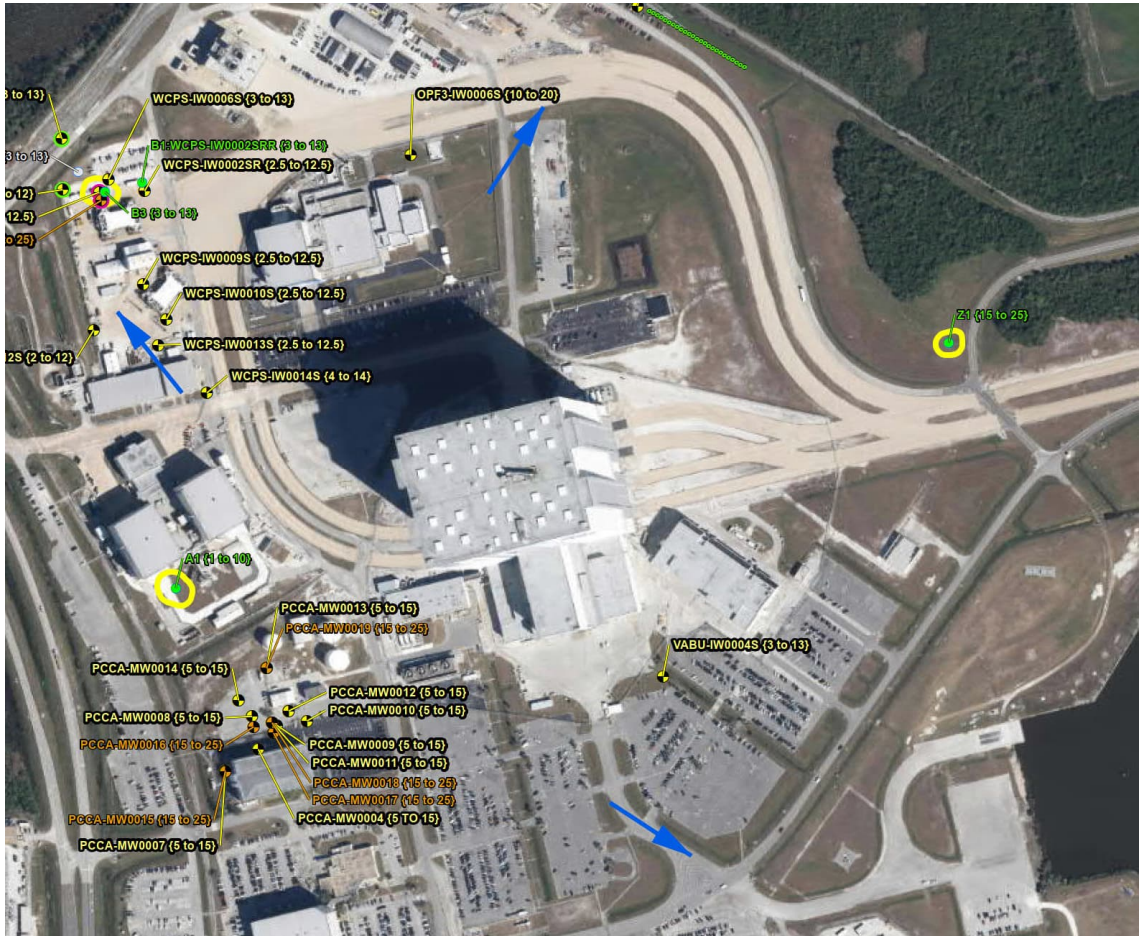
Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Biosparge Expansion Well Location (46 - 48 screen interval ft bls)
- Biosparge Piezometer Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VC Isopleth (Delineated) Greater Than GCTL (>1 µg/L)
- Approximate Extent of VC Isopleth (Inferred) Greater Than GCTL (>1 µg/L)

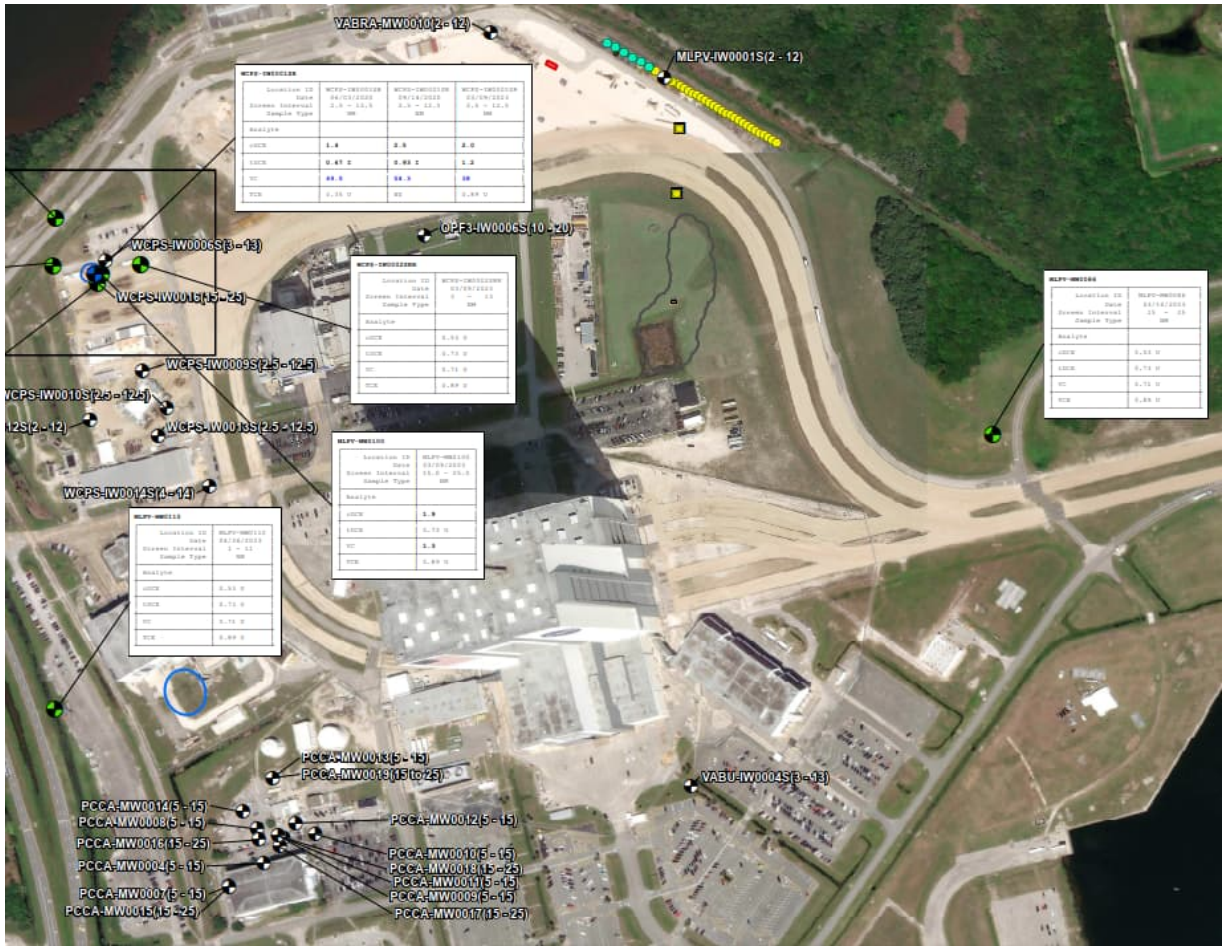
LCP LTM

Analytical Summary - 1 to 20 feet bls

- Two GCTL plumes remain
- OPF area plume remains because access to facility was restricted. Confirmed not migrated outside of SMWU.



2020

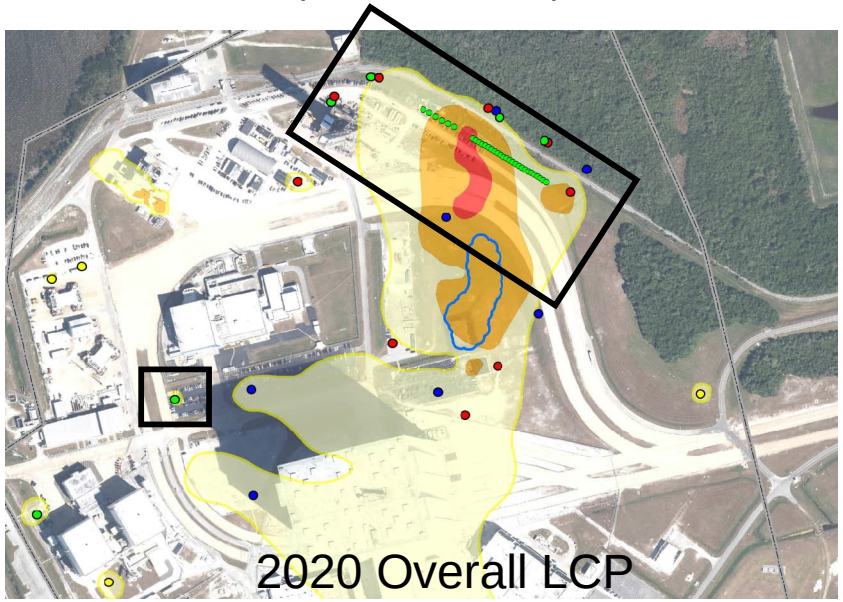


2023

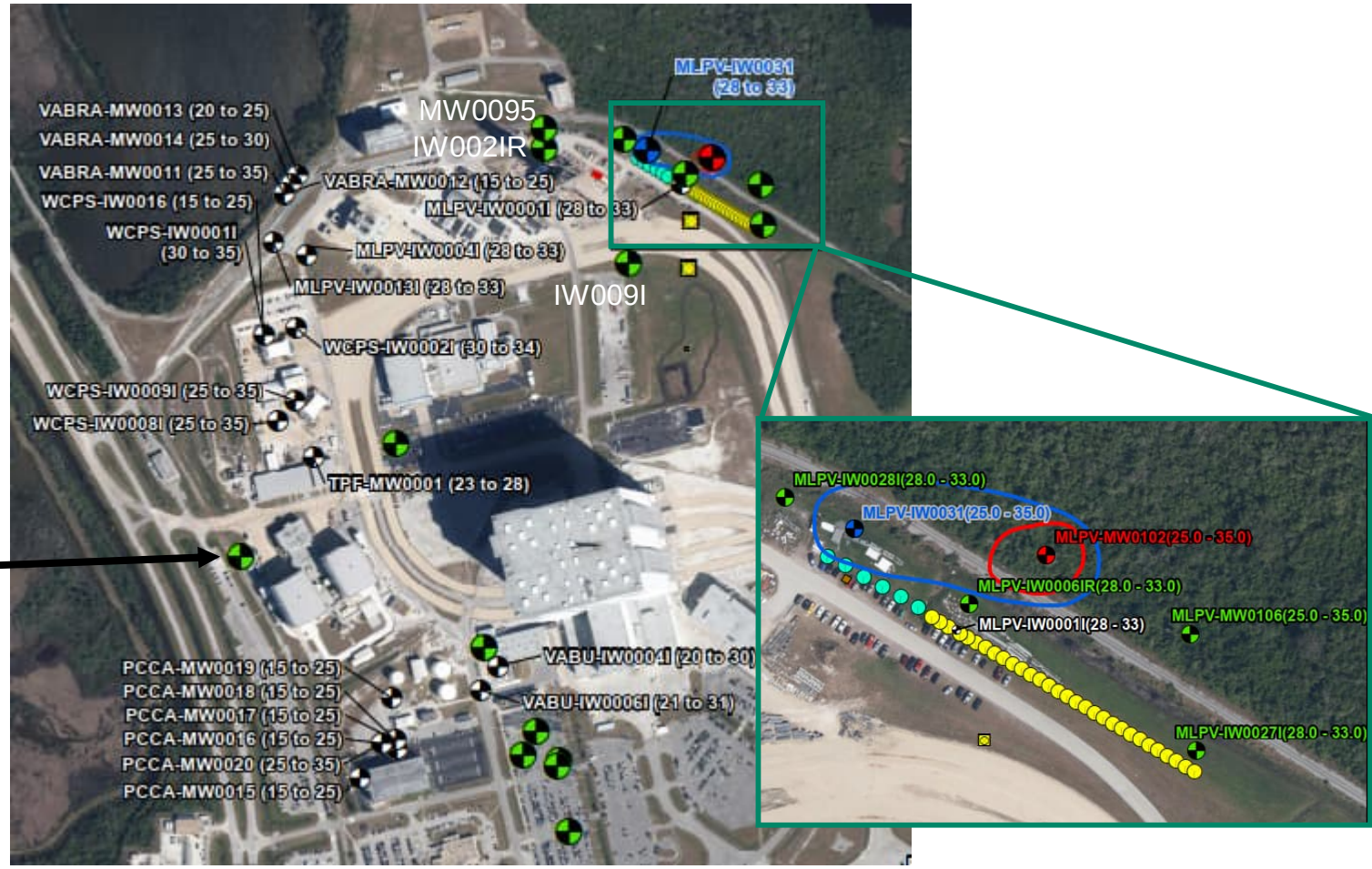
LCP LTM

Analytical Summary- 20 to 35 feet bls

- Northeast of VAB, wetland and biosparge areas:
  - Sampled new wells MW0095, MW0102, and MW0106; existing wells IW0027I and IW0009I; and replacement well IW0002IR.
  - VC exceeded NADC in MW0102 (440 µg/L)
  - All remaining contaminant concentrations remain below GCTL
- Northwest of VAB:
  - Sampled new well MW0098.
  - Contaminant concentrations below GCTL
  - Confirmed collapse of isolated plume



2020 Overall LCP



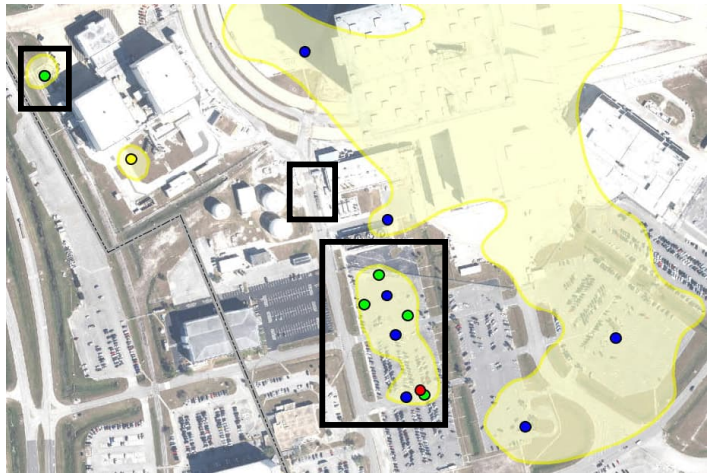
Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Proposed MW Locations
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC
- Biosparge Expansion Well Location (46 - 48 screen interval ft bls)
- Biosparge Piezometer Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold

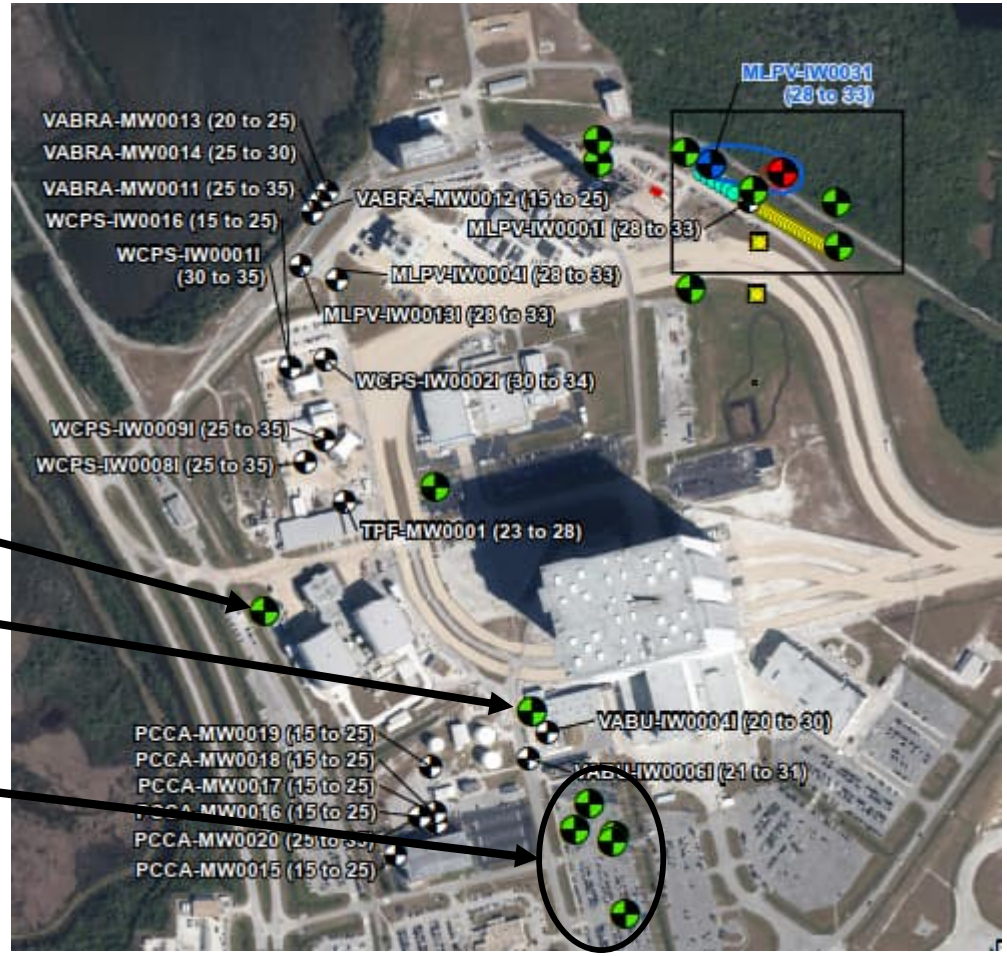
LCP LTM

Analytical Summary- 20 to 35 feet bls

- West of VAB, northwest corner of OPF:
  - Sampled new well MW0109.
  - Contaminant concentrations below GCTL
  - Confirmed collapse of isolated plume
- Southwest of VAB:
  - Sampled existing well VABU-IW0001I.
  - Contaminant concentrations remain below GCTL
- South VAB Parking Lots:
  - Sampled new wells MW0077, MW0078, MW0079, MW0081 and existing well SATV-IW0009.
  - Contaminant concentrations below GCTL in all sampled wells
  - Confirmed collapse of isolated plumes



2020 Overall LCP



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Proposed MW Locations
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC
- Biosparge Expansion Well Location (46 - 48 screen interval ft bls)
- Biosparge Piezometer Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold

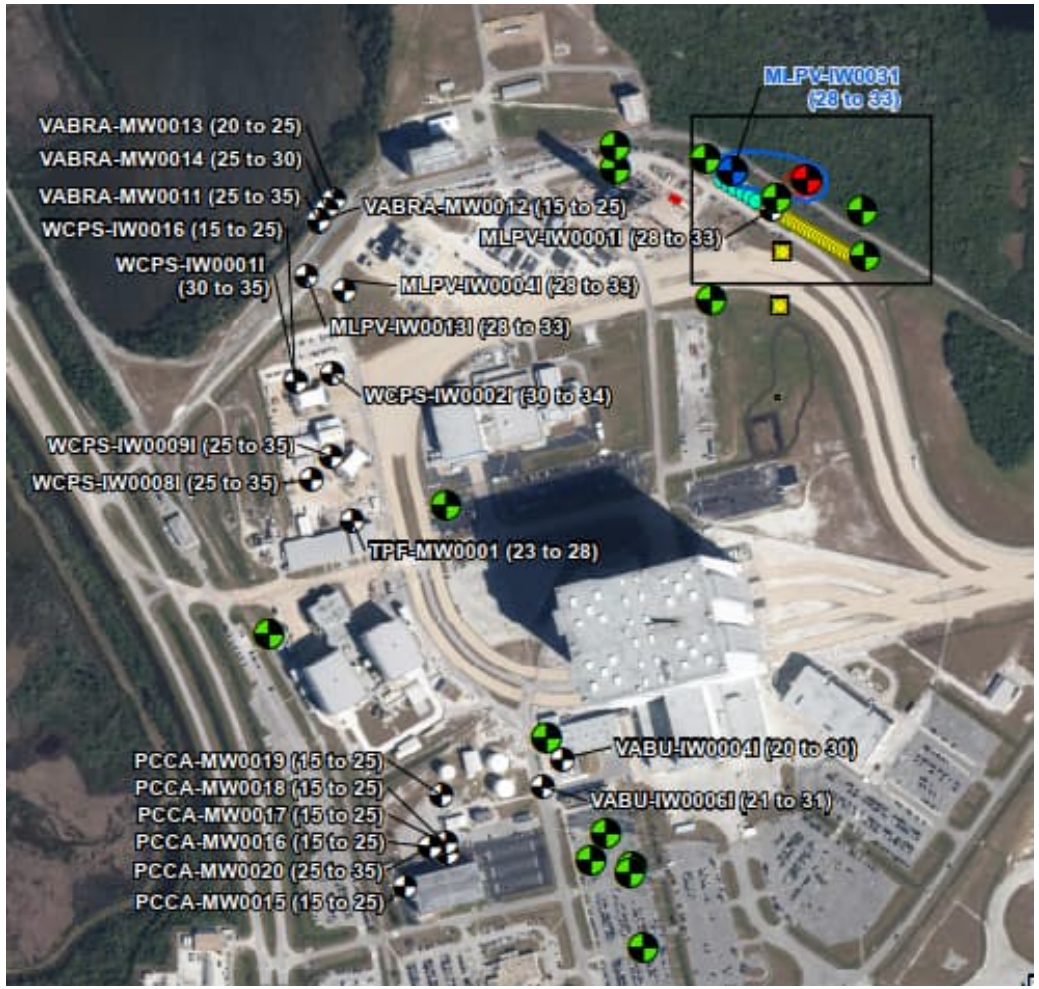
LCP LTM

Analytical Summary - 20 to 35 feet bls

- Reduced to one plume in the Biosparge area
- Consistent with ongoing performance monitoring data



2020

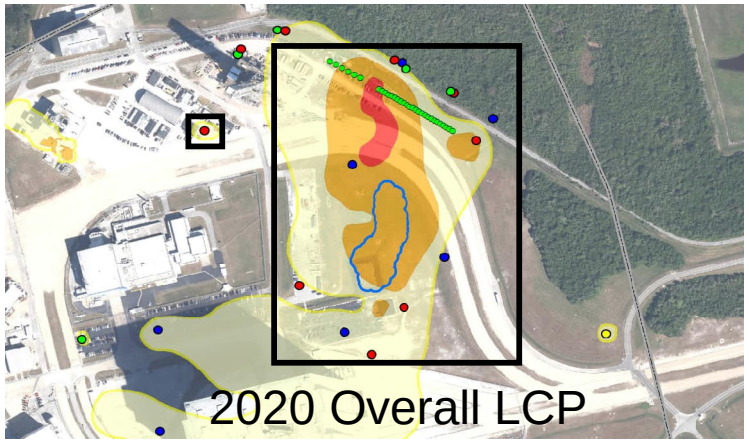


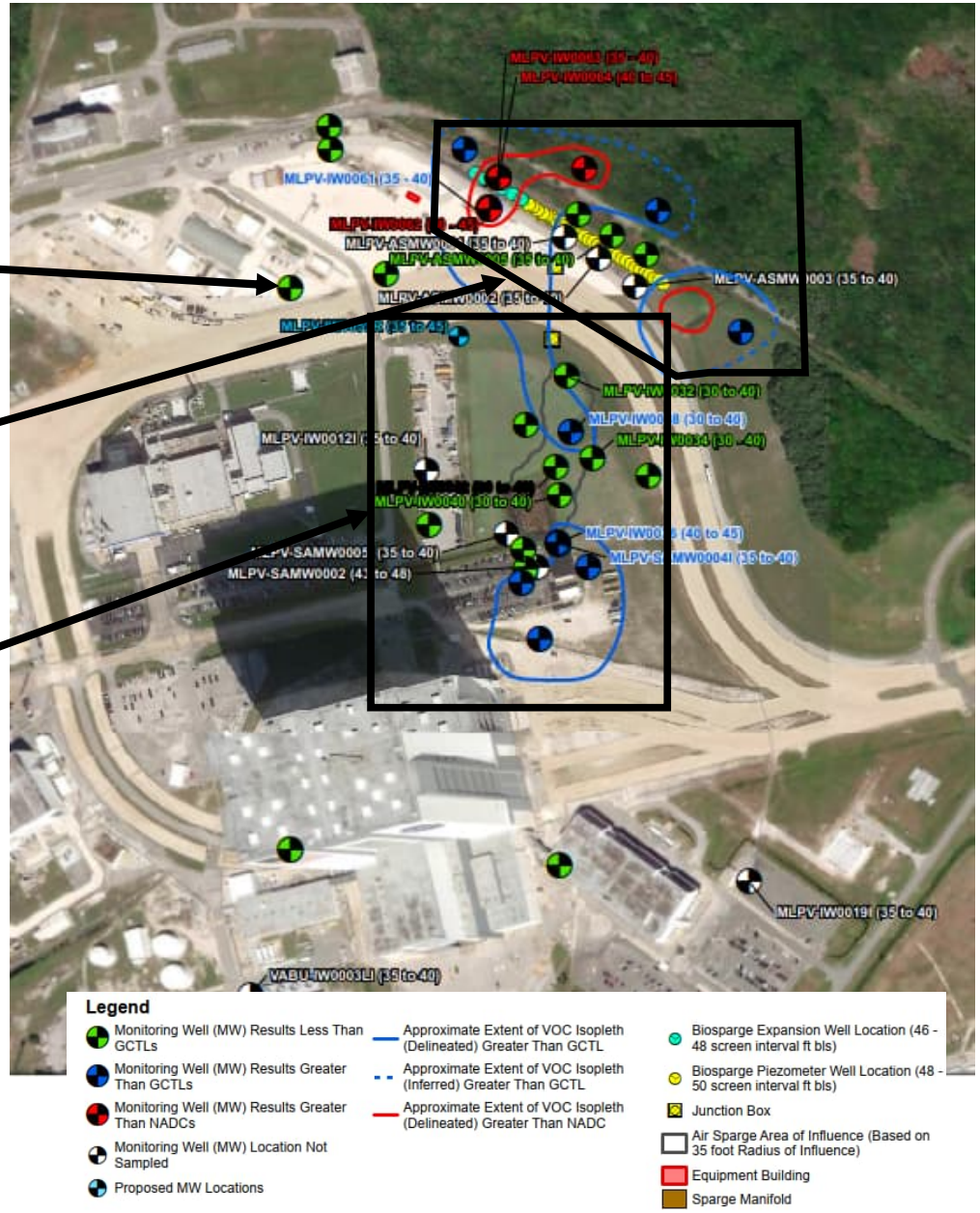
2023

LCP LTM

Analytical Summary - 35 to 45 feet bls

- MW0097 contaminant concentrations below GCTL
  - Confirms collapse of isolated plume
- Exceedances at new wells located in the Biosparge and Former Hot Spot 2 (discussed in the previous sections):
  - BSA well MW0103 (1000 µg/L) exceeded NADC
  - BSA wells MW0107 (21 µg/L) and MW0108 (26 µg/L) and HS2 wells MW0088 (2.3 µg/L) and MW0089 (1.8 µg/L) exceeded GCTL
  - Confirmed partial collapse of plume at this interval and presence of VOCs east of the railroad tracks greater than both NADC and GCTLs and confirmed presence of GCTL plume southeast of biosparge barrier.
- Northeast of VAB (near Former Hot Spot 2):
  - Sampled IW0014I and IW0017I
  - Contaminant concentrations below GCTL.
  - IW0053 was scheduled for sampling but could not be located and is presume destroyed
  - Plume presence is consistent with Former HS2 interim groundwater monitoring results from wells at this interval



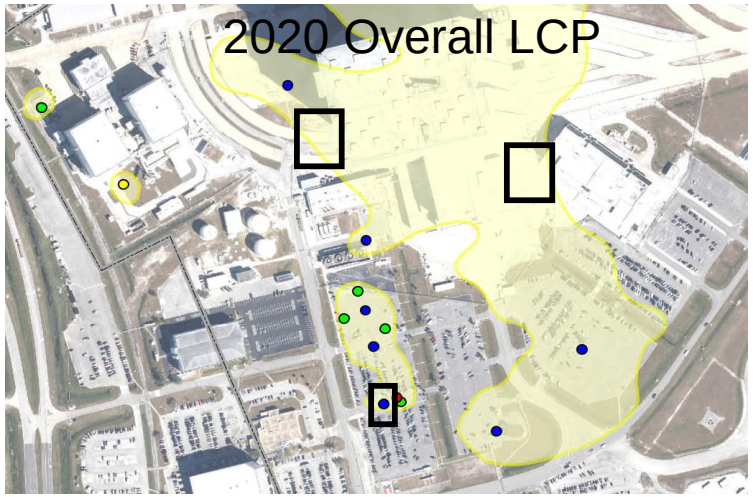


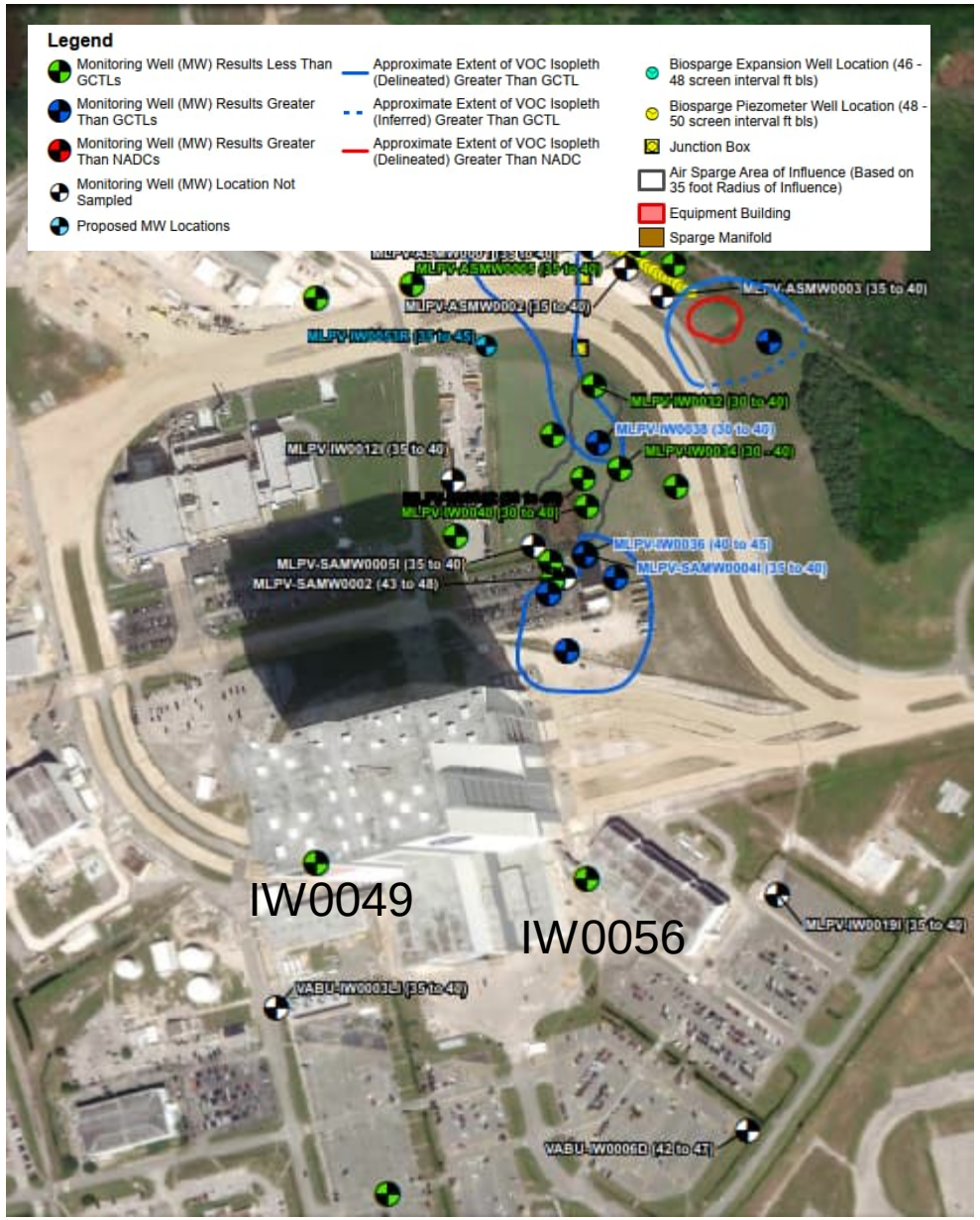
Note: Wells from Biosparge Area and Former Hot Spot 2 sampling plans are displayed

LCP LTM

Analytical Summary - 35 to 45 feet bls

- West of VAB, inside perimeter fence:
  - Sampled IW0049
  - Contaminant concentrations remain below GCTL
- Southeast of VAB, inside perimeter fence:
  - Sampled existing well IW0056
  - Contaminant concentrations remain below GCTL
- South VAB Parking Lots:
  - Sampled new well MW0082
  - Contaminant concentrations below GCTL
  - Confirmed collapse of isolated plume

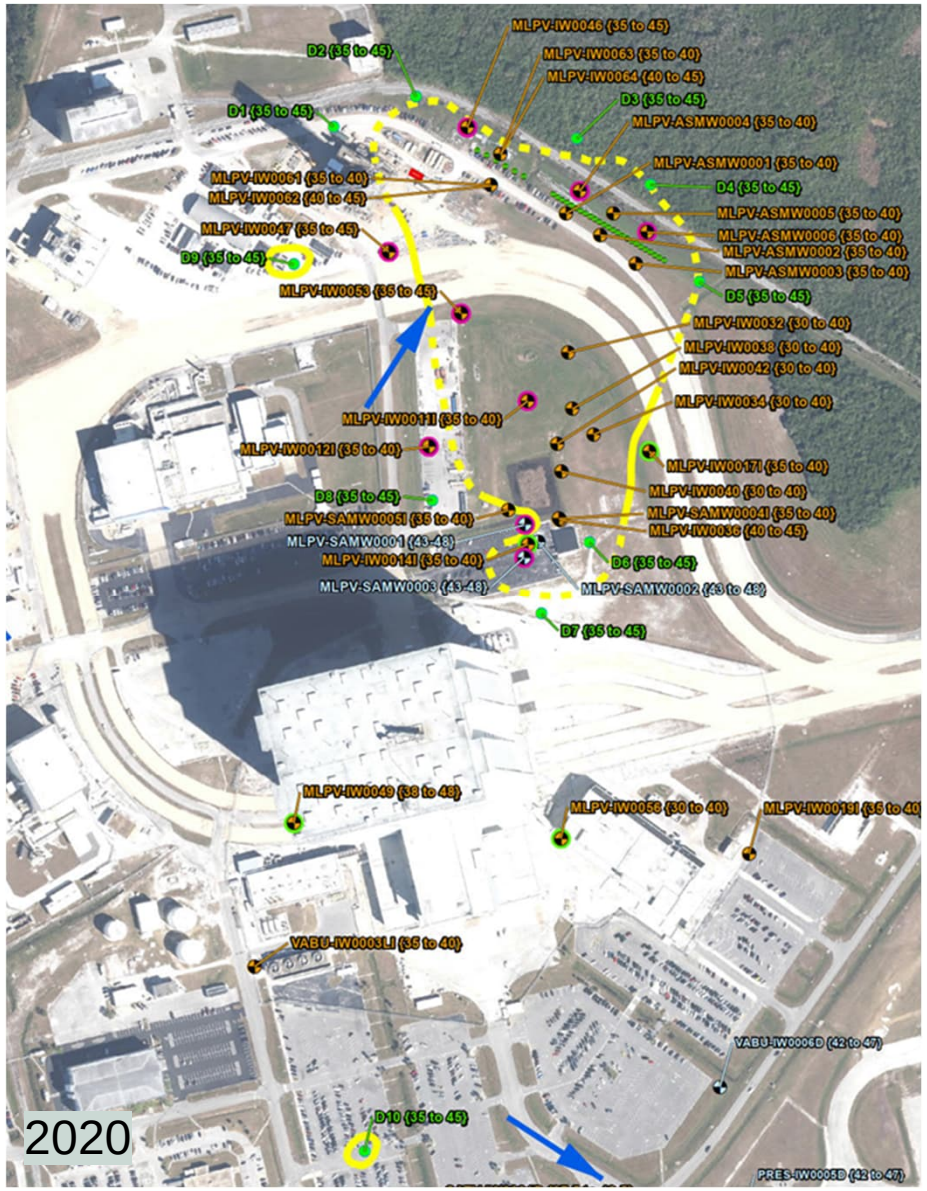




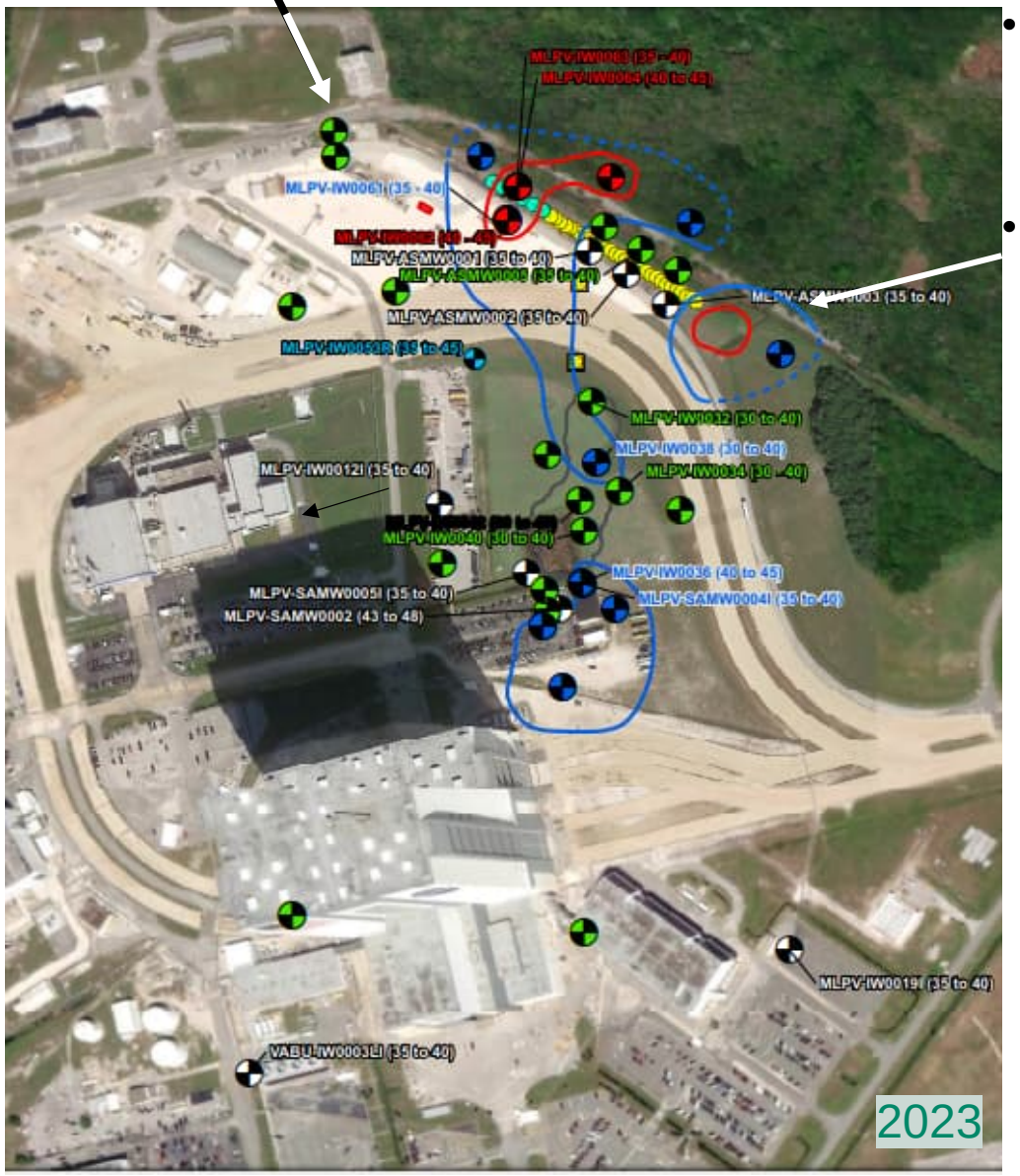
Note: Wells from Biosparge Area and Former Hot Spot 2 sampling plans are displayed

LCP LTM

Analytical Summary - 35 to 45 feet bls



Wells confirm northwest boundary of GCTL plume



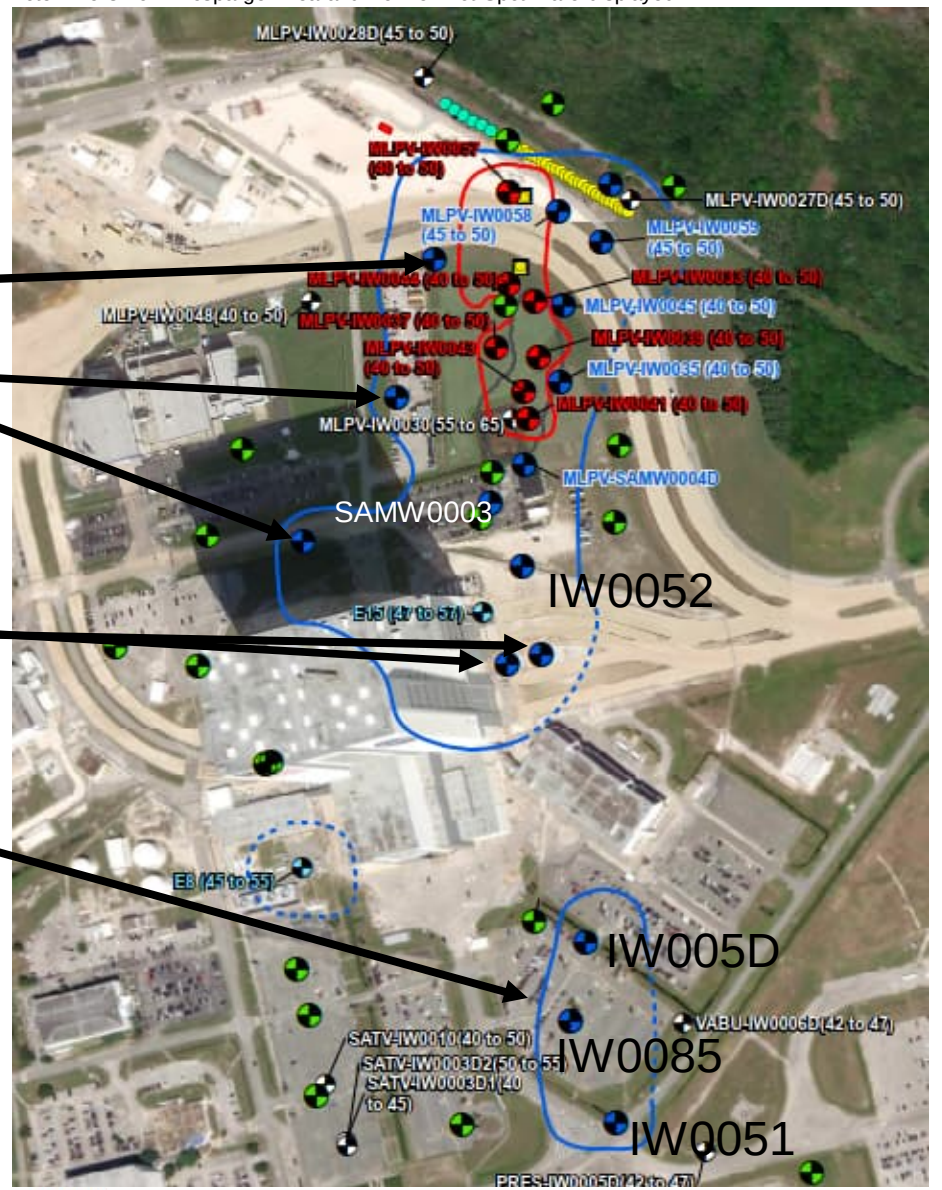
- Overall GCTL reduction in this interval
- Additional boundary wells needed to the southeast of the Biosparge wall.

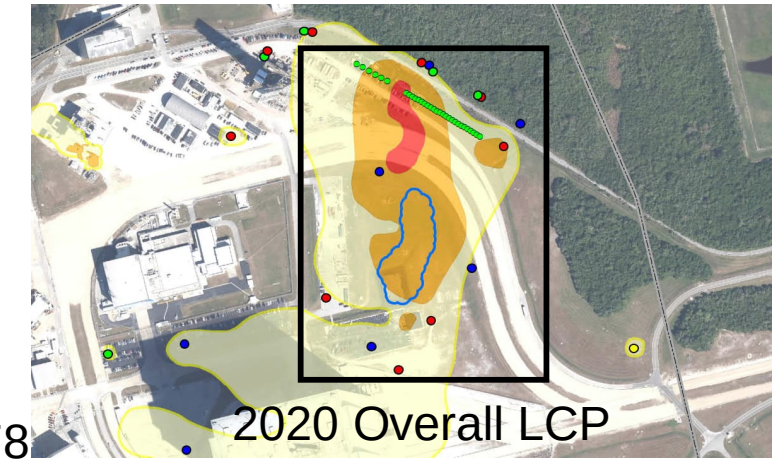
LCP LTM

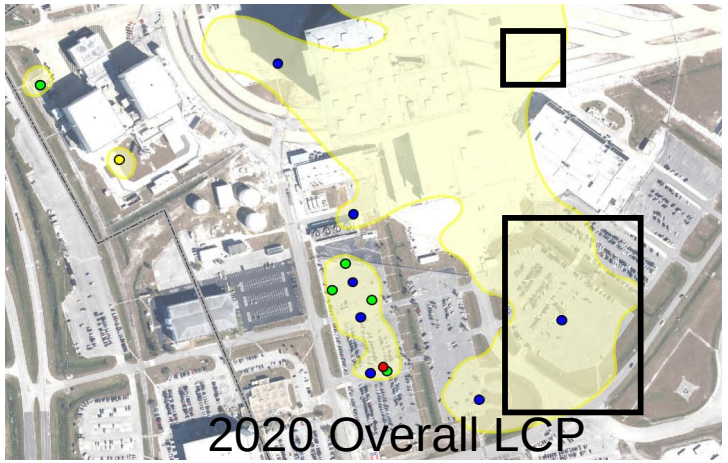
Analytical Summary - 40 to 57 feet bls

- Northeast of VAB:
  - VC exceeded GCTL in IW0009D (23 µg/L)
  - VC in wells IW0012D (2.5 µg/L) and IW0029D (39 µg/L) exceeded GCTL
    - Contaminant concentrations consistent with previous sampling events
  - VC exceeded GCTL in SAMW0003 (67 µg/L) and IW0052 (12 µg/L),
    - Confirmed GCTL plume continues southward
- East of VAB, inside perimeter fence:
  - VC exceeded GCTL in IW0018D (3.6 µg/L) and IW0020D (3.1 µg/L) and remains consistent with previous sampling event (3.1 µg/L)
- South VAB parking lots:
  - VC exceeded GCTL in IW0051 (1.7 µg/L), VAB-IW0005D (2.5 µg/L), and new well MW0085 (1.9 µg/L)
  - Previous events indicate VC below GCTL in IW0051, while VC in VAB-IW0005D fluctuates

Note: Wells from Biosparge Area and Former Hot Spot 2 are displayed





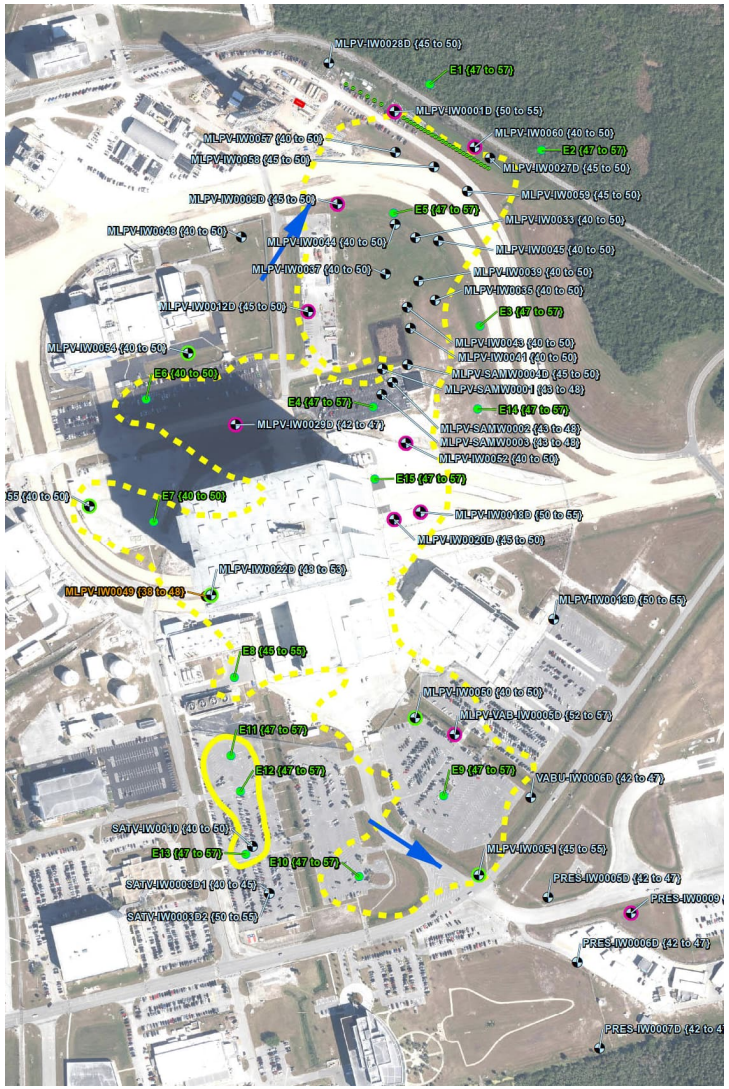


Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Proposed MW Locations
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC
- Biosparge Expansion Well Location (46 - 48 screen interval ft bls)
- Biosparge Piezometer Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold

LCP LTM

Analytical Summary - 40 to 57 feet bls



2020

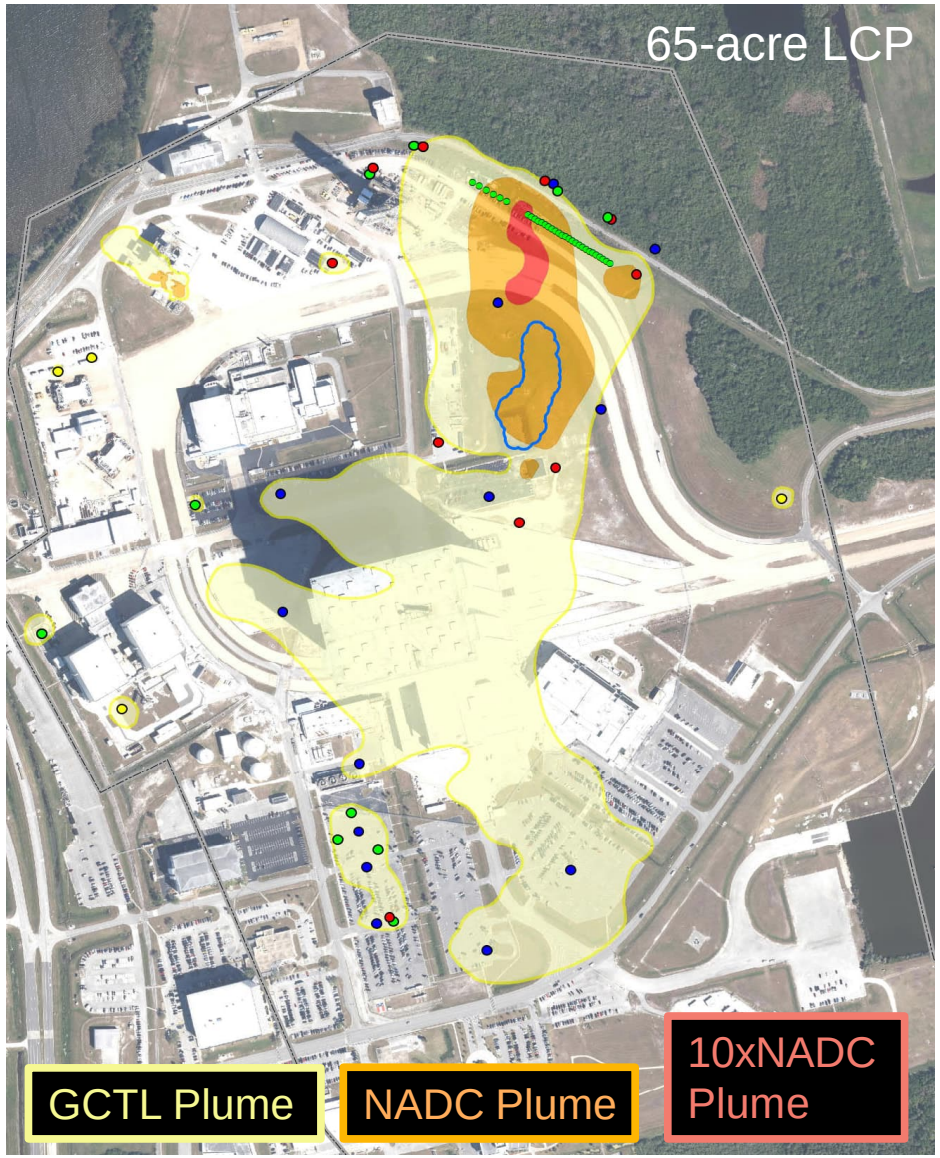


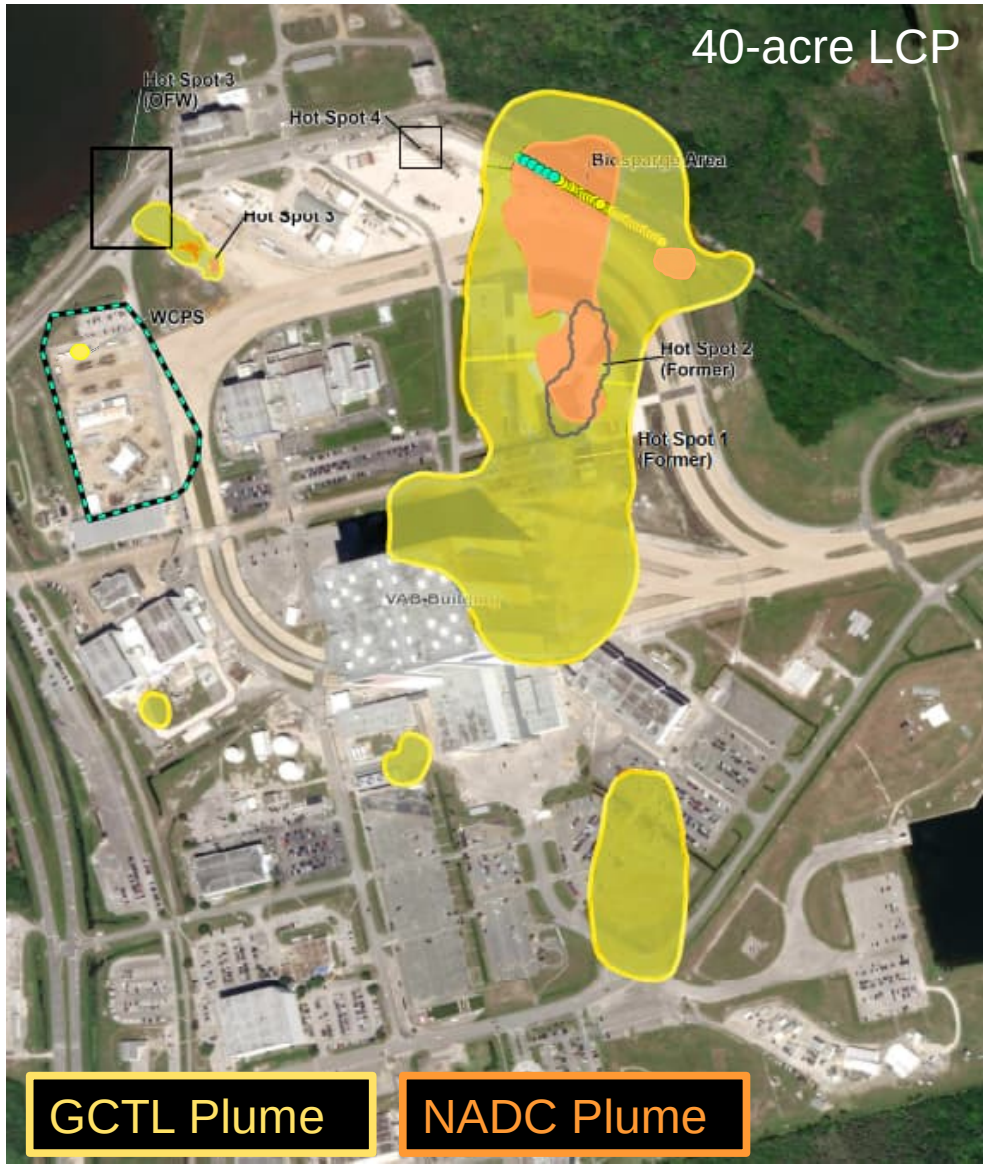
2023

- Comprises the majority of the GCTL plume
- Most likely represents groundwater conditions from 40 to 45 feet bls based on comparison of data from wells screen in this interval.

LCP LTM

Overall Plume 2020 vs 2023





LCP LTM

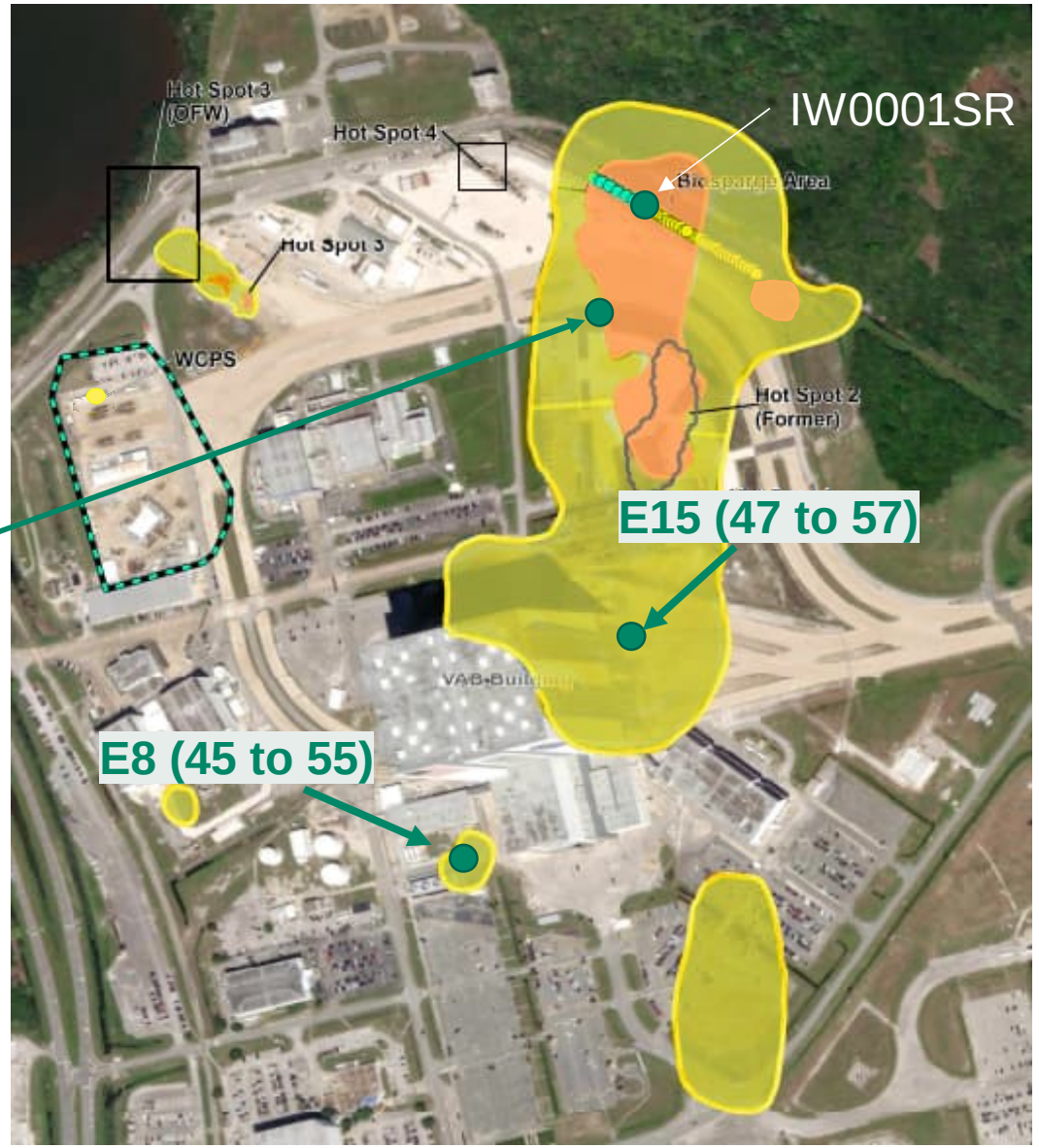
Conclusions

- Install two remaining proposed monitoring wells in the VAB area that were not accessible during previous installations (E8 and E15).

Test Consensus

- Replace well IW0053 (35-45) that historically exceeds GCTLs and is part of the sampling plan

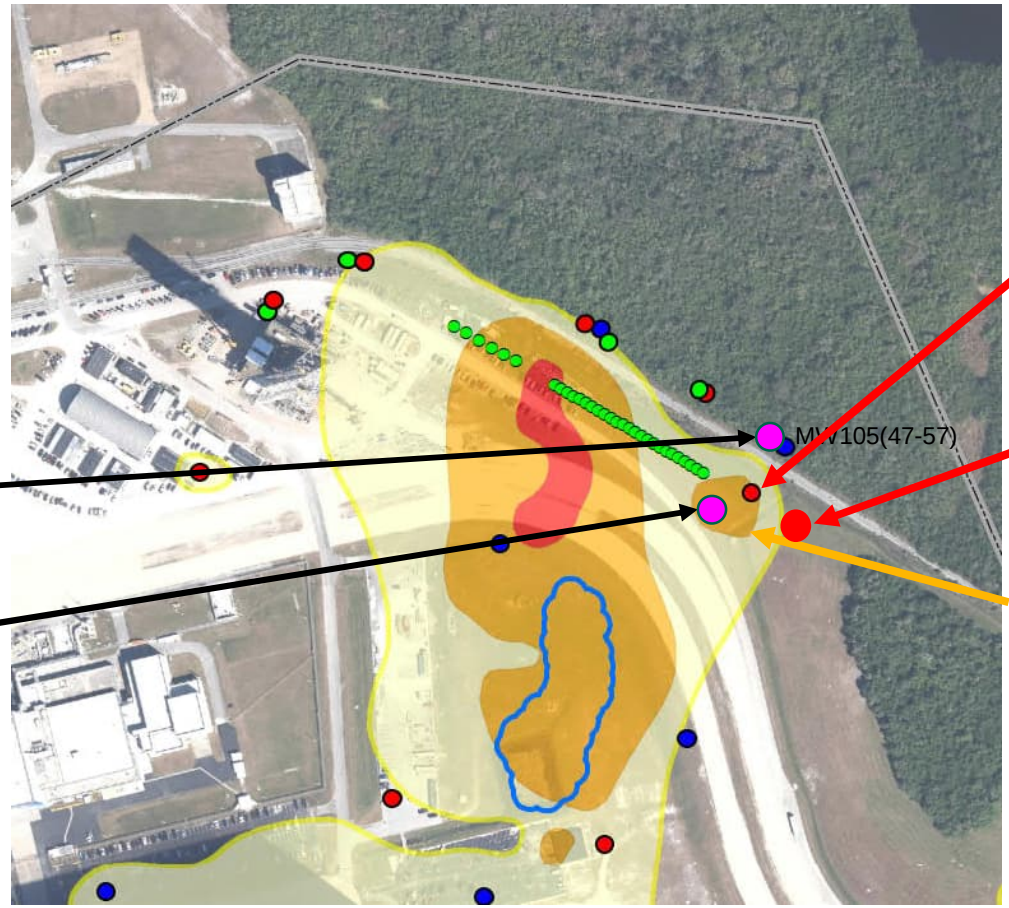
- Replace IW0001SR as part of general well maintenance. This well is not currently part of a sampling plan.



LCP LTM

Test Consensus (Continued)

- Due to restrictions from site layout and conditions in the originally proposed location for MW0108 (35 to 45 feet bls), the well had to be installed further south. Propose installing two additional monitoring wells to verify the NADC concentrations located south of the biosparge wall that were detected during the 2021 DPT groundwater sampling event.
  - One monitoring well, screened 37 to 47 feet bls, located east of the railroad tracks (downgradient, wetland area)
  - One monitoring well, screened 35 to 45 feet bls, located southwest and upgradient of original location for MW0108
- Installation is contingent on access to proposed locations, based on ongoing center operations and surface conditions in the wetland area

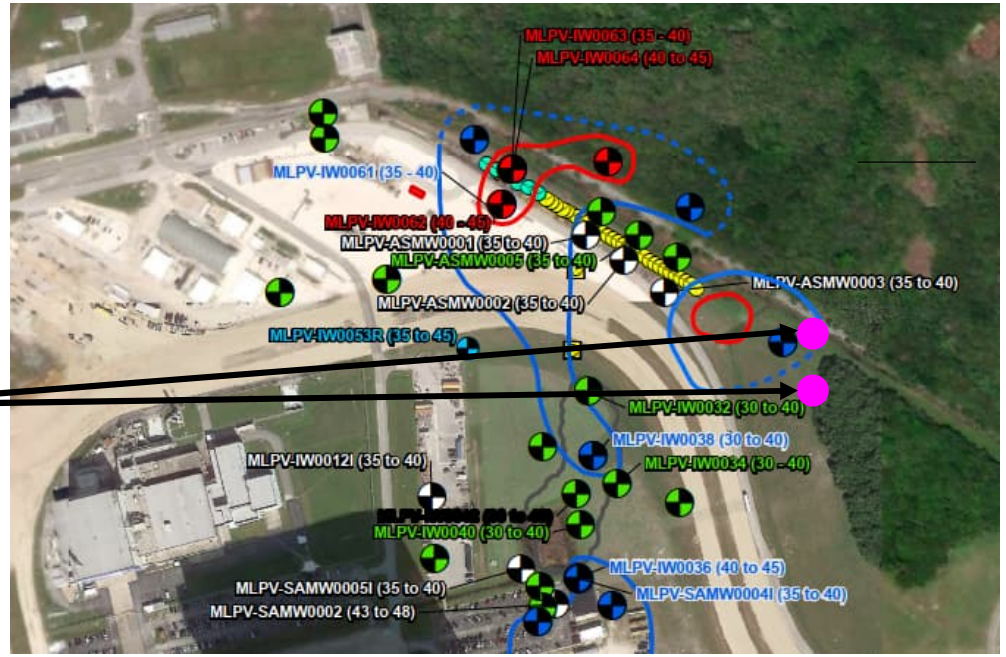


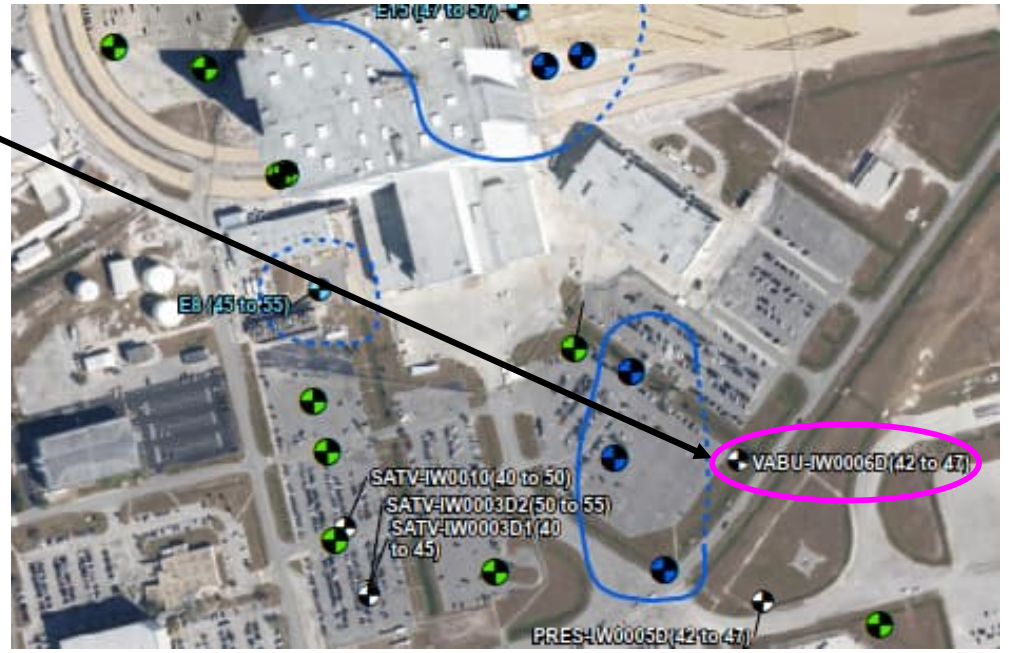
2021 MLPV CMI and IM Report – Proposed Locations

LCP LTM

Test Consensus (Continued)

- Install 2 additional monitoring wells, screened 35 to 45 feet bls, southeast of the biosparge area to provide GCTL boundary data around monitoring well MLPV-MW0108
- Add VABU-IW0006D (42 to 47) to the biennial sampling plan for boundary data to the east of the isolated plume.





LCP LTM

Test Consensus (Continued)

- Continue LTM on a biennial basis
- Remove MW0102, MW0103, and MW0107 from LCP sampling plan and transition to the Biosparge area semi-annual performance monitoring plan.
- Prior to further modifying the LCP LTM well network, collect one additional set of data to have two biennial data sets that reflect 4 years of groundwater conditions from the newly installed monitoring wells
- Add TCE to reported analyte list. Select wells (MW0077, MW0078, MW0081, MW086, MW0097, and MW0098) had TCE concentrations above the GCTL in historic DPT groundwater data. TCE results were obtained following the 2023 sampling event and indicated no detections in these or other wells.

Biennial Sampling and Analysis Plan

(Next event to be scheduled for 2025)

Network Monitored	Location	Screen Interval (feet bls)	Sampling Method	Analytical Parameters
18 Existing LTM Plan Monitoring Wells	MLPV-IW0009D	45 to 50	Low Flow	TCE (add) cDCE, tDCE, VC
	MLPV-IW0009I	28 to 33		
	MLPV-IW0012D	45 to 50		
	MLPV-IW0018D	50 to 55		
	MLPV-IW0020D	45 to 50		
	MLPV-IW0029D	42 to 47		
	MLPV-IW0047	35 to 45		
	MLPV-IW0052	40 to 50		
	MLPV-IW0053R	35 to 45		
	MLPV-SAMW0001	43 to 48		
	MLPV-SAMW0003	43 to 48		
	PRES-IW0009	40 to 50		
	SATV-IW0009I	22 to 27		
	VAB-IW0005D	52 to 57		
	VABU-IW0001I	20 to 30		
	WCPS-IW0001SR	2.5 to 12.5		
	WCPS-IW0016	15 to 25		
	MLPV-IW0001D	50 to 55		
12 Existing Monitoring Wells Added to LTM Plan in 2022	WCPS-IW0005S	2 to 12		
	WCPS-IW0015S	3 to 13		
	MLPV-IW0027I	28 to 33		
	MLPV-IW0014I	35 to 40		
	MLPV-IW0017I	35 to 40		
	MLPV-IW0049	38 to 48		
	MLPV-IW0056	30 to 40		
	MLPVIW0022D	48 to 55		
	MLPV-IW0050	40 to 50		
	MLPV-IW0051	45 to 55		
	MLPV-IW0054	40 to 50		
	MLPV-IW0055	40 to 55		

Network Monitored	Location	Screen Interval (feet bls)	Sampling Method	Analytical Parameters
41 new Monitoring Wells	MLPV-MW0110 (A1)	1 to 10	Low Flow	TCE (add) cDCE, tDCE, and VC
	WCPS-IW0002 SRR (B1)	3 to 13		
	MLPV-MW0100 (B3)	15 to 25		
	MLPV-MW0086 (Z1)	15 to 25		
	MLPV-MW0095 (C1)	25 to 35		
	MLPV-MW0106 (C3)	25 to 35		
	MLPV-IW0002IR (C4)	28 to 33		
	MLPV-MW0109 (C5)	20 to 30		
	MLPV-MW0078 (C6)	25 to 35		
	MLPV-MW0077 (C7)	25 to 35		
	MLPV-MW0081 (C8)	25 to 35		
	MLPV-MW0079 (C9)	25 to 35		
	MLPV-MW0098 (C10)	20 to 30		
	MLPV-MW0096 (D1)	35 to 45		
	MLPV-MW0094 (D2)	35 to 45		
	MLPV-MW0108 (D5)	35 to 45		
	MLPV-MW0088 (D6)	35 to 45		
	MLPV-MW0089 (D7)	35 to 45		
	MLPV-MW0093 (D8)	35 to 45		
	MLPV-MW0097 (D9)	35 to 45		
	MLPV-MW0082 (D10)	35 to 45		
	Proposed well (SE of BS wall)	35 to 45		
	Proposed well (SE of BS wall)	35 to 45		
	Proposed well (SW of original MW0108)	35 to 45		
	Proposed well (E of tracks)	37 to 47		
	VABU-IW0006D	42 o 47		
	MLPV-MW0104 (E1)	47 to 57		
	MLPV-MW0105 (E2)	47 to 57		
	MLPV-MW0091 (E3)	47 to 57		
	MLPV-MW0087 (E4)	47 to 57		
	MLPV-MW0092 (E5)	47 to 57		
	MLPV-MW0099 (E6)	40 to 50		
	MLPV-MW0101 (E7)	40 to 50		
	E8 (Pending Install)	45 to 55		
	MLPV-MW0085 (E9)	47 to 57		
	MLPV-MW0084 (E10)	47 to 57		
	MLPV-MW0076 (E11)	47 to 57		
	MLPV-MW0080 (E12)	47 to 57		
	MLPV-MW0083 (E13)	47 to 57		
	MLPV-MW0090 (E14)	47 to 57		
	E15 (Pending Install)	47 to 57		

Thank you

Hot Spot 3 (OFW)
Hot Spot 4
Biosparge Area
Hot Spot 3
WCPS
Hot Spot 2 (Former)
Hot Spot 1 (Former)
VAB Building

Notes:
1. LTM = Long-term Monitoring.
2. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB).
3. OFW = Outstanding Florida Waters.
4: SWMU = Solid Waste Management Unit.
5. WCPS = West Crawler Park Site.
6. 2021 Aerial: Florida Department of Transportation.

Legend

- Former air sparge area of influence (based on 35 ft)
- OFW Investigation
- WCPS
- Biosparge Well Location (46-48 screen interval ft bls)
- Biosparge Well Location (48-50 screen interval ft bls)
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

N

0 200 400 Feet

Figure 1
Hot Spots - Composite Plume

MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\1-3_MLPV_Area_Hot_Spots_COMPOSITE.mxd

MLPV-IW0046

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0046 06/02/2020 35.0 - 45.0 NM	MLPV-IW0046 03/16/2021 35.0 - 45.0 NM	MLPV-IW0046 09/14/2021 35.0 - 45.0 NM	MLPV-IW0046 03/15/2022 35.0 - 45.0 NM	MLPV-IW0046 04/26/2023 35.0 - 45.0 NM
Analyte					
TCE	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	**2.4**	**2.3**	**2.7**	**2.0**	**1.8**
tDCE	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**18.0**	**13**	**10**	**7.4**	**7.0**

MLPV-IW0031

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0031 11/01/2019 25.0 - 35.0 NM	MLPV-IW0031 03/19/2020 25.0 - 35.0 NM	MLPV-IW0031 09/15/2020 25.0 - 35.0 NM	MLPV-IW0031 03/17/2021 25.0 - 35.0 NM	MLPV-IW0031 09/15/2021 25.0 - 35.0 NM	MLPV-IW0031 03/15/2022 25.0 - 35.0 NM	MLPV-IW0031 04/26/2023 25.0 - 35.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	**0.57 I**	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	**1.9**	0.41 U	**3.4**	**6.1**	**5.6**

MLPV-IW0063

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0063 11/01/2019 35.0 - 40.0 NM	MLPV-IW0063 03/19/2020 35.0 - 40.0 NM	MLPV-IW0063 09/16/2020 35.0 - 40.0 NM	MLPV-IW0063 03/17/2021 35.0 - 40.0 NM	MLPV-IW0063 09/14/2021 35.0 - 40.0 NM	MLPV-IW0063 11/17/2021 35.0 - 40.0 NM	MLPV-IW0063 03/15/2022 35.0 - 40.0 NM	MLPV-IW0063 03/08/2023 35.0 - 40.0 NM
Analyte								
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	2.2 U	0.89 U	8.9 U
cDCE	0.28 U	**0.59 I**	**1.5**	**1.3**	**4.4**	**3.0**	**3.3**	**7.7 I**
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	1.8 U	0.73 U	7.3 U
VC	0.41 U	**0.86 I**	**1.7 JY**	**1.0**	**185**	**190**	**200**	**190**

MLPV-IW0028I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0028I 10/04/2018 28.0 - 33.0 NM	MLPV-IW0028I 06/02/2020 28.0 - 33.0 NM	MLPV-IW0028I 03/16/2021 28.0 - 33.0 NM	MLPV-IW0028I 09/14/2021 28.0 - 33.0 NM	MLPV-IW0028I 03/15/2022 28.0 - 33.0 NM	MLPV-IW0028I 03/15/2023 28.0 - 33.0 NM
Analyte						
TCE	0.61 U	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	0.32 U	0.28 U	0.53 U	0.53 U	0.53 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**5.2**	**6.0**	0.71 U	**2.3**	0.71 U	0.71 U

MLPV-IW0064

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0064 11/01/2019 40.0 - 45.0 NM	MLPV-IW0064 03/19/2020 40.0 - 45.0 NM	MLPV-IW0064 09/16/2020 40.0 - 45.0 NM	MLPV-IW0064 03/17/2021 40.0 - 45.0 NM	MLPV-IW0064 09/14/2021 40.0 - 45.0 NM	MLPV-IW0064 11/17/2021 40.0 - 45.0 NM	MLPV-IW0064 03/15/2022 40.0 - 45.0 NM	MLPV-IW0064 03/08/2023 40.0 - 45.0 NM
Analyte								
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	4.4 U	4.4 U	22 U
cDCE	**0.93 I**	**1.7**	**4.6**	**4.1**	**15.3**	**14**	**11**	13 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	3.6 U	3.6 U	18 U
VC	0.41 U	**7.5**	**1.5**	**5.0**	**235**	**380**	**370**	**460**

MLPV-IW0062R

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0062R 09/16/2020 28.0 - 33.0 NM	MLPV-IW0062R 03/16/2021 28.0 - 33.0 NM	MLPV-IW0062R 09/15/2021 28.0 - 33.0 NM	MLPV-IW0062R 03/15/2022 28.0 - 33.0 NM	MLPV-IW0062R 03/08/2023 28.0 - 33.0 NM
Analyte					
TCE	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	0.28 U	**0.77 I**	0.53 U	**0.59 I**	0.53 U
tDCE	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	0.41 U	**3.7**	**1.8**	**1.6**	0.71 U

MLPV-MW0094

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0094 03/08/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0104

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0104 03/10/2023 47.0 - 57.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0102

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0102 03/10/2023 25.0 - 35.0 NM
Analyte	
TCE	0.89 U
cDCE	**9.6**
tDCE	**2.8**
VC	**440**

MLPV-IW0001D

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0001D 06/03/2020 50.0 - 55.0 NM	MLPV-IW0001D 09/16/2020 50.0 - 55.0 NM	MLPV-IW0001D 03/09/2023 50.0 - 55.0 NM
Analyte			
TCE	0.35 U	0.35 U	0.89 U
cDCE	0.28 U	0.28 U	0.53 U
tDCE	0.22 U	0.22 U	0.73 U
VC	**2.1**	0.41 U	0.71 U

MLPV-MW0095

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0095 03/08/2023 25.0 - 35.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0103

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0103 03/10/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	**30**
tDCE	**3.7**
VC	**1000**

MLPV-ASMW0004

Location ID / Date / Screen Interval / Sample Type	MLPV-ASMW0004 11/01/2019 35.0 - 40.0 NM	MLPV-ASMW0004 03/19/2020 35.0 - 40.0 NM	MLPV-ASMW0004 09/16/2020 35.0 - 40.0 NM	MLPV-ASMW0004 03/17/2021 35.0 - 40.0 NM	MLPV-ASMW0004 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0004 11/17/2021 35.0 - 40.0 NM	MLPV-ASMW0004 03/15/2022 35.0 - 40.0 NM	MLPV-ASMW0004 04/26/2023 35.0 - 40.0 NM
Analyte								
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	4.4 U	2.2 U	0.89 U
cDCE	**8.4**	0.28 U	0.28 U	**11.4**	**8.0**	**4.3**	0.53 U	
tDCE	**0.52 I**	0.22 U	**0.76 I**	**0.30 I**	**8.3**	**8.0**	**4.3**	0.73 U
VC	0.41 U	0.41 U	**8.7**	0.41 U	**926**	**500**	**290**	0.71 U

MLPV-MW0096

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0096 03/08/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0107

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0107 03/10/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	**0.75 I**
tDCE	0.73 U
VC	**21**

MLPV-MW0106

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0106 03/10/2023 25.0 - 35.0 NM
Analyte	
TCE	0.89 U
cDCE	**0.54 I**
tDCE	0.73 U
VC	0.71 U

MLPV-IW0002IR

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0002IR 03/08/2023 28.0 - 33.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0062

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0062 10/31/2019 40.0 - 45.0 NM	MLPV-IW0062 03/19/2020 40.0 - 45.0 NM	MLPV-IW0062 09/16/2020 40.0 - 45.0 NM	MLPV-IW0062 03/16/2021 40.0 - 45.0 NM	MLPV-IW0062 09/13/2021 40.0 - 45.0 NM	MLPV-IW0062 03/15/2022 40.0 - 45.0 NM	MLPV-IW0062 04/26/2023 40.0 - 45.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	4.5 U
cDCE	**5.0**	**4.2**	**3.2**	**4.3**	**3.9**	**3.6**	2.7 U
tDCE	**0.57 I**	**0.55 I**	**0.36 I**	**0.48 I**	0.22 U	0.73 U	3.7 U
VC	**834**	**593**	**543**	**430**	**240**	**170**	**120**

MLPV-IW0061

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0061 10/31/2019 35.0 - 40.0 NM	MLPV-IW0061 03/19/2020 35.0 - 40.0 NM	MLPV-IW0061 09/16/2020 35.0 - 40.0 NM	MLPV-IW0061 03/16/2021 35.0 - 40.0 NM	MLPV-IW0061 09/13/2021 35.0 - 40.0 NM	MLPV-IW0061 03/15/2022 35.0 - 40.0 NM	MLPV-IW0061 04/26/2023 35.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	0.28 U	**0.46 I**	0.28 U	**0.50 I**	0.28 U	**0.63 I**	**0.58 I**
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**20.6**	**16.6**	**18.4**	**15.7**	**13.0**	**13.0**	**8.7**

MLPV-IW0047

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0047 10/04/2018 35.0 - 45.0 NM	MLPV-IW0047 06/02/2020 35.0 - 45.0 NM	MLPV-IW0047 04/26/2023 35.0 - 45.0 NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.39 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**0.89 I**	**0.56 I**	0.71 U

MLPV-MW0097

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0097 04/26/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0057

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0057 11/01/2019 40.0 - 50.0 NM	MLPV-IW0057 03/19/2020 40.0 - 50.0 NM	MLPV-IW0057 09/16/2020 40.0 - 50.0 NM	MLPV-IW0057 03/17/2021 40.0 - 50.0 NM	MLPV-IW0057 09/14/2021 40.0 - 50.0 NM	MLPV-IW0057 03/14/2022 40.0 - 50.0 NM	MLPV-IW0057 04/26/2023 40.0 - 50.0 NM
Analyte							
TCE	0.35 U	0.35 U	1.7 U	0.35 U	3.5 U	2.2 U	8.9 U
cDCE	**23.8**	**13.2**	**15.8**	**14.4**	**8.8 I**	**7.5**	5.3 U
tDCE	**6.9**	**6.8**	**3.7 I**	**4.9**	2.2 U	**2.5**	7.3 U
VC	**920**	**638**	**935**	**806**	**457**	**350**	**280**

MLPV-IW0027I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0027I 03/09/2023 26.0 - 33.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0060

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0060 11/01/2019 40.0 - 50.0 NM	MLPV-IW0060 03/19/2020 40.0 - 50.0 NM	MLPV-IW0060 09/16/2020 40.0 - 50.0 NM	MLPV-IW0060 03/17/2021 40.0 - 50.0 NM	MLPV-IW0060 09/15/2021 40.0 - 50.0 NM	MLPV-IW0060 03/14/2022 40.0 - 50.0 NM	MLPV-IW0060 03/09/2023 40.0 - 50.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	**0.82 I**	**0.69 I**	0.28 U	0.28 U	0.28 U	**1.1**	**0.88 I**
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**2.2**	0.73 U
VC	**0.90 I**	**1.1**	**1.0**	**1.3**	**0.90 I**	**88**	**4.6**

MLPV-MW0105

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0105 03/10/2023 47.0 - 57.0 NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-ASMW0005

Location ID / Date / Screen Interval / Sample Type	MLPV-ASMW0005 11/01/2019 35.0 - 40.0 NM	MLPV-ASMW0005 03/19/2020 35.0 - 40.0 NM	MLPV-ASMW0005 09/16/2020 35.0 - 40.0 NM	MLPV-ASMW0005 03/17/2021 35.0 - 40.0 NM	MLPV-ASMW0005 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0005 03/14/2022 35.0 - 40.0 NM	MLPV-ASMW0005 04/26/2023 35.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	0.28 U	0.28 U	0.28 U	0.28 U	**1.1**	**2.6**	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	0.41 U	0.41 U	**3.0**	**36**	0.71 U

MLPV-ASMW0006

Location ID / Date / Screen Interval / Sample Type	MLPV-ASMW0006 11/01/2019 35.0 - 40.0 NM	MLPV-ASMW0006 03/19/2020 35.0 - 40.0 NM	MLPV-ASMW0006 09/16/2020 35.0 - 40.0 NM	MLPV-ASMW0006 03/17/2021 35.0 - 40.0 NM	MLPV-ASMW0006 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0006 03/14/2022 35.0 - 40.0 NM	MLPV-ASMW0006 04/26/2023 35.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	**0.62 I**	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**0.47 I**	**1.5**	**1.7**	0.41 U	0.41 U	**96**	0.71 U

MLPV-MW0108

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0108 04/26/2023 35.0 - 45.0 NM
Analyte	
TCE	0.89 U
cDCE	**1.2**
tDCE	0.73 U
VC	**26**

MLPV-IW0059

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0059 10/31/2019 45.0 - 50.0 NM	MLPV-IW0059 03/19/2020 45.0 - 50.0 NM	MLPV-IW0059 09/16/2020 45.0 - 50.0 NM	MLPV-IW0059 03/17/2021 45.0 - 50.0 NM	MLPV-IW0059 09/14/2021 45.0 - 50.0 NM	MLPV-IW0059 03/14/2022 45.0 - 50.0 NM	MLPV-IW0059 03/09/2023 45.0 - 50.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U
cDCE	**0.38 I**	**0.76 I**	0.28 U	**0.73 I**	0.28 U	**0.73 I**	0.53 U
tDCE	**2.0**	**1.5**	**1.2**	**1.3**	0.22 U	**1.1**	0.73 U
VC	**6.9**	**34.6**	**39.8**	**46.1**	**4.4**	**37**	**8.4**

MLPV-IW0058

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0058 11/01/2019 45.0 - 50.0 NM	MLPV-IW0058 03/19/2020 45.0 - 50.0 NM	MLPV-IW0058 09/16/2020 45.0 - 50.0 NM	MLPV-IW0058 03/17/2021 45.0 - 50.0 NM	MLPV-IW0058 09/14/2021 45.0 - 50.0 NM	MLPV-IW0058 03/14/2022 45.0 - 50.0 NM	MLPV-IW0058 03/09/2023 45.0 - 50.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.69 U	0.89 U	4.5 U
cDCE	**6.5**	**7.9**	**6.1**	**10.8**	**5.5**	**9.4**	**5.7**
tDCE	0.22 U	**0.54 I**	0.22 U	**0.70 I**	0.44 U	**1.1**	3.7 U
VC	**77.1**	**65.9**	**70.0**	**107**	**101**	**88**	**90**

MLPV-IW0028D (40 - 57)
MLPV-IW0002I (20 - 35)
VABRA-MW0010 (1 - 25)
BSWW39
BSWW37
BSWW38
BSWW36
BSWW35
BSWW33
BSWW32
BSWW34
MLPV-IW0001S (1 - 25)
MLPV-IW0001I (20 - 35)
BSWW31
ASWW1
ASWW2
ASWW3
ASWW4
ASWW5
ASWW6
ASWW7
ASWW8
ASWW9
ASWW10
ASWW11
ASWW12
ASWW13
ASWW14
ASWW15
ASWW17
ASWW18
ASWW19
ASWW20
ASWW21
ASWW22
ASWW23
ASWW24
ASWW25
ASMW0001 (35 - 45)
ASPZ0001R
ASMW0002 (35 - 45)
ASPZ0002
ASMW0003 (35 - 45)
MLPV-IW0027D (40 - 57)
MLPV-IW0009I (28 - 33)
MLPV-IW0009D (45 - 50)
MLPV-IW0053 (35 - 45)
MLPV-IW0044 (40 - 60)
MLPV-IW0033 (40 - 50)
MLPV-IW0032 (30 - 40)
MLPV-IW0045 (40 - 50)
MLPV-IW0092 (47 - 57)
OPF3-IW0007S (1 - 25)
MLPV-IW0048 (40 - 57)
OPF3-IW0006S (10 - 20)

Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. NS = Not sampled
5. U = The analyte was undetected
6. 2019 Aerial Source: FDOT
7. Results shown in micrograms per Liter (µg/L).
8. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
9. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
10. **Red** text indicates the analyte was detected at concentrations above its NADC.
11. IW0032, IW0038, IW0040 and IW0042 are sampled annually. Remaining wells are sampled semi-annually. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
12. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
13. Well IW0032, IW0033, and IW0044 were not accessible during the September 2020 sampling event. Therefore, wells were sampled in November 2020.
14. Wells IW0021, 32, 35, 40, 44, and 45 were not located during the September 2021 sampling event due to construction activities in the sampling area.
15. Monitoring wells MLPV-IW0031, IW0046, IW0047, IW0057, IW0061, IW0062, MW0108, ASMW0004, ASMW0005, ASMW0006, were resampled on April 26, 2023. Results from this event are present in place of data collected in March 2023 for these wells only.
16. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

0 50 100 200 Feet

Map Scale: 1":58'

N

Figure 2
Groundwater Analytical Results
Composite CVOC
March and April 2023

Biosparge Area
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

MLPV-IW0091

Location ID	MLPV-IW0091	MLPV-IW0091	MLPV-IW0091
Date	10/04/2018	06/03/2020	03/14/2023
Screen Interval	28.0 - 33.0	28.0 - 33.0	28.0 - 33.0
Sample Type	NM	NM	NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.43 I**	**0.33 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.6**	**0.72 I**	0.71 U

MLPV-IW0044

Location ID	MLPV-IW0044	MLPV-IW0044	MLPV-IW0044	MLPV-IW0044	MLPV-IW0044	MLPV-IW0044	MLPV-IW0044
Date	10/31/2019	03/18/2020	11/30/2020	03/16/2021	03/15/2021	04/21/2022	03/14/2023
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS
cDCE	**2.9**	**6.9**	**2.8**	**3.4**	**2.5**	**22**	
tDCE	**1.8**	**2.2**	**0.88 I**	**1.0**	0.73 U	7.3 U	
VC	**458**	**325**	**307**	**249**	**200**	**620**	

MLPV-IW0037

Location ID	MLPV-IW0037	MLPV-IW0037	MLPV-IW0037	MLPV-IW0037	MLPV-IW0037	MLPV-IW0037	MLPV-IW0037
Date	10/31/2019	03/18/2020	09/15/2020	03/16/2021	09/13/2021	04/21/2022	03/09/2023
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
TCE	0.69 U	0.86 U	NS	NS	NS	NS	NS
cDCE	**135**	**132**	**55.4**	**138**	**25.1**	**100**	**79 Q**
tDCE	0.44 U	**0.67 I**	**0.52 I**	**0.71 I**	**0.47 I**	0.73 U	0.73 U
VC	**178**	**245**	**208 L**	**269**	**99.3**	**200**	**170 Q**

MLPV-IW0011I

Location ID	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I	MLPV-IW0011I
Date	10/31/2019	03/18/2020	09/15/2020	03/16/2021	09/13/2021	04/21/2022	03/09/2023	
Screen Interval	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	
Sample Type	NM	NM	NM	NM	NM	NM	NM	
Analyte								
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS	
cDCE	0.28 U	**0.35 I**	0.28 U	0.28 U	0.28 U	0.53 U	0.53 U	
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	
VC	**0.48 I**	**0.92 I**	0.41 U	**0.46 I**	0.41 U	0.71 U	0.71 U	

MLPV-IW0012D

Location ID	MLPV-IW0012D	MLPV-IW0012D	MLPV-IW0012D
Date	10/04/2018	06/03/2020	03/16/2023
Screen Interval	45.0 - 50.0	45.0 - 50.0	45.0 - 50.0
Sample Type	NM	NM	NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	0.32 U	**0.44 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**4.8**	**9.7**	**2.5**

MLPV-SAMW0001

Location ID	MLPV-SAMW0001	MLPV-SAMW0001	MLPV-SAMW0001
Date	10/03/2018	06/03/2020	04/26/2023
Screen Interval	43.2 - 47.7	43.2 - 47.7	43.2 - 47.7
Sample Type	NM	NM	NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.52 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.8**	0.41 U	0.71 U

MLPV-SAMW0003

Location ID	MLPV-SAMW0003	MLPV-SAMW0003	MLPV-SAMW0003
Date	10/03/2018	06/03/2020	03/16/2023
Screen Interval	42.7 - 47.7	42.7 - 47.7	42.7 - 47.7
Sample Type	NM	NM	NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**1.1**	0.28 U	**95**
tDCE	**3.9**	**2.9**	**6.1**
VC	**1.5**	**3.3**	**67**

MLPV-SAMW0004I

Location ID	MLPV-SAMW0004I	MLPV-SAMW0004I	MLPV-SAMW0004I	MLPV-SAMW0004I	MLPV-SAMW0004I	MLPV-SAMW0004I	MLPV-SAMW0004I
Date	10/31/2019	03/18/2020	03/15/2021	09/14/2021	03/15/2022	03/13/2023	
Depth Interval (ft)	37.5 - 37.5	37.5 - 37.5	37.5 - 37.5	37.5 - 37.5	37.5 - 37.5	37.5 - 37.5	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
cDCE	**0.40 I**	0.28 U	**0.61 I**	0.28 U	**0.56 I**	**0.74 I**	
tDCE	0.22 U	0.22 U	**0.41 I**	0.22 U	0.73 U	0.73 U	
TCE	0.35 U	0.35 U	NS	NS	NS	NS	
VC	**15.9**	**13.8**	**19.4**	**15.5**	**15**	**12**	

MLPV-SAMW0004D

Location ID	MLPV-SAMW0004D	MLPV-SAMW0004D	MLPV-SAMW0004D	MLPV-SAMW0004D	MLPV-SAMW0004D	MLPV-SAMW0004D	MLPV-SAMW0004D
Date	10/31/2019	03/18/2020	03/15/2021	09/14/2021	03/14/2022	03/13/2023	
Depth Interval (ft)	47.5 - 47.5	47.5 - 47.5	47.5 - 47.5	47.5 - 47.5	47.5 - 47.5	47.5 - 47.5	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
cDCE	**0.32 I**	**3.1**	**2.4**	**0.65 I**	**2.3**	**1.9**	
tDCE	**0.37 I**	**0.58 I**	**0.59 I**	**0.67 I**	**0.94 I**	**1.2**	
TCE	0.35 U	0.35 U	NS	NS	NS	NS	
VC	**2.6**	**22.2**	**14.6**	**5.0**	**17**	**18**	

MLPV-IW0036

Location ID	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036	MLPV-IW0036
Date	10/31/2019	03/18/2020	09/15/2020	03/15/2021	09/14/2021	03/16/2022	04/26/2023	
Screen Interval	40.0 - 45.0	40.0 - 45.0	40.0 - 45.0	40.0 - 45.0	40.0 - 45.0	40.0 - 45.0	40.0 - 45.0	
Sample Type	NM	NM	NM	NM	NM	NM	NM	
Analyte								
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS	
cDCE	0.28 U	**0.34 I**	0.28 U	**0.47 I**	**0.60 I**	**1.4**	**0.84 I**	
tDCE	**0.33 I**	**0.33 I**	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	
VC	**9.1**	**22.1**	**5.5**	**24.9**	**32.3**	**44**	**29**	

MLPV-MW0093

Location ID	MLPV-MW0093
Date	03/15/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**0.85 I**

MLPV-IW0014I

Location ID	MLPV-IW0014I
Date	03/14/2023
Screen Interval	35.0 - 40.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**0.98 I**

MLPV-MW0087

Location ID	MLPV-MW0087
Date	03/13/2023
Screen Interval	47.0 - 57.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0092

Location ID	MLPV-MW0092
Date	03/09/2023
Screen Interval	47.0 - 57.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0009D

Location ID	MLPV-IW0009D	MLPV-IW0009D	MLPV-IW0009D
Date	10/04/2018	06/03/2020	03/13/2023
Screen Interval	45.0 - 50.0	45.0 - 50.0	45.0 - 50.0
Sample Type	NM	NM	NM
Analyte			
TCE	0.61 U	0.35 U	0.89 U
cDCE	**0.50 I**	**1.4**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**16**	**32.6**	**23**

MLPV-IW0033

Location ID	MLPV-IW0033	MLPV-IW0033	MLPV-IW0033	MLPV-IW0033	MLPV-IW0033	MLPV-IW0033
Date	10/31/2019	03/18/2020	11/30/2020	03/16/2021	04/21/2022	03/14/2023
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TCE	1.7 U	**0.44 I**	NS	NS	NS	NS
cDCE	**58.4**	**55.9**	**82.3**	**49.6**	**100**	**57**
tDCE	1.1 U	**9.6**	**7.7**	**6.3**	**9.8**	18 U
VC	**365**	**455**	**497**	**471**	**950**	**560**

MLPV-IW0045

Location ID	MLPV-IW0045	MLPV-IW0045	MLPV-IW0045	MLPV-IW0045	MLPV-IW0045	MLPV-IW0045	MLPV-IW0045
Date	10/31/2019	03/18/2020	09/15/2020	03/16/2021	04/21/2022	03/14/2023	
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
TCE	0.35 U	0.35 U	NS	NS	NS	NS	
cDCE	**4.8**	**20.0**	**6.4**	**75.8**	**6.3**	**11**	
tDCE	**3.6**	**5.7**	**4.2**	**7.8**	**0.95 I**	**1.6**	
VC	**97.2**	**207**	**205 L**	**295**	**92**	**59**	

MLPV-IW0032

Location ID	MLPV-IW0032	MLPV-IW0032	MLPV-IW0032	MLPV-IW0032	MLPV-IW0032	MLPV-IW0032
Date	03/18/2020	11/30/2020	03/16/2021	04/21/2022	03/14/2023	
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	
Sample Type	NM	NM	NM	NM	NM	
Analyte						
TCE	0.35 U	NS	NS	NS	NS	
cDCE	**0.35 I**	**0.68 I**	**0.84 I**	**0.75 I**	0.53 U	
tDCE	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	
VC	0.41 U	**0.49 I**	**1.6**	**3.1**	**1.3**	

MLPV-IW0038

Location ID	MLPV-IW0038	MLPV-IW0038	MLPV-IW0038	MLPV-IW0038	MLPV-IW0038
Date	03/18/2020	03/15/2021	03/16/2022	04/26/2023	
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	
Sample Type	NM	NM	NM	NM	
Analyte					
TCE	0.35 U	NS	NS	NS	
cDCE	**0.54 I**	**1.2**	**0.63 I**	**0.85 I**	
tDCE	0.22 U	0.22 U	0.73 U	0.73 U	
VC	0.41 U	**2.3**	**1.1**	**1.8**	

MLPV-IW0039

Location ID	MLPV-IW0039	MLPV-IW0039	MLPV-IW0039	MLPV-IW0039	MLPV-IW0039	MLPV-IW0039	MLPV-IW0039
Date	10/31/2019	03/18/2020	09/15/2020	03/15/2021	09/14/2021	03/16/2022	04/26/2023
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
TCE	0.86 U	0.86 U	NS	NS	NS	NS	NS
cDCE	**198**	**128**	**92.1**	**161**	**76.9**	**140**	**150**
tDCE	**4.6**	**4.4**	**3.9**	**6.5**	**3.3**	**5.4**	4.2 I
VC	**241**	**228**	**276 L**	**236**	**191**	**160**	**270**

MLPV-IW0034

Location ID	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034	MLPV-IW0034
Date	10/31/2019	03/18/2020	09/15/2020	03/15/2021	09/14/2021	03/15/2022	03/09/2023	
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	
Sample Type	NM	NM	NM	NM	NM	NM	NM	
Analyte								
TCE	0.35 U	0.35 U	NS	NS	NS	NS	NS	
cDCE	0.28 U	0.28 U	0.28 U	**0.41 I**	0.28 U	**0.62 I**	**0.54 I**	
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	
VC	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	**0.92 I**	0.71 U	

MLPV-IW0017I

Location ID	MLPV-IW0017I
Date	03/14/2023
Screen Interval	35.0 - 40.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-IW0035

Location ID	MLPV-IW0035	MLPV-IW0035	MLPV-IW0035	MLPV-IW0035	MLPV-IW0035	MLPV-IW0035	MLPV-IW0035
Date	10/31/2019	03/18/2020	09/15/2020	03/15/2021	04/21/2022	03/14/2023	
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
TCE	0.86 U	0.35 U	NS	NS	NS	NS	
cDCE	0.69 U	**3.2**	0.28 U	**3.2**	0.53 U	**2.1**	
tDCE	0.55 U	**4.0**	**3.0**	**2.5**	0.73 U	0.73 U	
VC	**152**	**192**	**205 L**	**124**	0.71 U	**78**	

MLPV-MW0091

Location ID	MLPV-MW0091
Date	03/09/2023
Screen Interval	47.0 - 57.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U

MLPV-MW0088

Location ID	MLPV-MW0088
Date	03/14/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
TCE	0.89 U
cDCE	0.53 U
tDCE	0.73 U
VC	**2.3**

MLPV-IW0042

Location ID	MLPV-IW0042	MLPV-IW0042	MLPV-IW0042	MLPV-IW0042	MLPV-IW0042
Date	03/18/2020	03/16/2021	03/14/2022	03/14/2023	
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	
Sample Type	NM	NM	NM	NM	
Analyte					
TCE	0.35 U	NS	NS	NS	
cDCE	0.28 U	**1.2**	**0.63 I**	0.53 U	
tDCE	0.22 U	0.22 U	0.73 U	0.73 U	
VC	0.41 U	**0.42 I**	**1.2**	0.71 U	

MLPV-IW0043

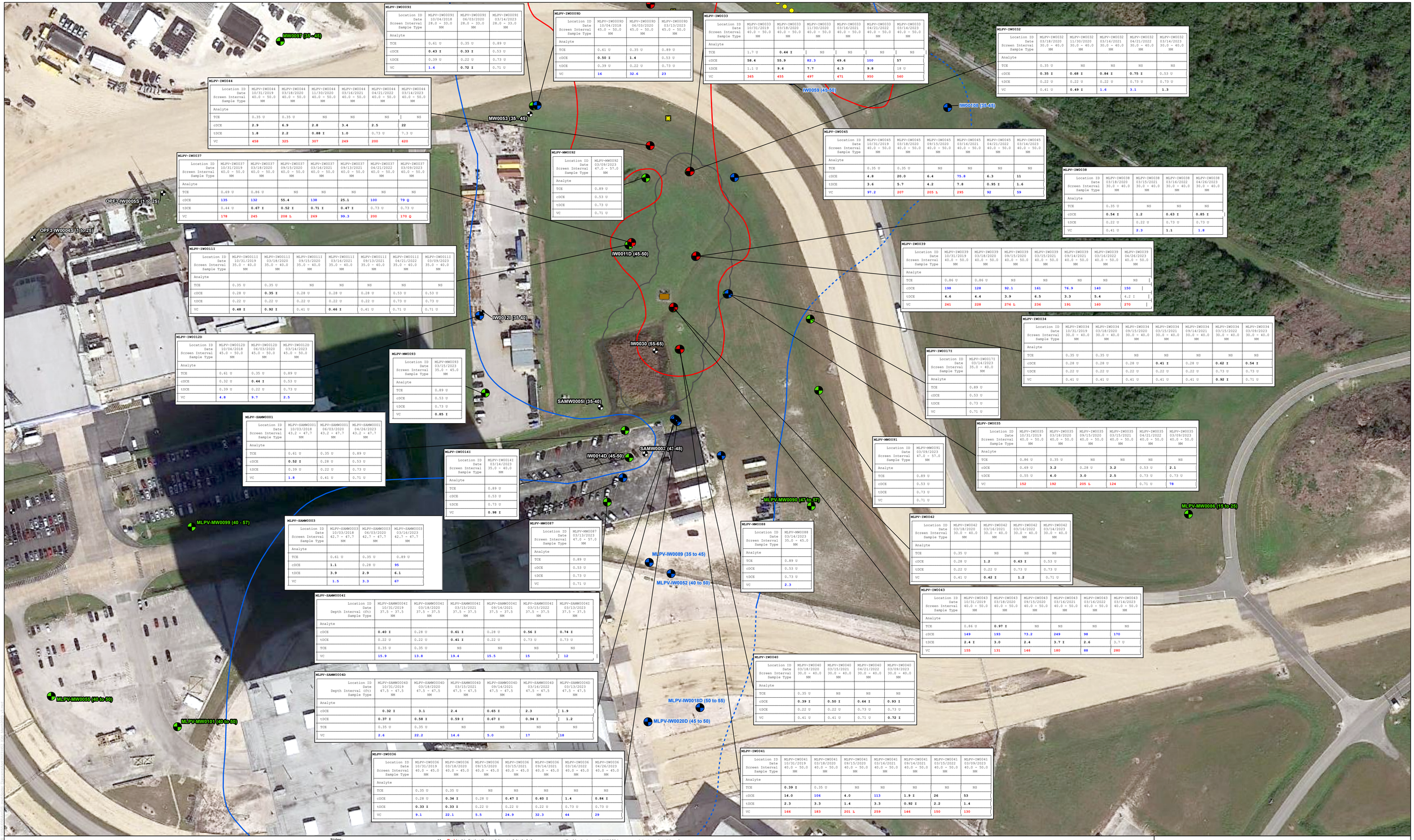
Location ID	MLPV-IW0043	MLPV-IW0043	MLPV-IW0043	MLPV-IW0043	MLPV-IW0043	MLPV-IW0043	MLPV-IW0043
Date	10/31/2019	03/18/2020	09/15/2020	03/16/2021	03/16/2022	03/14/2023	
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	
Sample Type	NM	NM	NM	NM	NM	NM	
Analyte							
TCE	0.86 U	**0.97 I**	NS	NS	NS	NS	
cDCE	**149**	**193**	**73.2**	**249**	**98**	**170**	
tDCE	**2.4 I**	**3.0**	**2.4**	**3.7 I**	**2.6**	3.7 U	
VC	**155**	**131**	**146**	**180**	**88**	**280**	

MLPV-IW0040

Location ID	MLPV-IW0040	MLPV-IW0040	MLPV-IW0040	MLPV-IW0040	MLPV-IW0040
Date	03/18/2020	03/15/2021	04/21/2022	03/09/2023	
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	
Sample Type	NM	NM	NM	NM	
Analyte					
TCE	0.35 U	NS	NS	NS	
cDCE	**0.39 I**	**0.50 I**	**0.64 I**	**0.93 I**	
tDCE	0.22 U	0.22 U	0.73 U	0.73 U	
VC	0.41 U	0.41 U	0.71 U	**0.72 I**	

MLPV-IW0041

Location ID	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041	MLPV-IW0041
Date	10/31/2019	03/18/2020	09/15/2020	03/16/2021	09/14/2021	03/15/2022	03/09/2023	
Screen Interval	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	40.0 - 50.0	
Sample Type	NM	NM	NM	NM	NM	NM	NM	
Analyte								
TCE	**0.39 I**	0.35 U	NS	NS	NS	NS	NS	
cDCE	**14.0**	**106**	**4.0**	**113**	**1.9 I**	**26**	**53**	
tDCE	**2.3**	**3.3**	**1.4**	**3.3**	**0.92 I**	**2.2**	**1.4**	
VC	**166**	**183**	**201 L**	**259**	**146**	**150**	**130**	



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:

1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. NS = Not sampled
5. L = Value exceeds calibration range" and renumber accordingly
6. U = The analyte was undetected
7. 2019 Aerial Source: FDOT
8. Results shown in micrograms per Liter (µg/L).
9. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
10. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
11. **Red** text indicates the analyte was detected at concentrations above its NADC.
12. IW0032, IW0038, IW0040 and IW0042 are sampled annually. Remaining wells are sampled semi-annually. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
13. MLPV/AB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
14. Well IW0032, IW0033, and IW0044 were not accessible during the September 2020 sampling event. Therefore, wells were sampled in November 2020.
15. Wells IW0021, 32, 35, 40, 44, and 45 were not located during the September 2021 sampling event due to construction activities in the sampling area.
16. Monitoring well IW0053 is presumed destroyed and therefore not sampled in 2023.
17. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.
18. Monitoring wells MLPV-IW0036 , MLPV-IW0038, MLPV-IW0039, MLPV-SAMW0001 were resampled on April 26, 2023. Results from this event are present in place of data collected in March 2023 for these wells only.

Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

0 75 150 300 Feet

Map Scale: 1":80'

N

Figure 3
Groundwater Analytical Results
Composite CVOC
March and April 2023

Former Hot Spot 2
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

WCPS-IW0015S

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0015S 09/14/2020 3.0 - 13.0 NM	WCPS-IW0015S 03/14/2023 3.0 - 13.0 NM
Analyte		
cDCE	0.28 U	0.53 U
tDCE	0.22 U	0.73 U
VC	0.41 U	0.71 U
TCE	NS	0.89 U

WCPS-IW0005S

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0005S 09/14/2020 2 - 12 NM	WCPS-IW0005S 03/09/2023 2 - 12 NM
Analyte		
cDCE	0.28 U	0.28 U
tDCE	0.22 U	0.22 U
VC	0.41 U	0.41 U
TCE	NS	0.89 U

WCPS-IW0016

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0016 06/03/2020 15.0 - 25.0 NM	WCPS-IW0016 03/09/2023 15.0 - 25.0 NM
Analyte		
cDCE	**1.2**	**0.77 I**
tDCE	0.22 U	0.73 U
VC	**0.80 I**	0.71 U
TCE	0.35 U	0.89 U

MLPV-MW0110

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0110 04/26/2023 1 - 11 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

WCPS-IW0001SR

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0001SR 06/03/2020 2.5 - 12.5 NM	WCPS-IW0001SR 09/14/2020 2.5 - 12.5 NM	WCPS-IW0001SR 03/09/2023 2.5 - 12.5 NM
Analyte			
cDCE	**1.4**	**2.5**	**2.0**
tDCE	**0.67 I**	**0.93 I**	**1.2**
VC	**49.5**	**54.3**	**38**
TCE	0.35 U	NS	0.89 U

WCPS-IW0002SRR

Location ID / Date / Screen Interval / Sample Type	WCPS-IW0002SRR 03/09/2023 3 - 13 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0100

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0100 03/09/2023 15.0 - 25.0 NM
Analyte	
cDCE	**1.9**
tDCE	0.73 U
VC	**1.3**
TCE	0.89 U

MLPV-MW0086

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0086 03/14/2023 15 - 25 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

VABRA-MW0010(2 - 12)
MLPV-IW0001S(2 - 12)
OPF3-IW0006S(10 - 20)
WCPS-IW0006S(3 - 13)
WCPS-IW0016(15 - 25)
WCPS-IW0009S(2.5 - 12.5)
WCPS-IW0010S(2.5 - 12.5)
WCPS-IW0012S(2 - 12)
WCPS-IW0013S(2.5 - 12.5)
WCPS-IW0014S(4 - 14)
PCCA-MW0013(5 - 15)
PCCA-MW0019(15 to 25)
VABU-IW0004S(3 - 13)
PCCA-MW0014(5 - 15)
PCCA-MW0008(5 - 15)
PCCA-MW0016(15 - 25)
PCCA-MW0004(5 - 15)
PCCA-MW0007(5 - 15)
PCCA-MW0015(15 - 25)
PCCA-MW0012(5 - 15)
PCCA-MW0010(5 - 15)
PCCA-MW0018(15 - 25)
PCCA-MW0011(5 - 15)
PCCA-MW0009(5 - 15)
PCCA-MW0017(15 - 25)



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VC Isopleth (Delineated) Greater Than GCTL (>1 µg/L)
- Approximate Extent of VC Isopleth (Inferred) Greater Than GCTL (>1 µg/L)

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
10. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
11. PCCA = Processing Control Center Area.
12. SWMU = Solid Waste Management Unit.
13. WCPS = West Crawler Park Site.
14. Monitoring well MLPV-MW0110 was resampled on April 26, 2023. Results from this event are present in place of data collected in March 2023 for these wells only.
15. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

0 130 260 520 Feet

N

Reference Scale: 1":261'

Figure 4
Groundwater Analytical Results
Composite CVOC - 1 to 25 Foot Screening Depth
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: Y:\Projects\NASA\KSC\MLP/V_VAB_SWMU\056\Arc\GIS_mxd\Spider_Diagrams\April 2023\5_RSA_HS2_LCP_March2023_1to25_v2.mxd

MLPV-MW0095

Location ID Date Screen Interval Sample Type	MLPV-MW0095 03/08/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0028I

Location ID Date Screen Interval Sample Type	MLPV-IW0028I 10/04/2018 28.0 - 33.0 NM	MLPV-IW0028I 06/02/2020 28.0 - 33.0 NM	MLPV-IW0028I 03/16/2021 28.0 - 33.0 NM	MLPV-IW0028I 09/14/2021 28.0 - 33.0 NM	MLPV-IW0028I 03/15/2022 28.0 - 33.0 NM	MLPV-IW0028I 03/15/2023 28.0 - 33.0 NM
Analyte						
cDCE	0.32 U	0.28 U	0.53 U	0.53 U	0.53 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**5.2**	**6.0**	0.71 U	**2.3**	0.71 U	0.71 U
TCE	0.61 U	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U

MLPV-IW0002IR

Location ID Date Screen Interval Sample Type	MLPV-IW0002IR 03/08/2023 28.0 - 33.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0102

Location ID Date Screen Interval Sample Type	MLPV-MW0102 03/10/2023 25.0 - 35.0 NM
Analyte	
cDCE	**9.6**
tDCE	**2.8**
VC	**440**
TCE	0.89 U

MLPV-IW0006IR

Location ID Date Screen Interval Sample Type	MLPV-IW0006IR 09/16/2020 28.0 - 33.0 NM	MLPV-IW0006IR 03/16/2021 28.0 - 33.0 NM	MLPV-IW0006IR 09/15/2021 28.0 - 33.0 NM	MLPV-IW0006IR 03/15/2022 28.0 - 33.0 NM	MLPV-IW0006IR 03/08/2023 28.0 - 33.0 NM
Analyte					
cDCE	0.28 U	**0.77 I**	0.53 U	**0.59 I**	0.53 U
tDCE	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	0.41 U	**3.7**	**1.8**	**1.6**	0.71 U
TCE	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U

MLPV-MW0098

Location ID Date Screen Interval Sample Type	MLPV-MW0098 03/13/2023 20.0 - 30.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0106

Location ID Date Screen Interval Sample Type	MLPV-MW0106 03/10/2023 25.0 - 35.0 NM
Analyte	
cDCE	**0.54 I**
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0109

Location ID Date Screen Interval Sample Type	MLPV-MW0109 03/09/2023 20 - 30 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0009I

Location ID Date Screen Interval Sample Type	MLPV-IW0009I 10/04/2018 28.0 - 33.0 NM	MLPV-IW0009I 06/03/2020 28.0 - 33.0 NM	MLPV-IW0009I 03/14/2023 28.0 - 33.0 NM
Analyte			
cDCE	**0.43 I**	**0.33 I**	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.6**	**0.72 I**	0.71 U
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0027I

Location ID Date Screen Interval Sample Type	MLPV-IW0027I 03/09/2023 28.0 - 33.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

VABU-IW0001I

Location ID Date Screen Interval Sample Type	VABU-IW0001I 06/03/2020 20.0 - 30.0 NM	VABU-IW0001I 03/10/2023 20.0 - 30.0 NM
Analyte		
cDCE	0.28 U	0.53 U
tDCE	0.22 U	0.73 U
VC	0.41 U	0.71 U
TCE	0.35 U	0.89 U

SATV-IW0009I

Location ID Date Screen Interval Sample Type	SATV-IW0009I 10/09/2018 22.0 - 27.0 NM	MLPV-IW0009I 06/03/2020 22.0 - 27.0 NM	MLPV-IW0009I 03/08/2023 22.0 - 27.0 NM
Analyte			
cDCE	**1.5**	**7.2**	**14.0**
tDCE	**1.8 I**	**5.1**	**9.0**
VC	0.26 U	0.41 U	0.71 U
TCE	0.61 U	**0.40 I**	0.89 U

MLPV-MW0078

Location ID Date Screen Interval Sample Type	MLPV-MW0078 03/08/2023 25.0 - 35.0 NM
Analyte	
cDCE	**0.74 I**
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0079

Location ID Date Screen Interval Sample Type	MLPV-MW0079 03/08/2023 25.0 - 35.0 NM
Analyte	
cDCE	**6.2**
tDCE	**3.0**
VC	0.71 U
TCE	0.89 U

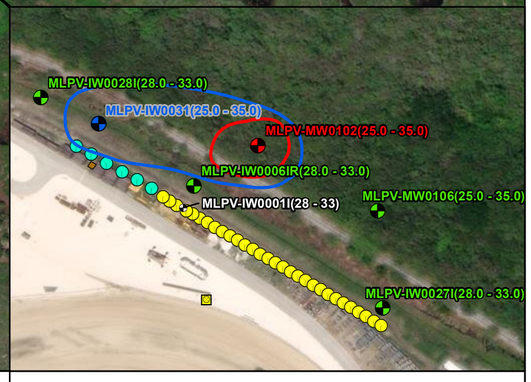
MLPV-MW0077

Location ID Date Screen Interval Sample Type	MLPV-MW0077 03/08/2023 25.0 - 35.0 NM
Analyte	
cDCE	**1.8**
tDCE	**1.2**
VC	0.71 U
TCE	0.89 U

MLPV-MW0081

Location ID Date Screen Interval Sample Type	MLPV-MW0081 03/09/2023 25.0 - 35.0 NM
Analyte	
cDCE	**19**
tDCE	**13**
VC	0.71 U
TCE	0.89 U

VABRA-MW0013 (20 to 25)
VABRA-MW0014 (25 to 30)
VABRA-MW0011 (25 to 35)
WCPS-IW0016 (15 to 25)
WCPS-IW0001I (30 to 35)
VABRA-MW0012 (15 to 25)
MLPV-IW0001I (28 to 33)
MLPV-IW0004I (28 to 33)
MLPV-IW0013I (28 to 33)
WCPS-IW0002I (30 to 34)
WCPS-IW0009I (25 to 35)
WCPS-IW0008I (25 to 35)
TPF-MW0001 (23 to 28)
MLPV-IW0031 (28 to 33)
PCCA-MW0019 (15 to 25)
PCCA-MW0018 (15 to 25)
PCCA-MW0017 (15 to 25)
PCCA-MW0016 (15 to 25)
PCCA-MW0020 (25 to 35)
PCCA-MW0015 (15 to 25)
VABU-IW0004I (20 to 30)
VABU-IW0006I (21 to 31)
SATV-IW0001I (22 to 27)
SATV-IW0002I (23 to 28)
SATV-IW0008I (25 to 30)
PRES-IW0001I (22 to 27)
PRES-IW0003I (22 to 27)
PRES-IW0004I (22 to 27)
PRES-IW0007I (32 to 37)



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:
1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. **Red** text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

0 250 500 1,000 Feet

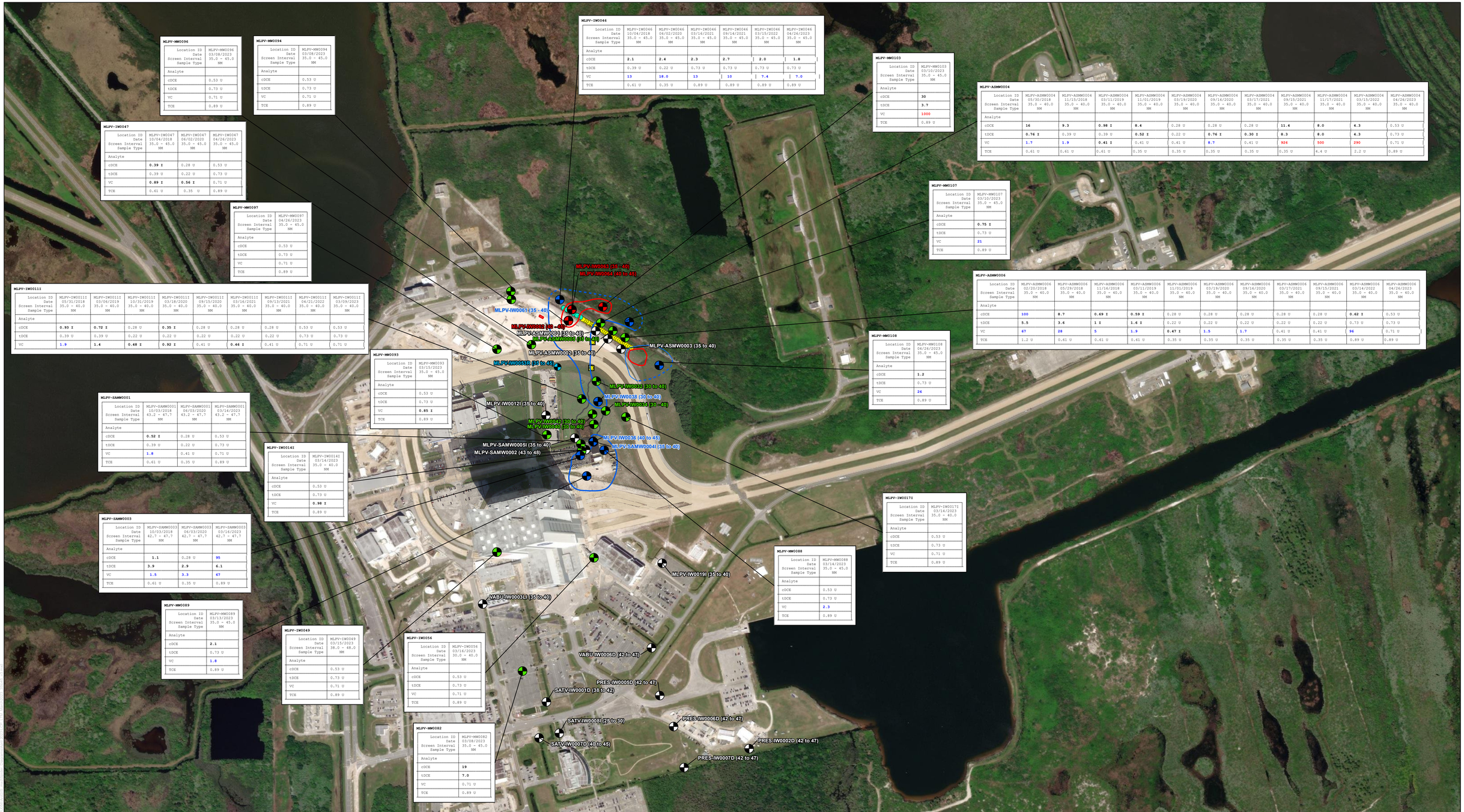
Reference Scale: 1":550'

N

Figure 5
Groundwater Analytical Results
Composite CVOC - 20 to 35 Foot Screen Depth
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: V:\Projects\NASA\KSC\MLP_VAB_SWMU056\ArcGIS_mxd\Solder_Diagram\April 2023\LCP_LTM_March2023_20to35ft.mxd



MLPV-IW0046

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0046 10/04/2018 35.0 - 45.0 NM	MLPV-IW0046 06/02/2020 35.0 - 45.0 NM	MLPV-IW0046 03/16/2021 35.0 - 45.0 NM	MLPV-IW0046 09/14/2021 35.0 - 45.0 NM	MLPV-IW0046 03/15/2022 35.0 - 45.0 NM	MLPV-IW0046 04/26/2023 35.0 - 45.0 NM
Analyte						
cDCE	**2.1**	**2.4**	**2.3**	**2.7**	**2.0**	**1.8**
tDCE	0.39 U	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**13**	**18.0**	**13**	**10**	**7.4**	**7.0**
TCE	0.61 U	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U

MLPV-MW0096

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0096 03/08/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0094

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0094 03/08/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0047

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0047 10/04/2018 35.0 - 45.0 NM	MLPV-IW0047 06/02/2020 35.0 - 45.0 NM	MLPV-IW0047 04/26/2023 35.0 - 45.0 NM
Analyte			
cDCE	**0.39 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**0.89 I**	**0.56 I**	0.71 U
TCE	0.61 U	0.35 U	0.89 U

MLPV-MW0097

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0097 04/26/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0011I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0011I 05/31/2018 35.0 - 40.0 NM	MLPV-IW0011I 03/06/2019 35.0 - 40.0 NM	MLPV-IW0011I 10/31/2019 35.0 - 40.0 NM	MLPV-IW0011I 03/18/2020 35.0 - 40.0 NM	MLPV-IW0011I 09/15/2020 35.0 - 40.0 NM	MLPV-IW0011I 03/16/2021 35.0 - 40.0 NM	MLPV-IW0011I 09/13/2021 35.0 - 40.0 NM	MLPV-IW0011I 04/21/2022 35.0 - 40.0 NM	MLPV-IW0011I 03/09/2023 35.0 - 40.0 NM
Analyte									
cDCE	**0.93 I**	**0.72 I**	0.28 U	**0.35 I**	0.28 U	0.28 U	0.28 U	0.53 U	0.53 U
tDCE	0.39 U	0.39 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**1.9**	**1.4**	**0.48 I**	**0.92 I**	0.41 U	**0.46 I**	0.41 U	0.71 U	0.71 U

MLPV-MW0093

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0093 03/15/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	**0.85 I**
TCE	0.89 U

MLPV-SAMW0001

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0001 10/03/2018 43.2 - 47.7 NM	MLPV-SAMW0001 06/03/2020 43.2 - 47.7 NM	MLPV-SAMW0001 03/14/2023 43.2 - 47.7 NM
Analyte			
cDCE	**0.52 I**	0.28 U	0.53 U
tDCE	0.39 U	0.22 U	0.73 U
VC	**1.8**	0.41 U	0.71 U
TCE	0.61 U	0.35 U	0.89 U

MLPV-IW0014I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0014I 03/14/2023 35.0 - 40.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	**0.98 I**
TCE	0.89 U

MLPV-SAMW0003

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0003 10/03/2018 42.7 - 47.7 NM	MLPV-SAMW0003 06/03/2020 42.7 - 47.7 NM	MLPV-SAMW0003 03/16/2023 42.7 - 47.7 NM
Analyte			
cDCE	**1.1**	0.28 U	**95**
tDCE	**3.9**	**2.9**	**6.1**
VC	**1.5**	**3.3**	**67**
TCE	0.61 U	0.35 U	0.89 U

MLPV-MW0089

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0089 03/13/2023 35.0 - 45.0 NM
Analyte	
cDCE	**2.1**
tDCE	0.73 U
VC	**1.8**
TCE	0.89 U

MLPV-IW0049

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0049 03/15/2023 38.0 - 48.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-IW0056

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0056 03/16/2023 35.0 - 40.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0082

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0082 03/08/2023 35.0 - 45.0 NM
Analyte	
cDCE	**19**
tDCE	**7.0**
VC	0.71 U
TCE	0.89 U

MLPV-MW0103

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0103 03/10/2023 35.0 - 45.0 NM
Analyte	
cDCE	**30**
tDCE	**3.7**
VC	**1000**
TCE	0.89 U

MLPV-ASMW0004

Location ID / Date / Screen Interval / Sample Type	MLPV-ASMW0004 05/30/2018 35.0 - 40.0 NM	MLPV-ASMW0004 11/15/2018 35.0 - 40.0 NM	MLPV-ASMW0004 03/13/2019 35.0 - 40.0 NM	MLPV-ASMW0004 11/01/2019 35.0 - 40.0 NM	MLPV-ASMW0004 03/19/2020 35.0 - 40.0 NM	MLPV-ASMW0004 09/16/2020 35.0 - 40.0 NM	MLPV-ASMW0004 03/17/2021 35.0 - 40.0 NM	MLPV-ASMW0004 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0004 11/17/2021 35.0 - 40.0 NM	MLPV-ASMW0004 03/15/2022 35.0 - 40.0 NM	MLPV-ASMW0004 04/26/2023 35.0 - 40.0 NM
Analyte											
cDCE	**16**	**9.3**	**0.98 I**	**8.4**	0.28 U	0.28 U	0.28 U	**11.4**	**8.0**	**4.3**	0.53 U
tDCE	**0.76 I**	0.39 U	0.39 U	**0.52 I**	0.22 U	**0.74 I**	**0.30 I**	**0.3**	**8.0**	**4.3**	0.73 U
VC	**1.7**	**1.9**	**0.41 I**	0.41 U	0.41 U	**8.7**	0.41 U	**926**	**500**	**290**	0.71 U
TCE	0.61 U	0.61 U	0.61 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	4.4 U	2.2 U	0.89 U

MLPV-MW0107

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0107 03/10/2023 35.0 - 45.0 NM
Analyte	
cDCE	**0.75 I**
tDCE	0.73 U
VC	**21**
TCE	0.89 U

MLPV-ASMW0006

Location ID / Date / Screen Interval / Sample Type	MLPV-ASMW0006 02/20/2018 35.0 - 40.0 NM	MLPV-ASMW0006 05/29/2018 35.0 - 40.0 NM	MLPV-ASMW0006 11/14/2018 35.0 - 40.0 NM	MLPV-ASMW0006 03/11/2019 35.0 - 40.0 NM	MLPV-ASMW0006 11/01/2019 35.0 - 40.0 NM	MLPV-ASMW0006 03/19/2020 35.0 - 40.0 NM	MLPV-ASMW0006 09/16/2020 35.0 - 40.0 NM	MLPV-ASMW0006 03/17/2021 35.0 - 40.0 NM	MLPV-ASMW0006 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0006 03/14/2022 35.0 - 40.0 NM	MLPV-ASMW0006 04/26/2023 35.0 - 40.0 NM
Analyte											
cDCE	**100**	**8.7**	**0.69 I**	**0.59 I**	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	**0.62 I**	0.53 U
tDCE	**5.5**	**3.6**	**1 I**	**1.6 I**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U
VC	**67**	**28**	**5**	**1.9**	**0.47 I**	**1.5**	**1.7**	0.41 U	0.41 U	**96**	0.71 U
TCE	1.2 U	0.61 U	0.61 U	0.61 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U

MLPV-MW0108

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0108 04/26/2023 35.0 - 45.0 NM
Analyte	
cDCE	**1.2**
tDCE	0.73 U
VC	**26**
TCE	0.89 U

MLPV-IW0017I

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0017I 03/14/2023 35.0 - 40.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0088

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0088 03/14/2023 35.0 - 45.0 NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	**2.3**
TCE	0.89 U

Legend

- Monitoring Well (MW) Results Less Than
- Monitoring Well (MW) Results Greater Than
- Monitoring Well (MW) Results Greater Than
- Monitoring Well (MW) Location Not
- Proposed Monitoring Well
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Junction Box
- Equipment Building
- Sparge Manifold
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC

Notes:

1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. Red text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Monitoring wells ASMW0004, ASMW0005, ASMW0006, IW0036, IW0038, IW0046, IW0047, IW0061, IW0062, MW0097, and MW0108, were resampled on April 26, 2023. Results from this event are present in place of data collected in March 2023 for these wells only.
16. Monitoring well IW0053 is presumed destroyed and therefore not sampled in 2023.
17. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

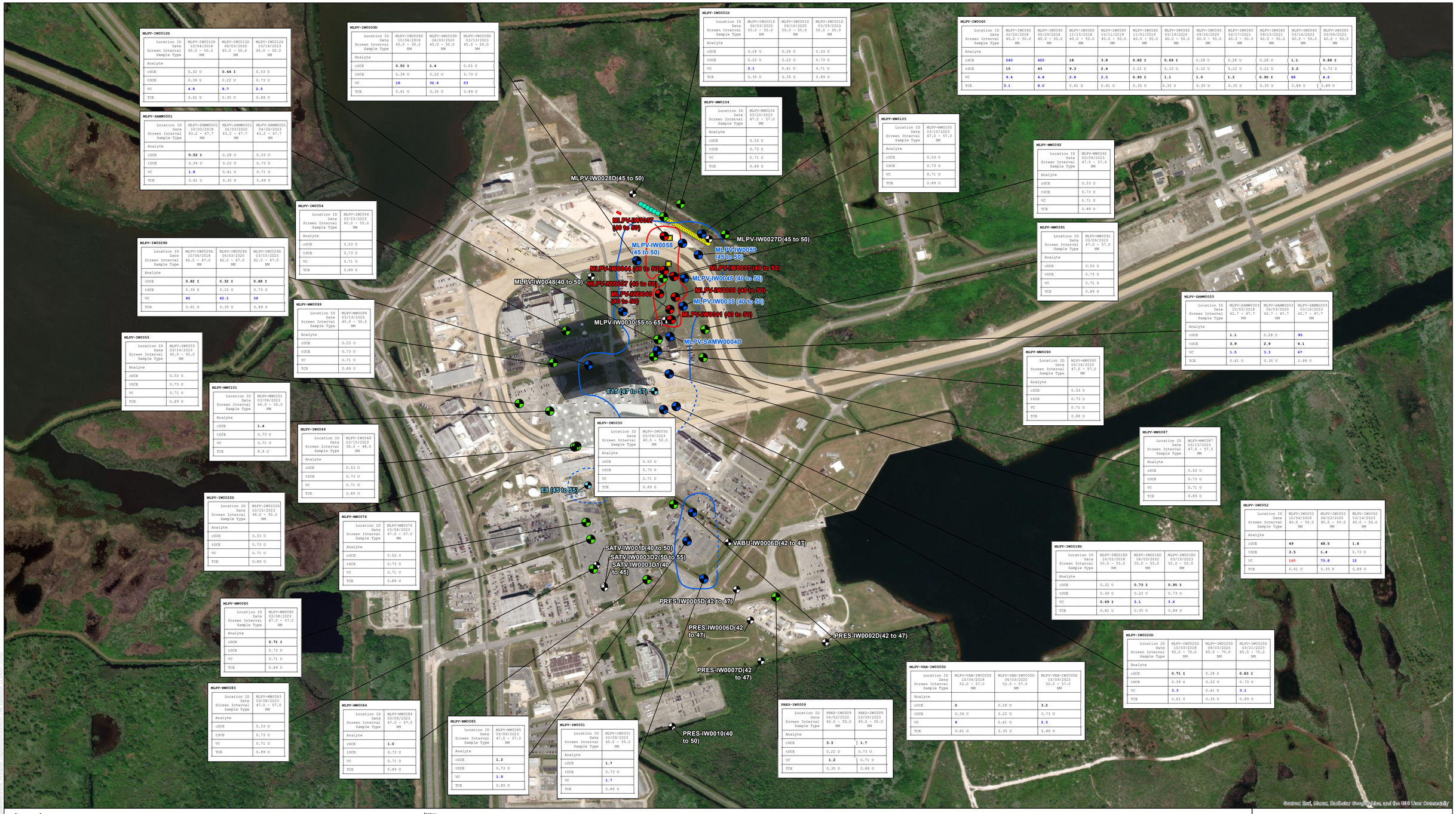
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Reference Scale: 1":350'

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Figure 6
Groundwater Analytical Results
Composite CVOC - 35 to 45 Foot Screen Depth
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Location Not Sampled
- Proposed MW Locations
- Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL
- Approximate Extent of VOC Isopleth (Delineated) Greater Than NADC
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold

Notes:

1. GCTL = Groundwater Cleanup Target Levels as provided in Table 1 of 62-777, F.A.C.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value
3. NADC = Natural Attenuation Default Concentration as provided in Table 5 of 62-777, F.A.C.
4. U = The analyte was undetected
5. 2019 Aerial Source: FDOT
6. Results shown in micrograms per Liter (µg/L).
7. **Blue** text indicates the analyte was detected at concentrations above its GCTL.
8. **Bold** text indicates the analyte was detected at concentrations below its GCTL.
9. **Red** text indicates the analyte was detected at concentrations above its NADC.
10. Data presented includes the last 5 years. Additional historical data is provided in the analytical table for Former Hot Spot 2.
11. MLP/VAB Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB) Area, SWMU (Solid Waste Management Unit) 056.
12. PCCA = Processing Control Center Area.
13. SWMU = Solid Waste Management Unit.
14. WCPS = West Crawler Park Site.
15. Monitoring well SAMW0001, was resampled on April 26, 2023. Results from this event are present in place of data collected in March 2023 for these wells only.
16. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.

Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

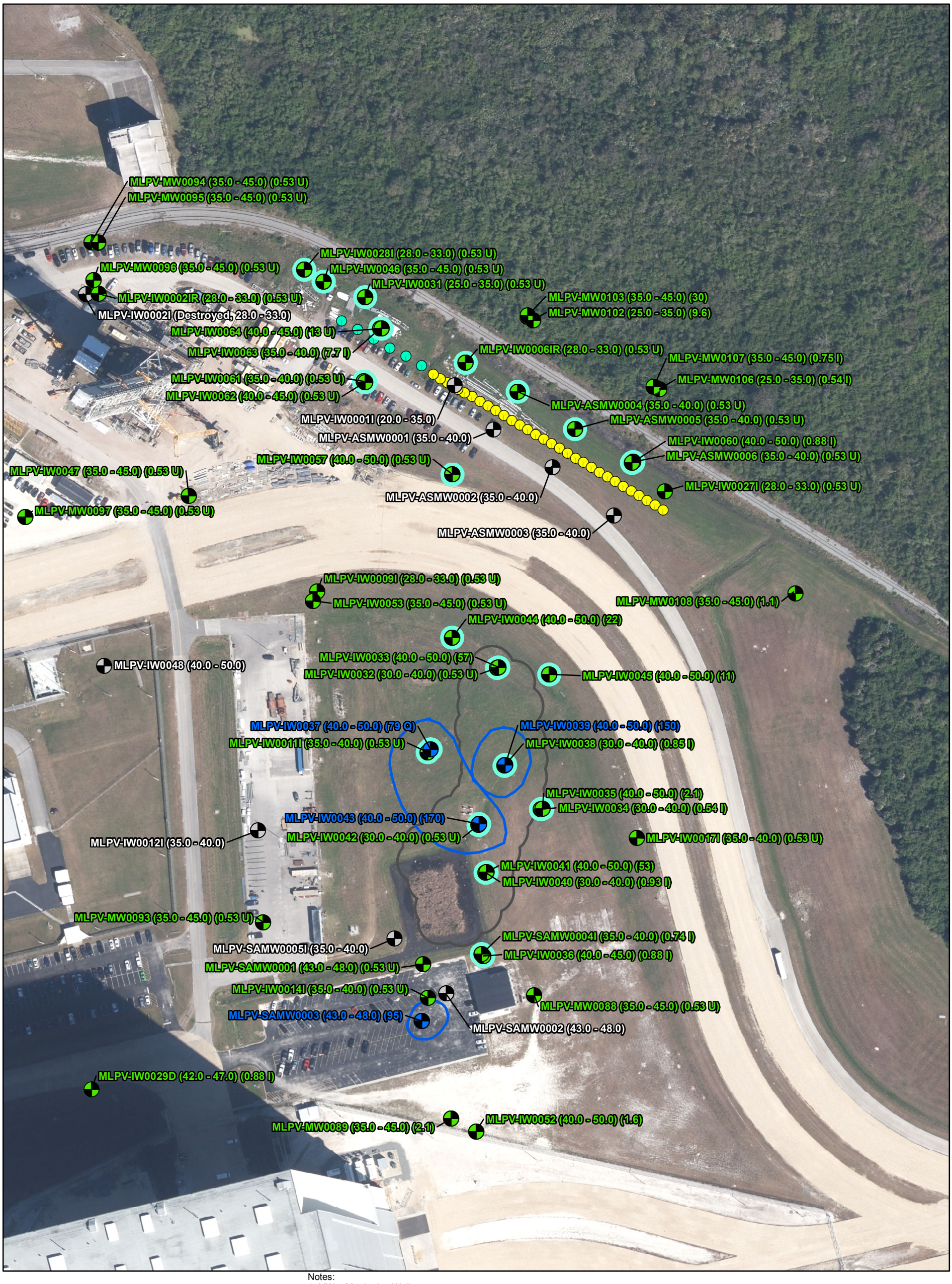
0 300 600 1,200 Feet

Reference Scale: 1":350'

N

Figure 7
Groundwater Analytical Results
Composite CVOC - 40 to 57 Foot Screen Depth
March and April 2023

Low Concentration Plume (LCP)
Long Term Monitoring
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



Legend

- MW Sample Results Less Than GCTLs (70 µg/L)
- MW Sample Results Greater Than GCTLs (70 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of cDCE Isopleth Greater Than GCTL (>70 µg/L)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbole indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 t0 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

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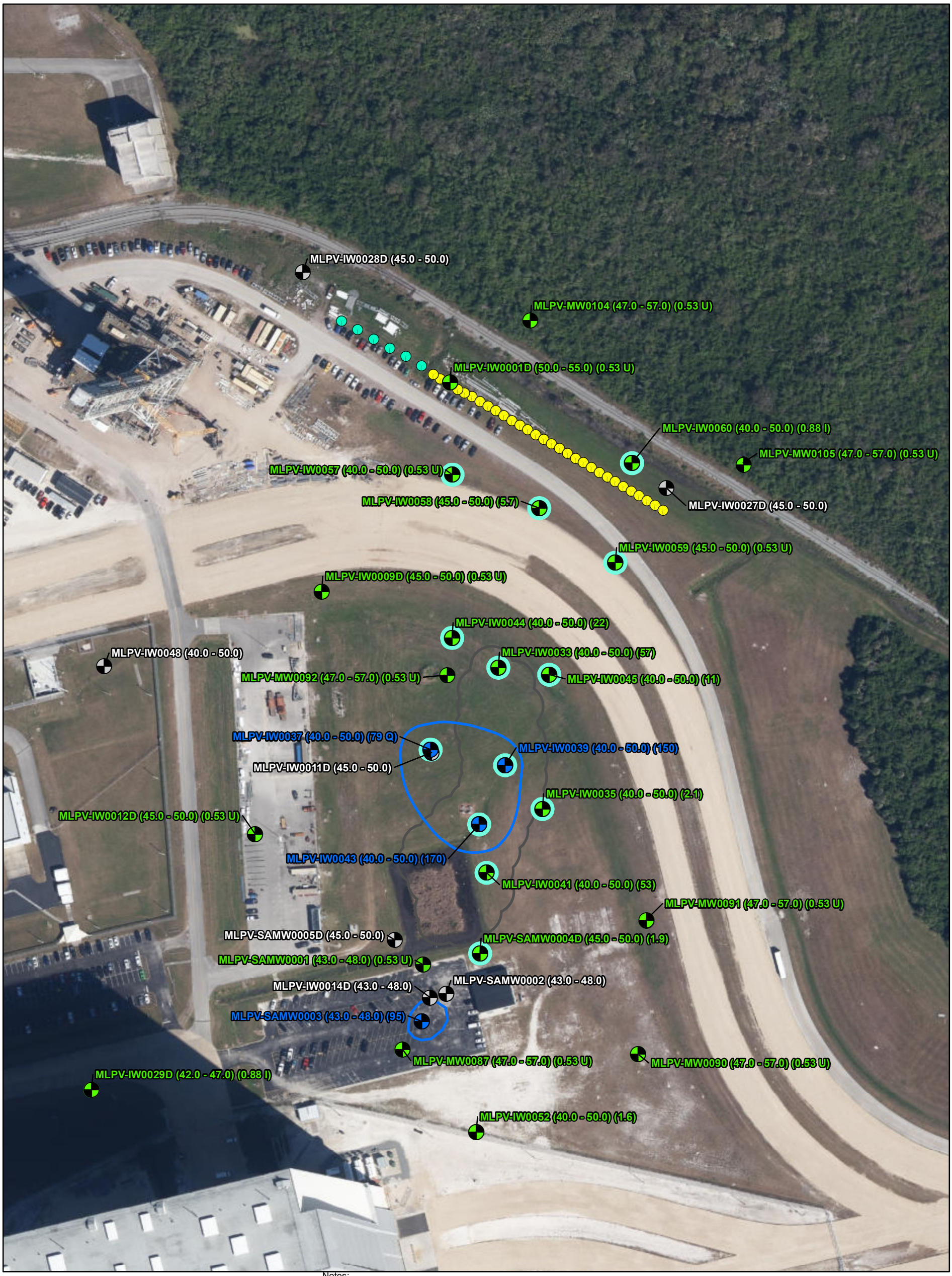
0 200 400 Feet

Map Scale: 1":157'

FIGURE 8
cis-1,2-Dichloroethene (cDCE) Plume Map
30 to 45 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

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Legend

- MW Sample Results Less Than GCTLs (70 µg/L)
- MW Sample Results Greater Than GCTLs (70 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of cDCE Isopleth Greater Than GCTL (>70 µg/L)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbole indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 t0 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

N

0 200 400 Feet

Map Scale: 1":157'

FIGURE 9
cis-1,2-Dichloroethene (cDCE) Plume Map
45 to 50 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: N:\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\HS2_BSA_2023_IGM_cis12DCE_45_50.mxd

MLPV-MW0094 (35.0 - 45.0) (0.71 U)
MLPV-MW0095 (35.0 - 45.0) (0.71 U)
MLPV-MW0096 (35.0 - 45.0) (0.71 U)
MLPV-IW0002IR (28.0 - 33.0) (0.71 U)
MLPV-IW0002I (Destroyed, 28.0 - 33.0)
MLPV-IW0028I (28.0 - 33.0) (0.71 U)
MLPV-IW0046 (35.0 - 45.0) (7.0)
MLPV-IW0031 (25.0 - 35.0) (5.6)
MLPV-IW0063 (35.0 - 40.0) (190)
MLPV-IW0064 (40.0 - 45.0) (460)
MLPV-MW0103 (35.0 - 45.0) (1000)
MLPV-MW0102 (25.0 - 35.0) (440)
MLPV-MW0107 (35.0 - 45.0) (21)
MLPV-MW0106 (25.0 - 35.0) (0.71 U)
MLPV-IW0006IR (28.0 - 33.0) (0.71 U)
MLPV-IW0061 (35.0 - 40.0) (8.7)
MLPV-IW0062 (40.0 - 45.0) (120)
MLPV-IW0001I (28.0 - 33.0)
MLPV-ASMW0004 (35.0 - 40.0) (0.71 U)
MLPV-ASMW0001 (35.0 - 40.0)
MLPV-ASMW0005 (35.0 - 40.0) (0.71 U)
MLPV-IW0057 (40.0 - 50.0) (0.71 U)
MLPV-ASMW0006 (35.0 - 40.0) (0.71 U)
MLPV-IW0060 (40.0 - 50.0) (4.6)
MLPV-IW0047 (35.0 - 45.0) (0.71 U)
MLPV-ASMW0002 (35.0 - 40.0)
MLPV-IW0027I (28.0 - 33.0) (0.71 U)
MLPV-MW0097 (35.0 - 45.0) (0.71 U)
MLPV-ASMW0003 (35.0 - 40.0)
MLPV-MW0108 (35.0 - 45.0) (25)
MLPV-IW0009I (28.0 - 33.0) (0.71 U)
MLPV-IW0053 (35.0 - 45.0) (Destroyed)
MLPV-IW0044 (40.0 - 50.0) (620)
MLPV-IW0048 (40.0 - 50.0)
MLPV-IW0033 (40.0 - 50.0) (560)
MLPV-IW0032 (30.0 - 40.0) (1.3)
MLPV-IW0045 (40.0 - 50.0) (59)
MLPV-IW0037 (40.0 - 50.0) (170 Q)
MLPV-IW0011I (35.0 - 40.0) (0.71 U)
MLPV-IW0039 (40.0 - 50.0) (270)
MLPV-IW0038 (30.0 - 40.0) (1.8)
MLPV-IW0035 (40.0 - 50.0) (78)
MLPV-IW0034 (30.0 - 40.0) (0.71 U)
MLPV-IW0043 (40.0 - 50.0) (280)
MLPV-IW0042 (30.0 - 40.0) (0.71 U)
MLPV-IW0017I (35.0 - 40.0) (0.71 U)
MLPV-IW0012I (35.0 - 40.0)
MLPV-IW0041 (40.0 - 50.0) (130)
MLPV-IW0040 (30.0 - 40.0) (0.72 I)
MLPV-MW0093 (35.0 - 45.0) (0.85 I)
MLPV-SAMW0005I (35.0 - 40.0)
MLPV-SAMW0004I (35.0 - 40.0) (12)
MLPV-IW0036 (40.0 - 45.0) (29)
MLPV-SAMW0001 (43.0 - 48.0) (0.71 U)
MLPV-SAMW0002 (43.0 - 48.0)
MLPV-IW0014I (35.0 - 40.0) (0.98 I)
MLPV-MW0088 (35.0 - 45.0) (2.3)
MLPV-SAMW0003 (43.0 - 48.0) (67)
MLPV-IW0029D (42.0 - 47.0) (39)
MLPV-MW0089 (35.0 - 45.0) (1.8)
MLPV-IW0052 (40.0 - 50.0) (12)

Legend

- MW Sample Results Less Than GCTL (1 µg/L)
- MW Sample Results Greater Than GCTL (1 µg/L)
- MW Sample Results Greater Than NADC (100 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Approximate Extent of VC Isopleth Greater Than GCTL (>1 µg/L)(Dashed Where Inferred)
- Approximate Extent of VC Isopleth Greater Than NADC (>100 µg/L)(Dashed Where Inferred)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbole indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 t0 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.
16. Moitoring well IW0053 is presumed destoryed and therefore not sampled in 2023

N

0 200 400 Feet

Map Scale: 1":157'

FIGURE 10
Vinyl Chloride Plume Map
30 to 45 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: N:\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\HS2_BSA_2023_IGM_VC_30_45.mxd

MLPV-IW0028D (45.0 - 50.0)
MLPV-MW0104 (47.0 - 57.0) (0.71 U)
MLPV-IW0001D (50.0 - 55.0) (0.71 U)
MLPV-MW0105 (47.0 - 57.0) (0.71 U)
MLPV-IW0060 (40.0 - 50.0) (4.6)
MLPV-IW0027D (45.0 - 50.0)
MLPV-IW0057 (40.0 - 50.0) (280)
MLPV-IW0058 (45.0 - 50.0) (90)
MLPV-IW0059 (45.0 - 50.0) (8.4)
MLPV-IW0009D (45.0 - 50.0) (23)
MLPV-IW0044 (40.0 - 50.0) (620)
MLPV-IW0033 (40.0 - 50.0) (560)
MLPV-IW0048 (40.0 - 50.0)
MLPV-IW0045 (40.0 - 50.0) (59)
MLPV-MW0092 (47.0 - 57.0) (0.71 U)
MLPV-IW0037 (40.0 - 50.0) (170 Q)
MLPV-IW0011D (45.0 - 50.0)
MLPV-IW0039 (40.0 - 50.0) (270)
MLPV-IW0035 (40.0 - 50.0) (78)
MLPV-IW0043 (40.0 - 50.0) (280)
MLPV-IW0012D (45.0 - 50.0) (2.5)
MLPV-IW0041 (40.0 - 50.0) (130)
MLPV-MW0091 (47.0 - 57.0) (0.71 U)
MLPV-SAMW0005D (45.0 - 50.0)
MLPV-SAMW0004D (45.0 - 50.0) (18)
MLPV-SAMW0001 (43.0 - 48.0) (0.71 U)
MLPV-SAMW0002 (43.0 - 48.0)
MLPV-IW0014D (43.0 - 48.0)
MLPV-SAMW0003 (43.0 - 48.0) (67)
MLPV-MW0090 (47.0 - 57.0) (0.71 U)
MLPV-MW0087 (47.0 - 57.0) (0.71 U)
MLPV-IW0029D (42.0 - 47.0) (39)
MLPV-IW0052 (40.0 - 50.0) (12)

Legend

- MW Sample Results Less Than GCTL (1 µg/L)
- MW Sample Results Greater Than GCTL (1 µg/L)
- MW Sample Results Greater Than NADC (100 µg/L)
- MWs Not Sampled
- MW Sampled as Part of the Former Hot Spot 2 and Biosparge Area Sampling Plans
- Biosparge Well Location (46 - 48 screen interval ft bls)
- Biosparge Well Location (48 - 50 screen interval ft bls)
- Junction Box
- Air Sparge Area of Influence (Based on 35 foot Radius of Influence)
- Equipment Building
- Sparge Manifold
- Approximate Extent of VC Isopleth Greater Than NADC (>100 µg/L)(Dashed Where Inferred)
- Approximate Extent of VC Isopleth Greater Than GCTL (>1 µg/L)(Dashed Where Inferred)

Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. Q = Sample was analyzed beyond hold time.
4. U = Result was below laboratory Method Detection Limit.
5. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
6. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
7. bls = feet below land surface.
8. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
9. Monitoring well data is from the most recent sampling event.
10. Only monitoring wells with screens within this sampling interval are presented.
11. Results Shown in Micrograms per Liter (ug/L).
12. SWMU = Solid Waste Management Unit.
13. Halo around MW symbole indicates MW was sampled as part of the Former Hot Spot 2 and Biosparge Area sampling plans. Remaining wells were sampled under the low concentration plume long-term monitoring plan.
14. Air sparge treatment wells are screened 40 t0 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
15. Aerial source Florida Department of Transportation, 2018.

N

0 200 400 Feet

Map Scale: 1":157'

FIGURE 11
Vinyl Chloride Plume Map
45 to 50 Feet bls
March and April, 2023

Former Hot Spot 2 and Biosparge Area
MLPV/VAB (SWMU 056)
NASA Kennedy Space Center, Florida

Document Path: N:\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\Colored_Dot_Diagrams\HS2_BSA_2023_IGM_VC_45_50.mxd

Table 1
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-IW0006IR	28 to 33	2/25/2003	2 U	**12.8**	**5.1**	**65.7**
		2/4/2004	2 U	**11.9**	**4.5**	**53.7**
		8/10/2004	2 U	**7.9**	**2.6**	**62.8**
		5/4/2005	0.50 U	**6.3**	**2.4**	**44.3**
		11/1/2005	0.50 U	**2.9**	**1.2**	**35.0**
		5/16/2006	0.50 U	**1.1**	0.50 U	**15.3**
		11/8/2006	0.50 U	**2.7**	**0.55 I**	**31.0**
		5/16/2007	0.50 U	**3.8**	0.50 U	**34.8**
		11/13/2007	0.38 U	0.28 U	0.20 U	**9.5**
		5/27/2008	0.32 U	**2.8**	**0.48 I**	**32.1**
		11/13/2008	0.32 U	0.2 U	0.45 U	**8.9**
		5/19/2009	0.32 U	**1.5**	0.45 U	**23.3**
		11/10/2009	0.15 U	**0.67 I**	0.13 U	**9.8**
		5/10/2010	0.12 U	0.083 U	0.39 U	**4.1**
		11/8/2010	0.16 U	0.36 U	0.12 U	**3.2**
		5/11/2011	0.16 U	0.36 U	0.12 U	**4.7**
		11/11/2011	0.16 U	0.36 U	0.12 U	**2.0**
		11/28/2012	0.16 U	0.36 U	0.12 U	**1.1**
		5/13/2013	0.16 U,J	0.36 U,J	0.12 U,J	**0.76 I**
		11/17/2014	0.50 U	0.50 U	0.50 U	**0.99 I**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U
		9/16/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/16/2021	0.89 U	**0.77 I**	0.73 U	**3.7**
		9/15/2021	0.89 U	0.53 U	0.73 U	**1.8**
		3/15/2022	0.89 U	**0.59 I**	0.73 U	**1.6**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-IW0028I	28 to 33	2/25/2003	2 U	**5.9**	**1.4 J**	**53.5**
		2/4/2004	2 U	**6**	**1.4 J**	**34.3**
		8/10/2004	2 U	2 U	2 U	1 U
		5/4/2005	0.50 U	**3.2**	**1.3**	**25.3**
		10/28/2005	0.50 U	**6.1**	**1.3**	**30.5**
		5/16/2006	0.50 U	**2.6**	**1**	**31.5**
		11/8/2006	0.50 U	**3.1**	**1.1**	**33.3**
		5/16/2007	0.50 U	**2.0**	**1.0**	**18.9**
		11/13/2007	0.38 U	0.28 U	0.20 U	**24.1**
		5/27/2008	0.32 U	**2.9**	**0.84 I**	**28.8**
		11/12/2008	0.32 U	**1.3**	**0.77 I**	**25.6**
		5/18/2009	0.32 U	**1.5**	**0.79 I**	**22.0**
		11/6/2009	0.15 U	**0.39 I**	0.13 U	**16**
		5/18/2010	0.12 U	**0.45 I**	0.39 U	**16**
		11/8/2010	NS	NS	NS	NS
		5/11/2011	0.16 U	0.36 U	**0.32 I**	**14**
		11/11/2011	NS	NS	NS	NS
		11/28/2012	0.16 U	0.36 U	**0.25 I**	**11**
		5/13/2013	0.16 U	0.36 U	**0.19 I**	**9.0**
		11/17/2014	0.50 U	0.50 U	0.50 U	**10**
		5/26/2016	0.50 U	0.50 U	0.50 U	**4.0**
		10/4/2018	0.61 U	0.32 U	0.39 U	**5.2**
		6/2/2020	0.35 U	0.28 U	0.22 U	**6.0**
		3/16/2021	0.89 U	0.53 U	0.73 U	0.71 U
		9/15/2021	0.89 U	0.53 U	0.73 U	**2.3**
		3/15/2022	0.89 U	0.53 U	0.73 U	0.71 U
		3/15/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-IW0046	35 to 45	11/17/2014	0.50 U	0.50 U	0.50 U	**1.8**
		5/26/2016	0.50 U	0.50 U	0.50 U	**8.1**
		10/4/2018	0.61 U	**2.1**	0.39 U	**13**
		6/2/2020	0.35 U	**2.4**	0.22 U	**18.0**
		3/16/2021	0.89 U	**2.3**	0.73 U	**13.0**
		9/15/2021	0.89 U	**2.7**	0.73 U	**10.0**
		3/15/2022	0.89 U	**2.0**	0.73 U	**7.4**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	**1.8**	0.73 U	**7.0**
MLPV-ASMW0004	35 to 40	5/28/2007	0.5 U	**12.2**	0.5 U	0.5 U
		9/6/2007	0.38 U	**2.4**	0.2 U	0.34 U
		12/31/2007	0.38 U	**7.7**	0.2 U	**0.39 I**
		3/31/2008	0.38 U	**8**	0.2 U	**0.65 I**
		6/27/2008	0.32 U	**7.5**	0.45 U	0.3 U
		9/22/2008	0.32 U	**48.5**	**1.6**	**41.8**
		12/18/2008	0.32 U	**48.4**	**0.73 I**	**8.4**
		3/5/2009	0.32 U	**37.7**	**0.57 I**	**1.8**
		9/22/2009	0.32 U	**9.9**	0.45 U	0.3 U
		3/24/2010	0.24 U	**1**	0.34 U	0.28 U
		10/1/2010	0.24 U	**5**	0.34 U	0.28 U
		3/15/2011	0.26 U	**0.45 I**	0.35 U	0.22 U
		9/26/2011	0.26 U	**5.9**	0.35 U	0.22 U
		3/16/2012	0.26 U	**40.8**	0.35 U	0.22 U
		8/28/2012	0.26 U	**18.8**	0.35 U	0.22 U
		3/18/2013	0.31 U	**87.3**	**0.79 I**	0.44 U
		10/25/2013	0.31 U	**119**	**1.8**	**0.90 I**
		1/27/2014	0.3 U	**73.7**	**1.5**	**1.2**
		4/17/2014	0.3 U	**45**	**0.54 I**	**5.1**
		7/22/2014	0.5 U	**1.3**	0.44 U	0.5 U
		1/19/2015	0.48 U	**26**	0.37 U	**0.78 I**

Table 1
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-ASMW0004 (continued)	35 to 40	4/6/2015	0.61 U	**12**	0.67 U	0.71 U
		7/14/2015	0.61 U	**12**	0.67 U	0.71 U
		1/11/2016	0.61 U	**17**	0.67 U	0.71 U
		7/12/2016	0.61 U	**37**	**1.1**	0.71 U
		3/6/2017	1.2 U	**200**	**7.8**	**500**
		11/8/2017	0.61 U	**53**	**3.2**	**1.7**
		5/30/2018	0.61 U	**16**	**0.76 I**	**1.7**
		11/15/2018	0.61 U	**9.3**	0.39 U	**1.9**
		3/11/2019	0.61 U	**0.98 I**	0.39 U	**0.41 I**
		11/1/2019	0.35 U	**8.4**	**0.52 I**	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/16/2020	0.35 U	0.28 U	**0.76 I**	**8.7**
		3/17/2021	0.35 U	0.28 U	**0.30 I**	0.41 U
		9/15/2021	0.35 U	**11.4**	**8.3**	**926**
		11/17/2021	4.4 U	**8.0**	**8.0**	**500**
		3/15/2022	2.2 U	**4.3**	**4.3**	**290**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-ASMW0005	35 to 40	5/28/2007	0.5 U	0.5 U	0.5 U	0.5 U
		9/6/2007	0.38 U	**0.35 I**	0.2 U	0.34 U
		12/31/2007	0.38 U	0.28 U	0.2 U	0.34 U
		3/31/2008	0.38 U	**0.28 I**	0.2 U	0.34 U
		6/27/2008	0.32 U	**0.32 I**	0.45 U	0.3 U
		9/22/2008	0.32 U	**1.6**	0.45 U	0.30 U
		12/18/2008	0.32 U	**0.69 I**	0.45 U	**0.44 I**
		3/5/2009	0.32 U	0.2 U	0.45 U	0.3 U
		9/22/2009	0.32 U	**1.4**	0.45 U	0.3 U
		3/24/2010	0.24 U	**0.48 I**	0.34 U	0.28 U
		10/1/2010	0.24 U	**5.6**	0.34 U	0.28 U
		3/15/2011	0.26 U	**0.67 I**	0.35 U	0.22 U
		9/23/2011	0.26 U	**1.6**	0.35 U	0.22 U
		3/16/2012	0.26 U	**5.3**	0.35 U	0.22 U
		8/28/2012	0.26 U	**2.4**	0.35 U	0.22 U
		3/18/2013	0.31 U	**7.3**	0.23 U	0.44 U
		10/25/2013	0.31 U	**81.3**	**2.7**	**50.4**
		1/27/2014	0.3 U	**52.1**	**1.6**	**27.5**
		4/17/2014	0.3 U	**62.3**	**1.5**	**44.2**
		7/22/2014	0.5 U	**25**	**0.68 I**	**21**
		10/27/2014	0.50 U	**14**	0.44 U	0.50 U
		1/19/2015	0.48 U	**26**	**0.60 I**	0.5 U
		4/6/2015	0.61 U	**99**	**1.1**	0.71 U
		7/14/2015	0.61 U	**50**	**0.95 I**	0.71 U
		1/11/2016	0.61 U	**78**	**1.8**	0.71 U
		7/12/2016	0.61 U	**28**	**0.68 I**	0.71 U
		3/6/2017	0.61 U	**140**	**7.9**	**3.9**
		11/8/2017	0.61 U	**4.1**	0.67 U	**0.81 I**
		5/30/2018	0.61 U	**1.2**	0.39 U	0.26 U
		11/16/2018	0.61 U	0.32 U	0.39 U	0.26 U
		3/11/2019	0.61 U	0.32 U	0.39 U	0.26 U
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/16/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	**1.1**	0.22 U	**3.0**
		3/14/2022	0.89 U	**2.6**	0.73 U	**36**
		3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-ASMW0006	35 to 40	5/28/2007	0.5 U	0.5 U	0.5 U	0.5 U
		9/6/2007	0.38 U	**3.5**	0.2 U	**1.1**
		12/31/2007	0.38 U	**1.3**	0.2 U	**1**
		3/31/2008	0.38 U	**1**	0.2 U	**0.82 I**
		6/27/2008	0.32 U	**8.8**	0.45 U	**3.4**
		9/22/2008	0.32 U	**35.1**	**0.64**	**5.2**
		12/18/2008	0.32 U	**37.6**	**0.67 I**	**8.2**
		3/5/2009	0.32 U	**18.1**	**0.56 I**	**13.6**
		9/22/2009	0.32 U	**10.7**	0.45 U	**3.4**
		3/24/2010	0.24 U	**33**	**0.50 I**	**1.5**
		10/1/2010	0.24 U	**12.3**	0.34 U	**1.1**
		3/15/2011	0.26 U	**15.3**	**0.37 I**	**2**
		9/23/2011	0.26 U	**2.7**	0.35 U	0.22 U
		3/16/2012	0.26 U	**24.2**	**0.52 I**	**2.1**
		8/24/2012	0.26 U	**113**	**4.4**	**1.5**
		3/18/2013	0.63 U	**137**	**8.6**	**9.9**
		10/25/2013	0.63 U	**490**	**22.3**	**833**
		1/27/2014	3 U	**493**	**18.9**	**902**
		4/17/2014	3 U	**569**	**25.2**	**1350**
		6/20/2014	1.9 U	**380**	**18**	**820**
		7/22/2014	1 U	**290**	**10**	**690**
		10/27/2014	0.50 U	**1.1**	0.44 U	**2.1**
		1/19/2015	0.48 U	**0.85 I**	0.37 U	**2.2**
		4/6/2015	0.61 U	**0.67 I**	0.67 U	**4.7**
		7/14/2015	0.61 U	**4.3**	0.67 U	**1.3**
		1/11/2016	0.61 U	0.65 U	0.67 U	**1.2**
		7/12/2016	0.61 U	**30**	**4.2**	**4.6**
		3/6/2017	0.61 U	**180**	**13**	**120**
		11/8/2017	**18**	**1100**	**64**	**210**
		2/20/2018	1.2 U	**100**	**5.5**	**67**
		5/29/2018	0.61 U	**8.7**	**3.6**	**28**
		11/16/2018	0.61 U	**0.69 I**	**1 I**	**5**
		3/11/2019	0.61 U	**0.59 I**	**1.6 I**	**1.9**
		11/1/2019	0.35 U	0.28 U	0.22 U	**0.47 I**
		3/19/2020	0.35 U	0.28 U	0.22 U	**1.5**
		9/16/2020	0.35 U	0.28 U	0.22 U	**1.7**

Table 1
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-ASMW0006 (continued)	35 to 40	3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		3/14/2022	0.89 U	**0.62 I**	0.73 U	**96**
		3/9/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-IW0031	25 to 35	9/27/2011	0.26 U	**1.8**	**0.70 I**	**115**
		3/16/2012	0.26 U	**2**	**0.64 I**	**99.2**
		8/24/2012	0.26 U	**2.2**	**0.77 I**	**152**
		3/18/2013	0.31 U	**1.5**	**0.51 I**	**86.5**
		10/25/2013	0.31 U	**1.4**	**0.50 I**	**71**
		4/17/2014	0.3 U	**1.5**	**0.66 I**	**79.5**
		10/27/2014	0.50 U	**1.4**	**0.59 I**	**83**
		1/20/2015	0.48 U	**1.4**	**0.49 I**	**46**
		7/14/2015	0.61 U	**1.3**	0.67 U	**51**
		1/11/2016	0.61 U	**1.4**	0.67 U	**42**
		5/31/2016	0.61 U	**1.8**	0.67 U	**32**
		3/6/2017	0.61 U	0.65 U	0.67 U	**5.8**
		8/9/2017	0.61 U	0.65 U	0.67 U	**7.4**
		11/8/2017	0.61 U	0.65 U	0.67 U	**1.9**
		2/20/2018	0.61 U	0.32 U	0.39 U	0.26 U
		5/29/2018	0.61 U	**0.36 I**	0.39 U	**1.6**
		11/16/2018	0.61 U	0.32 U	0.39 U	0.26 U
		3/12/2019	0.61 U	0.32 U	0.39 U	0.26 U
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2020	0.35 U	0.28 U	0.22 U	**1.9**
		3/17/2021	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	**3.4**
		3/15/2022	0.89 U	**0.57 I**	0.73 U	**6.1**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	**5.6**
MLPV-IW0057	40 to 50	1/19/2015	2.4 U	**360**	**12**	**800**
		7/14/2015	1.2 U	**300**	**14**	**1100**
		1/11/2016	1.2 U	**250**	**13**	**960**
		7/11/2016	3.1 U	**220**	**12**	**720**
		3/6/2017	3.1 U	**110**	**10**	**1100**
		11/8/2017	1.2 U	**48**	**8.1**	**660**
		5/29/2018	1.2 U	**84**	**8.8**	**970**
		11/14/2018	6.1 U	**45**	**8.3 I**	**1000**
		3/12/2019	3.1 U	**61**	**6.2 I**	**950**
		11/1/2019	0.35 U	**23.8**	**6.9**	**920**
		3/19/2020	0.35 U	**13.2**	**6.8**	**638**
		9/16/2020	1.7 U	**15.8**	**3.7 I**	**935**
		3/17/2021	0.35 U	**14.4**	**4.9**	**806**
		9/14/2021	3.5 U	**8.8 I**	2.2 U	**457**
		3/14/2022	2.2 U	**7.5**	**2.5**	**350**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	8.9 U	5.3 U	7.3 U	**280**
MLPV-IW0058	45 to 50	1/19/2015	2.4 U	**440**	**20**	**420**
		7/17/2015	6.1 U	**880**	**52**	**940**
		1/11/2016	6.1 U	**1500**	**60**	**1700**
		7/11/2016	0.61 U	**210**	**15**	**570**
		3/6/2017	0.61 U	**44**	**2.2**	**150**
		11/8/2017	0.61 U	**12**	**0.77 I**	**86**
		5/29/2018	0.61 U	**21**	**1.1 I**	**140**
		11/14/2018	0.61 U	**12**	**0.82 I**	**120**
		3/12/2019	0.61 U	**9.7**	**0.60 I**	**110**
		11/1/2019	0.35 U	**6.5**	0.22 U	**77.1**
		3/19/2020	0.35 U	**7.9**	**0.54 I**	**65.9**
		9/16/2020	0.35 U	**6.1**	0.22 U	**70.0**
		3/17/2021	0.35 U	**10.8**	**0.70 I**	**107**
		9/14/2021	0.69 U	**5.5**	0.44 U	**101**
		3/14/2022	0.89 U	**9.4**	**1.1**	**88**
		3/9/2023	4.5 U	**5.7**	3.7 U	**90**
MLPV-IW0059	45 to 50	1/19/2015	0.48 U	**51**	**5.4**	**92**
		7/14/2015	0.61 U	**510**	**35**	**770**
		1/11/2016	0.61 U	**250**	**30**	**400**
		7/11/2016	6.1 U	**1400**	**96**	**2300**
		3/6/2017	6.1 U	**3000**	**200**	**4000**
		11/8/2017	1.2 U	**2.4**	**54**	**600**
		5/29/2018	3.1 U	**17**	**110**	**1200**
		11/16/2018	0.61 U	**0.74 I**	**45**	**170**
		3/12/2019	0.61 U	**2.5**	**6.8**	**45**
		10/31/2019	0.35 U	**0.38 I**	**2.0**	**6.9**
		3/19/2020	0.35 U	**0.76 I**	**1.5**	**34.6**
		9/16/2020	0.35 U	0.28 U	**1.2**	**39.8**
		3/17/2021	0.35 U	**0.73 I**	**1.3**	**46.1**
		9/14/2021	0.35 U	0.28 U	0.22 U	**4.4**
		3/14/2022	0.89 U	**0.73 I**	**1.1**	**37**
		3/9/2023	0.89 U	0.53 U	0.73 U	**8.4**
MLPV-IW0060	40 to 50	1/19/2015	0.48 U	**2.3**	**0.41 I**	0.5 U
		4/6/2015	0.61 U	**1.4**	0.67 U	0.71 U
		7/14/2015	0.61 U	**1.2**	0.67 U	**0.79 I**
		1/11/2016	0.61 U	**0.75 I**	0.67 U	0.71 U
		7/13/2016	0.61 U	**68**	**6.1**	0.71 U
		3/6/2017	0.61 U	**120**	**16**	**1.6**
		11/8/2017	**36**	**2500**	**190**	**740**
		2/20/2018	**3.1**	**240**	**15**	**9.4**
		5/29/2018	**8**	**420**	**43**	**4.8**
		11/15/2018	0.61 U	**18**	**9.3**	**2.8**
		3/11/2019	0.61 U	**3.8**	**2.4**	**2.5**
		11/1/2019	0.35 U	**0.82 I**	0.22 U	**0.90 I**
		3/19/2020	0.35 U	**0.69 I**	0.22 U	**1.1**
		9/16/2020	0.35 U	0.28 U	0.22 U	**1.0**
		3/17/2021	0.35 U	0.28 U	0.22 U	**1.3**
		9/15/2021	0.35 U	0.28 U	0.22 U	**0.90 I**
		3/14/2022	0.89 U	**1.1**	**2.2**	**88**
		3/9/2023	0.89 U	**0.88 I**	0.73 U	**4.6**

Table 1
Biosparge Area - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-IW0061	35 to 40	1/18/2016	0.61 U	**0.75 I**	0.67 U	**59**
		3/28/2016	0.61 U	0.65 U	0.67 U	**47**
		5/31/2016	0.61 U	0.65 U	0.67 U	**48**
		3/7/2017	0.61 U	0.65 U	0.67 U	**53**
		8/9/2017	0.61 U	0.65 U	0.67 U	**38**
		11/8/2017	0.61 U	0.65 U	0.67 U	**41**
		2/20/2018	0.61 U	**0.35 I**	0.39 U	**29**
		5/30/2018	0.61 U	**0.52 I**	0.39 U	**37**
		11/14/2018	0.61 U	0.32 U	0.39 U	**24**
		3/12/2019	0.61 U	**0.57 I**	0.39 U	**25**
		10/31/2019	0.35 U	0.28 U	0.22 U	**20.6**
		3/19/2020	0.35 U	**0.46 I**	0.22 U	**16.6**
		9/16/2020	0.35 U	0.28 U	0.22 U	**18.4**
		3/16/2021	0.35 U	**0.50 I**	0.22 U	**15.7**
		9/13/2021	0.35 U	0.28 U	0.22 U	**13.0**
		3/15/2022	0.89 U	**0.63 I**	0.73 U	**13.0**
		3/8/2023	0.89 U	0.53 U	0.73 U	0.71 U
		4/26/2023	0.89 U	**0.58 I**	0.73 U	**8.7**
MLPV-IW0062	40 to 45	1/18/2016	1.2 U	**53**	1.3 U	**730**
		3/28/2016	0.61 U	**39**	**0.89 I**	**540**
		5/31/2016	0.61 U	**37**	**0.92 I**	**480**
		3/7/2017	1.2 U	**25**	1.3 U	**790**
		8/9/2017	3.1 U	**21**	3.4 U	**560**
		11/8/2017	1.2 U	**16**	1.3 U	**800**
		2/20/2018	3.1 U	**12**	1.9 U	**530**
		5/30/2018	1.2 U	**11**	0.78 U	**1100**
		11/14/2018	6.1 U	**7.3 I**	3.9 U	**920**
		3/12/2019	3.1 U	**7.8**	1.9 U	**1000**
		10/31/2019	0.35 U	**5.0**	**0.57 I**	**834**
		3/19/2020	0.35 U	**4.2**	**0.55 I**	**593**
		9/16/2020	0.35 U	**3.2**	**0.36 I**	**543**
		3/16/2021	0.35 U	**4.3**	**0.48 I**	**430**
		9/13/2021	0.35 U	**3.9**	0.22 U	**240**
		3/15/2022	0.89 U	**3.6**	0.73 U	**170**
		3/8/2023	0.89 U	0.53 U	0.73 U	**34**
		4/26/2023	4.5 U	2.7 U	3.7 U	**120**
MLPV-IW0063	35 to 40	1/18/2016	0.61 U	**18**	**0.99 I**	**260**
		3/28/2016	0.61 U	**4.3**	0.67 U	**38**
		5/31/2016	0.61 U	**15**	**1.1**	**180**
		3/7/2017	0.61 U	**6.9**	0.67 U	**150**
		8/9/2017	0.61 U	**12**	**0.82 I**	**180**
		11/8/2017	0.61 U	**3.1**	0.67 U	**2.3**
		2/20/2018	0.61 U	**2.9**	0.39 U	**4.7**
		5/29/2018	0.61 U	**1.2**	0.39 U	**6.1**
		11/14/2018	0.61 U	**1.6**	0.39 U	**3.8**
		3/11/2019	0.61 U	**0.96 I**	0.39 U	**0.59 I**
		11/1/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/19/2020	0.35 U	**0.59 I**	0.22 U	**0.86 I**
		9/16/2020	0.35 U	**1.5**	0.22 U	**1.7 JY**
		3/17/2021	0.35 U	**1.3**	0.22 U	**1.0**
		9/14/2021	0.35 U	**4.4**	022 U	**185**
		11/17/2021	2.2 U	**3.0**	1.8 U	**190**
		3/15/2022	0.89 U	**3.3**	0.73 U	**200**
		3/8/2023	8.9 U	**7.7 I**	7.3 U	**190**
MLPV-IW0064	40 to 45	1/18/2016	0.61 U	**12**	0.67 U	**82**
		3/28/2016	0.61 U	**9.1**	0.67 U	**82**
		5/31/2016	0.61 U	**8.8**	0.67 U,J3	**59**
		3/7/2017	0.61 U	**7.8**	0.67 U	**70**
		8/9/2017	0.61 U	**13**	0.67 U	**93**
		11/8/2017	0.61 U	**1.4**	0.67 U	**2**
		2/20/2018	0.61 U	**2.6**	0.39 U	**7.9**
		5/29/2018	0.61 U	**2.4**	0.39 U	**12**
		11/14/2018	0.61 U	**3.5**	0.39 U	**8.8**
		3/11/2019	0.61 U	**1.5**	0.39 U	**0.70 I**
		11/1/2019	0.35 U	**0.93 I**	0.22 U	0.41 U
		3/19/2020	0.35 U	**1.7**	0.22 U	**7.5**
		9/16/2020	0.35 U	**4.6**	0.22 U	**1.5**
		3/17/2021	0.35 U	**4.1**	0.22 U	**5.0**
		9/14/2021	0.35 U	**15.3**	0.22 U	**235**
		11/17/2021	4.4 U	**14**	3.6 U	**380**
		3/15/2022	4.4 U	**11**	3.6 U	**370**
		3/8/2023	22 U	13 U	18 U	**460**

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
ft bls = feet below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)

I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
J = An estimated value
L = Value exceeds calibration range
U = The analyte was not detected
µg/L = micrograms per liter
Y = Incorrect pH readings from sample received/analyzed

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-IW0011I	35 to 40	12/15/1997	26 U	180	16 U	2200
		10/5/1998	20 U	24 U	34 U	770
		7/17/2000	2.8 U	**24 I,J**	4.4 U	940
		1/21/2002	2 U	**8.1**	**2**	192
		2/27/2003	10 U	**35.2**	**2.9 J**	238
		2/3/2004	2 U	**51.7**	**4.2**	322
		8/10/2004	20 U	**56.2**	**5.2 J**	418
		5/4/2005	5 U	**31.7**	**6.3 J**	306
		10/28/2005	2.5 U	**4.6 I**	**2.9 I**	157
		5/16/2006	0.5 U	**8.8**	**7.9**	451
		11/9/2006	0.5 U	**3.3**	**5.7**	302
		5/22/2007	0.5 U	**1.7**	**4.3**	263
		11/15/2007	1.9 U	**1.6 I**	**2.6 I**	301
		5/23/2008	0.32 U	**1.7**	**3.2**	242
		11/13/2008	0.32 U	**3.6**	**3**	677
		5/19/2009	0.32 U	**7.9**	**2.6**	267
		11/9/2009	0.15 U	**12**	**2**	190
		5/18/2010	0.12 U	**6.5**	**1.8**	170
		11/8/2010	0.16 U	**3.6**	**1.9**	120
		5/10/2011	0.16 U	**3.1**	**1.9**	120
		11/1/2011	0.16 U	0.36 U	0.12 U	**0.68 I**
		5/29/2012	0.26 U	**2.9**	**1.9**	58.3
		1/27/2014	0.3 U	**1.3**	**1.1**	5.6
		7/22/2014	0.5 U	0.65 U	**0.75 I**	4.5
		1/21/2015	0.48 U	0.41 U	**0.81 I**	3.4
		7/15/2015	0.61 U	0.65 U	**0.91 I**	2.7
		1/12/2016	0.61 U	0.65 U	0.67 U	2.9
		7/11/2016	0.61 U	**1.1**	0.67 U	4.4
		11/7/2017	0.61 U	**1.1**	0.67 U	0.26 U
		5/31/2018	0.61 U	**0.93 I**	0.39 U	1.9
		3/6/2019	0.61 U	**0.72 I**	0.39 U	**1.4**
		10/31/2019	0.35 U	0.28 U	0.22 U	**0.48 I**
		3/18/2020	0.35 U	**0.35 I**	0.22 U	**0.92 I**
		9/15/2020	NS	0.28 U	0.22 U	0.41 U
		3/16/2021	NS	0.28 U	0.22 U	**0.46 I**
		9/13/2021	NS	0.28 U	0.22 U	0.41 U
		4/21/2022	NS	0.53 U	0.73 U	0.71 U
		3/9/2023	NS	0.53 U	0.73 U	0.71 U
MLPV-IW0032	30 to 40	5/31/2012	0.26 U	**1.7**	**2.2**	2.4
		9/26/2012	21	121	**11.2**	35.7
		8/19/2013	130	302	**44.5**	77.8
		10/24/2013	24.5	99	**10.1**	35
		1/27/2014	41.1	195	**9.3**	**0.44 I**
		4/16/2014	21.1	226	**13.9**	1.8 I
		7/21/2014	52	280	**14**	**1**
		1/20/2015	56	170	**28**	0.5 U
		7/15/2015	6.2	**32**	**9.3**	4.7
		10/6/2015	6.3	**45**	**12**	0.71 U
		1/12/2016	0.61 U	**7.6**	**2.8**	0.71 U
		7/13/2016	0.61 U	**33**	**8**	0.71 U
		11/7/2017	0.61 U	0.65 U	0.67 U	0.26 U
		5/31/2018	0.61 U	**0.36 I**	0.39 U	0.26 U
		3/6/2019	0.61 U	**0.74 I**	0.39 U	0.26 U
		3/18/2020	0.35 U	**0.35 I**	0.22 U	0.41 U
		11/30/2020	NS	**0.68 I**	0.22 U	**0.49 I**
		3/16/2021	NS	**0.84 I**	0.22 U	1.6
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	0.75 I	0.73 U	3.1
		3/14/2023	NS	0.53 U	0.73 U	**1.3**

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (ft bls)**	**Sample Date**				
MLPV-IW0033	40 to 50	5/31/2012	521	8270	492	3300
		9/26/2012	863	8250	617	2990
		8/19/2013	1290	6720	471	2800
		10/24/2013	1570	7880	601	3320
		1/27/2014	33.7	1300	88.7	771
		4/16/2014	34.6	2190	116	770
		7/21/2014	170	3200	220	810
		1/20/2015	9.9	370	39	280
		7/15/2015	2.1	500	45	540
		10/6/2015	0.84 I	300	27	320
		1/12/2016	0.61 U	72	8.8	150
		7/13/2016	0.64 I	120	12	350
		3/7/2017	0.61 U	100	17	470
		11/7/2017	0.61 U	24	6.3	68
		5/31/2018	0.61 U	21	3	120
		3/6/2019	1.2 U	46	6	400
		10/31/2019	1.7 U	58.4	1.1 U	365
		3/18/2020	0.44 I	55.9	9.6	455
		11/30/2020	NS	82.3	7.7	497
		3/16/2021	NS	49.6	6.3	471
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	100	9.8	950
		3/14/2023	NS	57	18 U	560
MLPV-IW0034	30 to 40	5/29/2012	0.26 U	1.4	4.9	80.4
		1/27/2014	33.2	133	9	468
		7/22/2014	4.6	130	9.8	120
		1/21/2015	13	200	35	600
		7/15/2015	0.61 U	5.8	2.8	94
		1/11/2016	0.61 U	5.9	0.67 U	27
		7/13/2016	0.61 U	2.8	0.80 I	37
		11/7/2017	0.61 U	0.65 U	0.67 U	13
		5/31/2018	0.61 U	0.40 I	0.39 U	5.5
		3/6/2019	0.61 U	1.4	0.39 U	2.4
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2020	NS	0.28 U	0.22 U	0.41 U
		3/15/2021	NS	0.41 I	0.22 U	0.41 U
		9/14/2021	NS	0.28 U	0.22 U	0.41 U
		3/15/2022	NS	0.62 I	0.73 U	0.92 I
		3/9/2023	NS	0.54 I	0.73 U	0.71 U
MLPV-IW0035	40 to 50	5/29/2012	1.3 U	573	38.7	900
		1/27/2014	3 U	173	28.9	1350
		7/22/2014	8.2	640	57	1200
		1/21/2015	7.4	690	49	960
		7/15/2015	1.2 U	130	33	960
		1/11/2016	0.61 U	1.6	7.3	260
		7/13/2016	0.61 U	0.82 I	9.3	400
		11/7/2017	0.61 U	1.8	5.4	220
		5/31/2018	0.61 U	1.2	6.9	330
		3/6/2019	0.61 U	2.3	3.3	150
		10/31/2019	0.86 U	0.69 U	0.55 U	152
		3/18/2020	0.35 U	3.2	4.0	192
		9/15/2020	NS	0.28 U	3.0	205 L
		3/15/2021	NS	3.2	2.5	124
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	0.53 U	0.73 U	0.71 U
		3/9/2023	NS	2.1	0.73 U	78
MLPV-IW0036	40 to 45	5/29/2012	0.26 U	0.26 U	0.35 U	0.22 U
		1/28/2014	0.3 U	0.33 U	0.34 U	5
		7/22/2014	0.5 U	0.65 U	0.44 U	4.5
		1/22/2015	0.48 U	0.47 I	0.37 U	6
		7/15/2015	0.61 U	0.65 U	0.67 U	42
		1/12/2016	0.61 U	0.65 U	0.67 U	42
		7/13/2016	0.61 U	0.65 U	0.67 U	170
		11/7/2017	0.61 U	0.65 U	0.67 U	87
		5/30/2018	0.61 U	0.32 U	0.63 I	80

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (ft bls)**	**Sample Date**				
MLPV-IW0036 (Continued)	40 to 45	3/6/2019	0.61 U	**0.41 I**	0.39 U	**32**
		10/31/2019	0.35 U	0.28 U	**0.33 I**	**9.1**
		3/18/2020	0.35 U	**0.34 I**	**0.33 I**	**22.1**
		9/15/2020	NS	0.28 U	0.22 U	**5.5**
		3/15/2021	NS	**0.47 I**	0.22 U	**24.9**
		9/14/2021	NS	**0.60 I**	0.22 U	**32.3**
		3/16/2022	NS	**1.4**	0.73 U	**44**
		3/13/2023	NS	**0.88 I**	0.73 U	**54**
		4/26/2023	NS	**0.84 I**	0.73 U	**29**
MLPV-IW0037	40 to 50	5/29/2012	1.3 U	**835**	**19.1**	**926**
		1/27/2014	0.3 U	**151**	**1.5**	**210**
		7/22/2014	1 U	**340**	**4**	**520**
		1/21/2015	2.4 U	**560**	**9.3**	**600**
		7/15/2015	1.2 U	**550**	**8.2**	**970**
		1/12/2016	3.1 U	**390**	**7**	**550**
		7/11/2016	1.2 U	**300**	**3.9**	**890**
		11/7/2017	0.61 U	**150**	**1.2**	**280**
		5/31/2018	0.61 U	**94**	**1.2 I**	**360**
		3/6/2019	0.61 U	**160**	**0.89 I**	**270**
		10/31/2019	0.69 U	**135**	0.44 U	**178**
		3/18/2020	0.86 U	**132**	**0.67 I**	**245**
		9/15/2020	NS	**55.4**	**0.52 I**	**208 L**
		3/16/2021	NS	**138**	**0.71 I**	**269**
		9/13/2021	NS	**25.1**	**0.47 I**	**99.3**
		4/21/2022	NS	**100**	**0.73 U**	**200**
		3/9/2023	NS	**79 Q**	0.73 U	**170 Q**
MLPV-IW0038	30 to 40	5/29/2012	**95.3**	**217**	**19.9**	**446**
		9/26/2012	**764**	**863**	**55.9**	**364**
		8/19/2013	**386**	**1010**	**55.8**	**263**
		10/24/2013	**121**	**617**	**34.2**	**93.1**
		1/27/2014	**45**	**235**	**27**	**42.3**
		4/16/2014	**30.3**	**136**	**6.9**	**1.6 I**
		7/22/2014	**5.3**	**29**	**5.7**	0.5 U
		1/21/2015	0.48 U	**3.6**	**0.93 I**	**4.6**
		7/14/2015	0.61 U	**2.9**	0.67 U	0.71 U
		10/6/2015	0.61 U	**2.3**	0.67 U	0.71 U
		1/12/2016	0.61 U	**1.2**	0.67 U	0.71 U
		7/13/2016	0.61 U	**2.8**	0.67 U	0.71 U
		11/7/2017	0.61 U	**0.78 I**	0.67 U	0.26 U
		5/31/2018	0.61 U	**0.48 I**	0.39 U	0.26 U
		3/6/2019	0.61 U	**0.94 I**	0.39 U	**1.1**
		3/18/2020	0.35 U	**0.54 I**	0.22 U	0.41 U
		3/15/2021	NS	**1.2**	0.22 U	**2.3**
		3/16/2022	NS	**0.63 I**	0.73 U	**1.1**
		3/10/2023	NS	**150 Q**	**4.4**	**270 Q**
		4/26/2023	NS	**0.85 I**	0.73 U	**1.8**
MLPV-IW0039	40 to 50	5/29/2012	**8980**	**13200**	**648**	**6200**
		9/26/2012	**6650**	**10000**	**502**	**3070**
		8/19/2013	**3720**	**6480**	**269**	**1520**
		10/24/2013	**2850**	**5880**	**278**	**1190**
		1/27/2014	**683**	**3470**	**147**	**841**
		4/16/2014	**549**	**3060**	**116**	**955**
		7/22/2014	**430**	**2200**	**130**	**640**
		1/21/2015	**5.8**	**270**	**17**	**220**
		7/14/2015	**3.3**	**180**	**13**	**250 J3**
		10/6/2015	**2.7**	**140**	**9.6**	**120**
		1/12/2016	**2.7**	**160**	**10**	**130**
		7/13/2016	**3.3**	**82**	**6.9**	**38**
		3/7/2017	**2.6**	**200**	**11**	**250**
		11/7/2017	**1.5**	**92**	**5.1**	**55**
		5/31/2018	**1.3 I**	**45**	**3.2**	**55**
		3/6/2019	**0.83 I**	**160**	**7.1**	**250**
		10/31/2019	0.86 U	**198**	**4.6**	**241**
		3/18/2020	0.86 U	**128**	**4.4**	**228**
		9/15/2020	NS	**92.1**	**3.9**	**276 L**
		3/15/2021	NS	**161**	**6.5**	**236**
		9/14/2021	NS	**76.9**	**3.3**	**191**
		3/16/2022	NS	**140**	**5.4**	**160**
		3/10/2023	NS	0.53 U	0.73 U	0.71 U
		4/26/2023	NS	**150**	4.2 I	**270**

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (ft bls)**	**Sample Date**				
MLPV-IW0040	30 to 40	5/29/2012	**1.9**	**90.9**	**59.7**	**3410**
		9/26/2012	**1300**	**2450**	**161**	**1210**
		8/19/2013	**157**	**643**	**44.8**	**464**
		10/24/2013	**5.5**	**88.2**	**6.1**	**331**
		1/27/2014	**68.3**	**189**	**4.2 I**	**18**
		4/16/2014	**20.1**	**78.2**	**7**	**56.7**
		7/23/2014	**13**	**9.3**	**1.6**	**8.2**
		1/22/2015	**0.89 I**	**5.6**	0.37 U	0.5 U
		7/15/2015	0.61 U	**0.68 I**	0.67 U	0.71 U
		10/6/2015	0.61 U	0.65 U	0.67 U	0.71 U
		1/11/2016	0.61 U	**0.91 I**	0.67 U	0.71 U
		7/13/2016	0.61 U	0.65 U	0.67 U	0.71 U
		11/7/2017	0.61 U	0.65 U	0.67 U	0.26 U
		5/30/2018	0.61 U	**0.58 I**	0.39 U	**0.36 I**
		3/5/2019	0.61 U	0.32 U	0.39 U	0.26 U
		3/18/2020	0.35 U	**0.39 I**	0.22 U	0.41 U
		3/15/2021	NS	**0.50 I**	0.22 U	0.41 U
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	**0.64 I**	0.73 U	0.71 U
		3/9/2023	NS	**0.93 I**	0.73 U	**0.72 I**
MLPV-IW0041	40 to 50	5/29/2012	**15300**	**14600**	**737**	**5260**
		9/26/2012	**8500**	**11000**	**556**	**3880**
		8/19/2013	**1380**	**5380**	**277**	**4150**
		10/24/2013	**2610**	**9250**	**559**	**6370**
		1/27/2014	**19.3 I**	**1570**	**56.5**	**993**
		4/16/2014	**685**	**2660**	**114**	**2030**
		7/23/2014	**450**	**2400**	**120**	**1900**
		1/22/2015	**1**	**14**	**2.6**	**150**
		7/15/2015	0.61 U	**89**	**4.5**	**290**
		10/6/2015	0.61 U	**55**	**5.5**	**240**
		1/11/2016	0.61 U	**80**	**6.3**	**360**
		7/13/2016	0.61 U	**20**	**4.2**	**230**
		3/7/2017	0.61 U	**63**	**3.8**	**330**
		11/7/2017	0.61 U	**140**	**5.2**	**300**
		5/30/2018	0.61 U	**9.7**	**3.9**	**230**
		3/5/2019	**0.65 I**	**76**	**2.6**	**260**
		10/31/2019	**0.39 I**	**14.0**	**2.3**	**166**
		3/18/2020	0.35 U	**106**	**3.3**	**183**
		9/15/2020	NS	**4.0**	**1.4**	**201 L**
		3/16/2021	NS	**113**	**3.3**	**259**
		9/14/2021	NS	**1.9 I**	**0.92 I**	**146**
		3/15/2022	NS	**26**	**2.2**	**150**
		3/9/2023	NS	**53**	**1.4**	**130**
MLPV-IW0042	30 to 40	5/29/2012	0.26 U	0.26 U	**0.92 I**	**571**
		9/26/2012	0.31 U	0.24 U	**0.63 I**	**97.9**
		8/19/2013	0.31 U	**1**	0.23 U	**5.9**
		10/24/2013	0.31 U	**1.9**	0.23 U	**6**
		1/28/2014	**1.5**	**2.4**	0.34 U	**2.2**
		4/16/2014	0.3 U	**1.1**	0.34 U	**5.6**
		7/22/2014	0.5 U	**4.5**	0.44 U	**7.9**
		1/20/2015	0.48 U	**20**	**0.45 I**	**4.4**
		7/14/2015	0.61 U	**6.4**	0.67 U	**1.7**
		10/6/2015	0.61 U	**6**	0.67 U	**0.81 I**
		1/11/2016	0.61 U	**11**	0.67 U	**1.4**
		7/13/2016	0.61 U	**2.4**	0.67 U	0.71 U
		11/7/2017	0.61 U	**0.86 I**	0.67 U	0.26 U
		5/30/2018	0.61 U	**0.32 I**	0.39 U	**0.34 I**
		3/6/2019	0.61 U	0.32 U	0.39 U	0.26 U
		3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
		3/16/2021	NS	**1.2**	0.22 U	**0.42 I**
		9/14/2021	Well submerged			
		3/16/2022	NS	**0.63 I**	0.73 U	**1.2**
		3/14/2023	NS	0.53 U	0.73 U	0.71 U

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (ft bls)	Sample Date				
MLPV-IW0043	40 to 50	5/29/2012	6620	7320	348	2540
		9/26/2012	2900	2910	101	887
		8/19/2013	3400	2790	128	828
		10/24/2013	698	1310	41.6	248
		1/28/2014	274	531	24.4	190
		4/16/2014	56.2	289	9	117
		7/22/2014	11	1800	51	340
		1/20/2015	4.8 U	1400	52	360
		7/14/2015	1.2 U	190	7.6	200
		10/6/2015	0.61 U	140	6.5	180
		1/11/2016	0.61 U	50	2.7	140
		7/13/2016	0.61 U	150	2.4	180
		3/7/2017	0.61 U	190	4.9	330
		11/7/2017	0.61 U	42	1.9	120
		5/30/2018	0.61 U	31	0.96 I	140
		3/6/2019	0.77 I	100	2.7	150
		10/31/2019	0.86 U	149	2.4 I	155
		3/18/2020	0.97 I	193	3.0	131
		9/15/2020	NS	73.2	2.4	146
		3/16/2021	NS	249	3.7 I	180
		9/14/2021	Well submerged			
		3/16/2022	NS	98	2.6	88
		3/14/2023	NS	170	3.7 U	280
MLPV-IW0044	40 to 50	7/6/2012	0.26 U	1240	90.2 I	4960
		1/28/2014	1.5 U	60.5	4 I	686
		7/23/2014	5 U	140	7.8 I	2300
		1/20/2015	12 U	67	14 I	1700
		7/15/2015	6.1 U	10	6.7 U	2100
		1/12/2016	1.2 U	4.3	3.3	600
		7/12/2016	3.1 U	39	18	1700
		11/7/2017	6.1 U	18	14	1500
		5/30/2018	1.2 U	7.5	6.4	810
		3/5/2019	1.2 U	3.7	2.9 I	510
		10/31/2019	0.35 U	2.9	1.8	458
		3/18/2020	0.35 U	6.9	2.2	325
		11/30/2020	NS	2.8	0.88 I	307
		3/16/2021	NS	3.4	1.0	249
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	2.5	0.73 U	200
		3/14/2023	NS	22	7.3 U	620
MLPV-IW0045	40 to 50	7/6/2012	115	10300	520	7360
		1/27/2014	192	2360	164	2050
		7/22/2014	600	5200	330	4000
		1/20/2015	5.7	390	51	360
		7/15/2015	49	860	110	960
		1/12/2016	1.2 U	79	61	570
		7/12/2016	0.61 U	35	41	180
		11/7/2017	0.61 U	7.7	7.9	200
		5/30/2018	0.61 U	2.4	10	270
		3/6/2019	0.61 U	3.2	6.8	170
		10/31/2019	0.35 U	4.8	3.6	97.2
		3/18/2020	0.35 U	20.0	5.7	207
		9/15/2020	NS	6.4	4.2	205 L
		3/16/2021	NS	75.8	7.8	295
		9/14/2021	Could not locate due to construction in sampling area			
		4/21/2022	NS	6.3	0.95 I	92
		3/14/2023	NS	11	1.6	59
MLPV-SAMW0004D	45 to 50	5/29/2012	0.58 I	0.26 U	75.8	533
		1/28/2014	0.34 U	0.30 U	29.7	156
		7/22/2014	0.70 I	0.50 U	5.5	310
		1/22/2015	0.37 U	0.48 U	0.41 U	4.9
		7/15/2015	0.67 U	0.61 U	2.5	26.0
		1/12/2016	0.67 U	0.61 U	0.75 I	6.2
		7/13/2016	0.67 U	0.61 U	0.65 U	0.71 U
		11/7/2017	0.67 U	0.61 U	0.74 I	5.1
		5/30/2018	0.61 U	0.32 U	0.45 I	6.6

Table 2
Former Hot Spot 2 (Air Sparge System Area) - Chlorinated Volatile Organic Compound (CVOC) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	**Screened Interval (ft bls)**	**Sample Date**				
MLPV-SAMW0004D (Continued)	45 to 50	3/6/2019	0.61 U	**0.55 I**	0.39 U	**4.3**
		10/31/2019	0.35 U	**0.32 I**	**0.37 I**	**2.6**
		3/18/2020	0.35 U	**3.1**	**0.58 I**	**22.2**
		9/15/2020	NS	0.28 U	**0.60**	**4.2**
		3/15/2021	NS	**2.4**	**0.59**	**14.6**
		9/14/2021	NS	**0.65 I**	**0.67 I**	**5.0**
		3/16/2022	NS	**2.3**	**0.94 I**	**17**
		3/13/2023	NS	**1.9**	**1.2**	**18**
MLPV-SAMW0004I	35 to 40	5/29/2012	0.26 U	0.26 U	**0.65 I**	**6.8**
		1/28/2014	0.30 U	0.33 U	0.34 U	**4.0**
		7/22/2014	0.50 U	0.65 U	0.44 U	**4.4**
		1/22/2015	0.48 U	0.41 U	0.37 U	**5.7**
		7/15/2015	0.61 U	0.65 U	0.67 U	**9.7**
		1/12/2016	0.61 U	0.65 U	0.67 U	**14.0**
		7/13/2016	0.61 U	0.65 U	0.67 U	**25.0**
		11/7/2017	0.61 U	0.65 U	0.67 U	**21.0**
		5/30/2018	0.61 U	0.32 U	0.39 U	**1.6**
		3/6/2019	0.61 U	0.32 U	0.39 U	**5.6**
		10/31/2019	0.35 U	**0.40 I**	0.22 U	**15.9**
		3/18/2020	0.35 U	0.28 U	0.22 U	**13.8**
		9/15/2020	NS	0.28 U	0.22 U	**11.3**
		3/15/2021	NS	**0.61 I**	**0.41 I**	**19.4**
		9/14/2021	NS	0.28 U	0.22 U	**15.5**
		3/15/2022	NS	**0.56 I**	0.73 U	**15**
		3/13/2023	NS	**0.74 I**	0.73 U	**12**

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
ft bls = feet below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
J = An estimated value
L = Value exceeds calibration range
U = The analyte was not detected
µg/L = micrograms per liter
NS = Not sampled

Table 3
Hot Spot 3 (OFW Area) - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area SWMU 056

Category			Volatile Organic Compounds (VOCs)			
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	1
State of Florida NADCs (µg/L)			300	700	1000	100
Location ID	Screened Interval (feet bls)	Sample Date				
VABRA-MW0011	25 to 35	11/10/2015	0.61 U	**24**	**5.6**	**110**
		1/11/2016	0.61 U	**1.7**	**2.7**	**11**
		7/11/2016	0.61 U	**0.83 I**	**3.1**	**6.8**
		2/20/2017	0.61 U	0.65 U	**2.3**	**3.8**
		8/9/2017	0.61 U	0.65 U	**1**	**2.6**
		2/19/2018	0.61 U	0.32 U	**0.81 I**	**1.4**
		8/6/2018	0.61 U	0.32 U	0.39 U	0.26 U
		2/18/2019	0.61 U	0.32 U	**0.44 I**	**0.49 I**
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0012	15 to 25	11/10/2015	0.61 U	0.65 U	**0.67 I**	**4.2**
		1/11/2016	0.61 U	0.65 U	0.67 U	**1.6**
		7/11/2016	0.61 U	**7**	**1.9**	**20**
		2/20/2017	0.61 U	0.65 U	**0.81 I**	**1.7**
		8/9/2017	0.61 U	**2.5**	**1.1**	**7.2**
		2/19/2018	0.61 U	0.32 U	0.39 U	0.26 U
		8/6/2018	0.61 U	0.32 U	0.39 U	0.26 U
		2/18/2019	0.61 U	0.32 U	0.39 U	0.26 U
		10/31/2019	0.35 U	**0.69 I**	0.22 U	**1.0**
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0013	20 to 25	9/13/2018	0.61 U	**3**	**1.1 I**	**8.8**
		2/18/2019	0.61 U	**5.5**	**0.97 I**	**9.3**
		10/31/2019	0.35 U	**0.86 I**	**1.3**	**2.6**
		9/14/2020	0.35 U	0.28 U	**0.63**	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U
VABRA-MW0014	25 to 30	9/13/2018	0.61 U	**0.45 I**	**0.76 I**	**3.5**
		2/18/2019	0.61 U	0.32 U	**0.53 I**	**0.68 I**
		10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
		9/14/2020	0.35 U	0.28 U	0.22 U	0.41 U
		9/15/2021	0.35 U	0.28 U	0.22 U	0.41 U
		12/14/2022	0.50 U	0.50 U	0.50 U	0.50 U

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
Blank cells indicate the analyte was not analyzed for that specific well and date
bls = Below land surface
FDEP = Florida Department of Environmental Protection
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
I = The analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
MW = Monitoring Well
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
SWMU = Solid Waste Management Unit
U = The analyte was not detected
µg/L = micrograms per liter
VABRA = prefix for Vehicle Assembly Building Reassessment monitoring well

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-IW0001D	50 to 55	3/19/1997	1 U	1 U	1 U	1 U	1 U
		12/18/1997	0.53 U	0.25 U	0.31 U	0.52 U	0.9 U
		10/6/1998	41 U	48 U	68 U	71 U	**88 U**
		7/17/2000	0.28 U	0.65 U	0.44 U	0.45 U	0.48 I,J
		1/21/2002	2 U	2 U	2 U	2 U	1 U
		2/25/2003	2 U	2 U	2 U	2 U	1 U
		2/4/2004	2 U	2 U	2 U	2 U	1 U
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/4/2005	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		5/16/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		11/8/2006	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
		5/16/2007	NS	NS	NS	NS	NS
		11/13/2007	NS	NS	NS	NS	NS
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	**2.1**
		9/16/2020	0.35 U	0.28 U	0.22 U	NS	0.41 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0002IR	28 to 33	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0006IR	28 to 33	2/25/2003	2 U	**12.8**	**5.1**	2 U	**65.7**
		2/4/2004	2 U	**11.9**	**4.5**	2 U	**53.7**
		8/10/2004	2 U	**7.9**	**2.6**	2 U	**62.8**
		5/4/2005	0.50 U	**6.3**	**2.4**	0.50 U	**44.3**
		11/1/2005	0.50 U	**2.9**	**1.2**	0.50 U	**35.0**
		5/16/2006	0.50 U	**1.1**	0.50 U	0.50 U	**15.3**
		11/8/2006	0.50 U	**2.7**	**0.55 I**	0.50 U	**31.0**
		5/16/2007	0.50 U	**3.8**	0.50 U	0.50 U	**34.8**
		11/13/2007	0.38 U	0.28 U	0.20 U	0.23 U	**9.5**
		5/27/2008	0.32 U	**2.8**	**0.48 I**	0.54 U	**32.1**
		11/13/2008	0.32 U	0.2 U	0.45 U	0.54 U	**8.9**
		5/19/2009	0.32 U	**1.5**	0.45 U	0.54 U	**23.3**
		11/10/2009	0.15 U	**0.67 I**	0.13 U	0.16 U	**9.8**
		5/10/2010	0.12 U	0.083 U	0.39 U	0.41 U	**4.1**
		11/8/2010	0.16 U	0.36 U	0.12 U	0.16 U	**3.2**
		5/11/2011	0.16 U	0.36 U	0.12 U	0.13U	**4.7**
		11/11/2011	0.16 U	0.36 U	0.12 U	0.16 U	**2.0**
		11/28/2012	0.16 U	0.36 U	0.12 U	0.16 U	**1.1**
		5/13/2013	0.16 U,J	0.36 U,J	0.12 U,J	0.16 U,J	**0.76 I**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**0.99 I**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		9/16/2020	0.35 U	0.28 U	0.22 U	NS	0.41 U
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0009I	28 to 33	2/25/2003	2 U	2 U	**1.1 J**	2 U	**2.5**
		2/4/2004	2 U	**1.5 J**	**1.5 J**	2 U	**5.6**
		8/10/2004	2 U	**1.3 J**	**0.91 J**	2 U	**5.1**
		5/4/2005	2 U	**1.4 J**	**1.3 J**	2 U	**6.6**
		11/1/2005	0.50 U	**0.86 J**	**0.92 J**	0.50 U	**3.8**
		5/16/2006	0.50 U	**1.3**	**1.2**	0.50 U	**3.3**
		11/8/2006	0.50 U	**0.66 I**	**0.75 I**	0.50 U	**4.8**
		5/16/2007	0.50 U	**0.68 I**	**0.78 I**	0.50 U	**5.2**
		5/16/2007	0.50 U	**0.60 I**	**0.59 I**	0.50 U	**4.8**
		11/16/2007	0.38 U	**0.71 I**	**0.48 I**	0.23 U	**5.0**
		5/23/2008	0.32 U	0.2 U	0.45 U	0.54 U	**4.4**
		11/13/2008	0.32 U	**0.27 I**	0.45 U	0.54 U	**3.0**
		5/19/2009	0.32 U	0.2 U	0.45 U	0.54 U	**2.8**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**2.3**
		5/17/2010	0.12 U	0.083 U	0.39 U	0.41 U	**1.8**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**0.4 I**	**0.22 I**	0.13 U	**2.3**

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-IW0009I (continued)	28 to 33	11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**0.41 I**	**0.16 I**	0.16 U	**1.7**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**1.6**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**2.1**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.43 I**	0.39 U	0.26 U	**1.6**
		6/3/2020	0.35 U	**0.33 I**	0.22 U	0.32 U	**0.72 I**
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0009D	45 to 50	2/25/2003	2 U	**16.8**	2 U	2 U	**35.4**
		2/4/2004	2 U	**15**	2 U	2 U	**46.7**
		8/10/2004	2 U	**16.3**	2 U	2 U	**62.9**
		5/4/2005	2 U	**229**	**1.1 J**	**1.9 J**	**1,550**
		11/1/2005	0.50 U	**5.5**	0.50 U	0.50 U	**21.0**
		5/16/2006	25 U	**255**	25 U	25 U	**1,580**
		11/8/2006	0.50 U	**2.3**	0.50 U	0.50 U	**14.6**
		5/16/2007	0.50 U	**9.1**	0.50 U	0.50 U	**105**
		5/16/2007	0.50 U	**5.2**	0.50 U	0.50 U	**36.4**
		11/16/2007	0.38 U	**13.3**	0.20 U	0.23 U	**199**
		5/23/2008	0.32 U	**4.6**	0.45 U	0.54 U	**56.2**
		11/13/2008	0.32 U	**1.7**	0.45 U	0.54 U	**115**
		5/19/2009	0.32 U	**2.4**	0.45 U	0.54 U	**46.9**
		11/9/2009	0.15 U	**1.8**	0.13 U	0.16 U	**35.0**
		5/17/2010	0.12 U	**0.86 I**	0.39 U	0.41 U	**35**
		11/8/2010	0.16 U	**0.93 I**	0.12 U	0.16 U	**9.4**
		5/11/2011	0.16 U	0.71 U	**0.12 I**	0.13 U	**11.0**
		11/11/2011	0.16 U	**11**	0.12 U	0.16 U	**260**
		11/28/2012	0.16 U	**1.0**	0.12 U	0.16 U	**15**
		5/13/2013	0.16 U	**1.6**	0.12 U	0.16 U	**21.0**
		11/17/2014	0.50 U	**0.77 I**	0.50 U	0.50 U	**10.0**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.50 I**	0.39 U	0.26 U	**16**
		6/3/2020	0.35 U	**1.4**	0.22 U	0.32 U	**32.6**
		3/13/2023	0.89 U	0.53 U	0.73 U	NS	**23**
MLPV-IW0012I	35 to 40	2/25/2003	2 U	**0.54 J**	2 U	2 U	**0.77 J**
		2/4/2004	2 U	**0.62 J**	2 U	2 U	**15.7 J**
		8/10/2004	2 U	**0.66 J**	2 U	2 U	**18.2**
		5/4/2005	2 U	**0.55 J**	2 U	2 U	**15.1**
		11/1/2005	0.50 U	0.50 U	0.50 U	0.50 U	**11.5**
		5/16/2006	0.50 U	**0.60 I**	0.50 U	0.50 U	**14**
		11/8/2006	0.50 U	0.50 U	0.50 U	0.50 U	**10.5**
		5/16/2007	0.50 U	**0.58 I**	0.50 U	0.50 U	**9.5**
		5/17/2007	0.50 U	**0.57 I**	0.50 U	0.50 U	**7.3**
		11/15/2007	0.38 U	**0.47 I**	0.20 U	0.23 U	**9.1**
		5/23/2008	0.32 U	**0.72 I**	0.45 U	0.54 U	**11.1**
		11/13/2008	0.32 U	**0.38 I**	0.45 U	0.54 U	**10.4**
		5/19/2009	0.32 U	**0.62 I**	0.45 U	0.54 U	**12.3**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**7.3**
		5/18/2010	0.12 U	**0.32 I**	0.39 U	0.41 U	**4.9**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**0.43 I**	**0.17 I**	0.13 U	**5.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**0.43 I**	0.12 U	0.16 U	**2.6**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	0.22 U
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-IW0012D	45 to 50	1/22/2002	2 U	**2.3**	2 U	2 U	**53.2**
		2/28/2003	2 U	**0.94 J**	2 U	2 U	**47.5**
		2/3/2004	2 U	**1 J**	2 U	2 U	**37.3**
		8/10/2004	4 U	**1.7 J**	4 U	4 U	**121**
		5/5/2005	0.50 U	0.50 U	0.50 U	0.50 U	**16.7**
		10/28/2005	0.50 U	**1.6**	**0.55 I**	0.50 U	**93.9**
		5/16/2006	0.50 U	0.50 U	0.50 U	0.50 U	**16.9**
		11/9/2006	0.50 U	**0.68 I**	0.50 U	0.50 U	**50.1**
		5/17/2007	0.50 U	0.50 U	0.50 U	0.50 U	**9.0**
		11/15/2007	0.38 U	**1.0**	0.20 U	0.23 U	**86.2**
		5/23/2008	0.32 U	0.2 U	0.45 U	0.54 U	**13.3**
		11/13/2008	0.32 U	0.2 U	0.45 U	0.54 U	**53.7**
		5/19/2009	0.32 U	0.2 U	0.45 U	0.54 U	**14.5**
		11/9/2009	0.15 U	0.12 U	0.13 U	0.16 U	**12.0**
		5/18/2010	0.12 U	**0.91 I**	0.39 U	0.41 U	**38**
		11/8/2010	0.16 U	0.36 U	0.12 U	0.16 U	**8.8**
		5/11/2011	0.16 U	0.36 U	0.12 U	0.13 U	**6.4**
		11/11/2011	0.16 U	**1.4**	0.12 U	0.16 U	**53**
		11/28/2012	0.16 U	0.36 U	0.12 U	0.16 U	**8.6**
		5/13/2013	0.16 U	**0.53 I**	0.12 U	0.16 U	**14**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**8.5**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**4.8**
		6/3/2020	0.35 U	**0.44 I**	0.22 U	0.32 U	**9.7**
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	**2.5**
MLPV-IW0014I	35 to 40	3/14/2023	0.89 U	0.53 U	0.73 U	NS	**0.98 I**
MLPV-IW0017I	35 to 40	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0018D	50 to 55	1/22/2002	2 U	**5.2**	2 U	2 U	**2.2**
		2/26/2003	2 U	**2**	2 U	2 U	**1.3**
		2/3/2004	2 U	**4**	2 U	2 U	**2.9**
		8/10/2004	2 U	**9.4**	2 U	2 U	**8.4**
		5/12/2005	0.50 U	**1.2**	0.50 U	0.50 U	**0.95 J**
		11/2/2005	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
		5/22/2006	0.50 U	**1.3**	0.50 U	0.50 U	**1.2**
		11/13/2006	0.50 U	**3.3**	0.50 U	0.50 U	**3.2**
		5/21/2007	0.50 U	**0.53 I**	0.50 U	0.50 U	0.50 U
		11/15/2007	0.38 U	**5.1**	0.20 U	0.23 U	**7.4**
		5/22/2008	0.32 U	**1.1**	0.45 U	0.54 U	**0.71 I**
		11/12/2008	0.32 U	**2.6**	0.45 U	0.54 U	**4.6**
		5/19/2009	0.32 U	**0.85 I**	0.45 U	0.54 U	**0.92 I**
		11/12/2009	0.15 U	**0.66 I**	0.13 U	0.16 U	**0.82 I**
		5/19/2010	0.12 U	**1.4**	0.39 U	0.41 U	**2.6**
		11/8/2010	0.16 U	**0.78 I**	0.12 U	0.16 U	**0.74 I**
		5/11/2011	0.16 U	**0.78 I**	0.12 U	0.13 U	**0.64 I**
		11/11/2011	0.16 U	**4.6**	**0.41 I**	0.16 U	**32.0**
		11/28/2012	0.16 U	**0.93 I**	0.12 U	0.16 U	**4.8**
		5/13/2013	0.16 U,J	**1.7 J**	**0.13 I**	0.16 U,J	**12 J**
		11/17/2014	0.50 U	**0.76 I**	0.50 U	0.50 U	**2.5**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**0.69 I**
		6/3/2020	0.35 U	**0.73 I**	0.22 U	0.32 U	**3.1**
		3/15/2023	0.89 U	**0.95 I**	0.73 U	NS	**3.6**

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-IW0020D	65 to 70	2/26/2003	2 U	**5.9**	**1.4 J**	2 U	**53.5**
		2/3/2004	2 U	**6**	**1.4 J**	2 U	**34.3**
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/12/2005	0.50 U	**3.2**	**1.3**	0.50 U	**25.3**
		11/2/2005	0.50 U	**6.1**	**1.3**	0.50 U	**30.5**
		5/22/2006	0.50 U	**2.6**	**1**	0.50 U	**31.5**
		11/13/2006	0.50 U	**3.1**	**1.1**	0.50 U	**33.3**
		10/3/2018	0.61 U	**0.71 I**	0.39 U	0.26 U	**3.3**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/21/2023	0.89 U	**0.83 I**	0.73 U	NS	**3.1**
MLPV-IW0022D	48 to 55	3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0027I	28 to 33	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0028I	28 to 33	2/25/2003	2 U	**5.9**	**1.4 J**	2 U	**53.5**
		2/4/2004	2 U	**6**	**1.4 J**	2 U	**34.3**
		8/10/2004	2 U	2 U	2 U	2 U	1 U
		5/4/2005	0.50 U	**3.2**	**1.3**	0.50 U	**25.3**
		10/28/2005	0.50 U	**6.1**	**1.3**	0.50 U	**30.5**
		5/16/2006	0.50 U	**2.6**	**1**	0.50 U	**31.5**
		11/8/2006	0.50 U	**3.1**	**1.1**	0.50 U	**33.3**
		5/16/2007	0.50 U	**2.0**	**1.0**	0.50 U	**18.9**
		11/13/2007	0.38 U	0.28 U	0.20 U	0.23 U	**24.1**
		5/27/2008	0.32 U	**2.9**	**0.84 I**	0.54 U	**28.8**
		11/12/2008	0.32 U	**1.3**	**0.77 I**	0.54 U	**25.6**
		5/18/2009	0.32 U	**1.5**	**0.79 I**	0.54 U	**22.0**
		11/6/2009	0.15 U	**0.39 I**	0.13 U	0.16 U	**16**
		5/18/2010	0.12 U	**0.45 I**	0.39 U	0.41 U	**16**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	0.36 U	**0.32 I**	0.13 U	**14**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	0.36 U	**0.25 I**	0.16 U	**11**
		5/13/2013	0.16 U	0.36 U	**0.19 I**	0.16 U	**9.0**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**10**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**4.0**
		10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	**5.2**
		6/2/2020	0.35 U	0.28 U	0.22 U	0.32 U	**6.0**
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0029D	42 to 47	2/28/2003	2 U	**1.2 J**	2 U	2 U	**84.7**
		2/4/2004	2 U	**0.99 J**	2 U	2 U	**83.1**
		8/11/2004	2 U	2 U	2 U	2 U	**71.8**
		5/5/2005	0.50 U	**0.74 J**	**0.54 J**	0.50 U	**55.8**
		10/28/2005	0.50 U	**0.89 I**	0.50 U	0.50 U	**52.2**
		5/16/2006	0.50 U	0.50 U	0.50 U	0.50 U	**56.2**
		11/9/2006	0.50 U	**0.70 I**	0.50 U	0.50 U	**43.0**
		5/17/2007	0.50 U	**0.69 I**	0.50 U	0.50 U	**34.2**
		11/15/2007	0.38 U	**0.53 I**	**0.36 I**	0.23 U	**38.2**
		5/27/2008	0.32 U	0.2 U	0.45 U	0.54 U	**59.4**
		11/12/2008	0.32 U	**1.0**	**0.53 I**	0.54 U	**54.8**
		5/18/2009	0.32 U	**0.86 I**	0.45 U	0.54 U	**55.1**
		11/10/2009	0.15 U	**0.61 I**	0.13 U	0.16 U	**43**
		5/18/2010	0.12 U	0.083 U	0.39 U	0.41 U	**33**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**1.1**	**0.37 I**	0.13 U	**51**
		11/11/2011	NS	NS	NS	NS	NS

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-IW0029D (continued)	42 to 47	11/28/2012	0.16 U	**1.2**	**0.32 I**	0.16 U	**42**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**33**
		11/17/2014	0.50 U	**0.77 I**	0.50 U	0.50 U	**43**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**27**
		10/4/2018	0.61 U	**0.82 I**	0.39 U	0.26 U	**40**
		6/3/2020	0.35 U	**0.32 I**	0.22 U	0.32 U	**42.1**
		3/15/2023	0.89 U	**0.88 I**	0.73 U	NS	**39**
MLPV-IW0046	35 to 45	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**1.8**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**8.1**
		10/4/2018	0.61 U	**2.1**	0.39 U	0.26 U	**13**
		6/2/2020	0.35 U	**2.4**	0.22 U	0.32 U	**18**
		3/16/2021	Re-assigned to semi-annual sampling in Biosparge Area				
MLPV-IW0047	35 to 45	11/17/2014	0.50 U	**0.56 I**	0.50 U	0.50 U	**4.2**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**0.39 I**	0.39 U	0.26 U	**0.89 I**
		6/2/2020	0.35 U	0.28 U	0.22 U	0.32 U	**0.56 I**
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0048	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
MLPV-IW0049	38 to 48	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0050	40 to 50	11/17/2014	0.50 U	**0.64 I**	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0051	45 to 55	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/9/2023	0.89 U	**1.7**	0.73 U	NS	**1.7**
MLPV-IW0052	40 to 50	11/17/2014	0.50 U	**1.8**	0.50 U	0.50 U	**81**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	**79**
		10/4/2018	0.61 U	**49**	**3.5**	0.26 U	**160**
		6/3/2020	0.35 U	**48.5**	**1.4**	0.32 U	**73.8**
		3/14/2023	0.89 U	**1.6**	0.73 U	NS	**12**
MLPV-IW0053	35 to 45	11/17/2014	0.50 U	**4.6**	0.50 U	0.50 U	**130**
		5/26/2016	0.50 U	**4.0**	**0.60 I**	0.50 U	**52**
		10/4/2018	0.61 U	**4.3**	0.39 U	0.26 U	**76**
		6/3/2020	0.35 U	**3.8**	0.22 U	0.32 U	**76**
		3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0054	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**1.1**
		5/26/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/15/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0055	40 to 50	11/17/2014	0.50 U	**0.57 I**	0.50 U	0.50 U	**1.1**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-IW0056	30 to 40	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		3/16/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0076	47 to 57	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0077	25 to 35	3/8/2023	0.89 U	**1.8**	**1.2**	NS	0.71 U
MLPV-MW0078	25 to 35	3/8/2023	0.89 U	**0.74 I**	0.73 U	NS	0.71 U
MLPV-MW0079	25 to 35	3/8/2023	0.89 U	**6.2**	**3.0**	NS	0.71 U
MLPV-MW0080	47 to 57	3/8/2023	0.89 U	**0.71 I**	0.73 U	NS	0.71 U
MLPV-MW0081	25 to 35	3/9/2023	0.89 U	**19.0**	**13.0**	NS	0.71 U

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-MW0082	35 to 45	3/8/2023	0.89 U	**19.0**	**7.0**	NS	0.71 U
MLPV-MW0083	47 to 57	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0084	47 to 57	3/9/2023	0.89 U	**1.0**	0.73 U	NS	0.71 U
MLPV-MW0085	47 to 57	3/9/2023	0.89 U	**1.3**	0.73 U	NS	**1.9**
MLPV-MW0086	15 to 25	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0087	47 to 57	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0088	35 to 45	3/14/2023	0.89 U	0.53 U	0.73 U	NS	**2.3**
MLPV-MW0089	35 to 45	3/13/2023	0.89 U	**2.1**	0.73 U	NS	**1.8**
MLPV-MW0090	47 to 57	3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0091	47 to 57	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0092	47 to 57	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0093	35 to 45	3/15/2023	0.89 U	0.53 U	0.73 U	NS	**0.85 I**
MLPV-MW0094	35 to 45	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0095	25 to 35	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0096	35 to 45	3/8/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0097	35 to 45	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0098	20 to 30	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0099	40 to 50	3/13/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0100	15 to 25	3/9/2023	0.89 U	**1.9**	0.73 U	NS	**1.3**
MLPV-MW0101	40 to 50	3/9/2023	8.9 U	**1.4**	0.73 U	NS	0.71 U
MLPV-MW0102	25 to 35	3/10/2023	0.89 U	**9.6**	**2.8**	NS	**440**
MLPV-MW0103	35 to 45	3/10/2023	0.89 U	**30.0**	**3.7**	NS	**1000**
MLPV-MW0104	47 to 57	3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0105	47 to 57	3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0106	25 to 35	3/10/2023	0.89 U	**0.54 I**	0.73 U	NS	0.71 U
MLPV-MW0107	35 to 45	3/10/2023	0.89 U	**0.75 I**	0.73 U	NS	**21**
MLPV-MW0108	35 to 45	3/9/2023	0.89 U	**1.1**	0.73 U	NS	**25**
		4/26/2023	0.89 U	**1.2**	0.73 U	NS	**26.0**
MLPV-MW0109	20 to 30	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
MLPV-MW0110	1 to 11	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-SAMW0001 (MLPV-MWS0001)	43 to 48	8/23/2012	0.26 U	**3.2**	0.35 U	0.23 U	**11.2**
		8/19/2014	0.50 U	0.65 U	0.44 U	0.45 U	**2.5**
		5/24/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/3/2018	0.61 U	**0.52 I**	0.39 U	0.26 U	**1.8**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
		4/26/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-SAMW0002 (MLPV-MWS0002)	43 to 48	3/22/2010	0.24 U	0.32 U	0.34 U	ND	**5.4**
		10/1/2010	**0.55 I**	**0.58 I**	0.34 U	ND	**3.4**
		3/16/2011	**0.6 I**	**0.63 I**	0.35 U	ND	**4.7**
		9/23/2011	**0.76 I**	**0.55 I**	**0.41 I**	ND	**4.4**
		8/23/2012	**0.50 I**	**0.83 I**	0.35 U	ND	**2.3**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	**1.1**
MLPV-SAMW0003 (MLPV-MWS0003)	43 to 48	8/23/2012	0.26 U	**0.78 I**	0.35 U	0.23 U	**6.6**
		8/19/2014	0.50 U	**1.3**	0.44 U	0.45 U	**4.6**
		5/24/2016	0.50 U	**86**	**3.9**	0.50 U	**80**
		10/3/2018	0.61 U	**1.1**	**3.9**	0.26 U	**1.5**
		6/3/2020	0.35 U	0.28 U	**2.9**	0.32 U	**3.3**
		3/16/2023	0.89 U	**95**	**6.1**	NS	**67**
PCCA-MW0004	5 to 15	5/22/2008	0.32 U	**1.6**	0.45 U	0.54 U	**0.88 I**
		11/11/2008	0.32 U	**1.4**	0.45 U	0.54 U	**2.9**
		5/26/2009	0.32 U	**0.37 I**	0.45 U	0.54 U	**1.4**
		11/11/2009	0.15 U	**1.1**	0.13 U	0.16 U	**1.8**
		5/18/2010	0.12 U	**0.49 I**	0.39 U	0.41 U	**1.1**
		11/11/2010	0.16 U	**1.1**	0.12 U	0.16 U	**1.5**
		5/11/2011	0.16 U	**0.85 I**	0.12 U	0.13 U	**1.1**
		11/11/2011	0.16 U	**0.93 I**	0.12 U	0.16 U	**2.1**
		11/28/2012	0.16 U	**1.1**	**0.21 I**	0.16 U	**1.4**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	0.22 U
		11/17/2014	0.50 U	**0.72 I**	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
PCCA-MW0017	15 to 25	5/22/2008	0.32 U	**0.56 I**	**0.54 I**	0.54 U	**2.2**
		11/11/2008	0.32 U	**0.74 I**	**0.64 I**	0.54 U	**3.7**
		5/26/2009	0.32 U	0.2 U	0.45 U	0.54 U	**0.58 I**
		11/11/2009	0.15 U	0.12 U	0.13 U	0.16 U	**3.7**
		5/18/2010	0.12 U	0.083 U	0.39 U	0.41 U	0.16 U
		11/11/2010	0.16 U	0.36 U	**0.43 I**	0.16 U	**2.7**
		5/11/2011	0.16 U	0.36 U	**0.45 I**	0.13 U	**2.9**
		11/11/2011	0.16 U	0.36 U	**0.72 I**	0.16 U	**5.1**
		11/28/2012	0.16 U	0.36 U	**0.17 I**	0.16 U	**1.9**
		5/13/2013	0.16 U	0.36 U	0.12 U	0.16 U	**1.6**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
PRES-IW0007I	32 to 37	3/3/2003	2 U	**11.4**	**0.97 J**	2 U	**44.4**
		2/5/2004	2 U	2 U	2 U	2 U	**3.7**
		8/11/2004	2 U	**16.3**	2 U	2 U	**56.2**
		5/6/2005	0.50 U	**37.3**	**0.76 J**	0.50 U	**23.4**
		11/1/2005	0.50 U	**29.1**	**0.67 I**	0.50 U	**14.0**
		5/18/2006	0.50 U	**28.6**	**0.63 I**	0.50 U	**13.3**
		11/7/2006	0.50 U	**19.6**	**0.65 I**	0.50 U	**9.4**
		5/18/2007	0.50 U	**25.0**	**0.79 I**	0.50 U	**8.1**
		11/12/2007	0.38 U	**12.4**	0.20 U	0.23 U	0.34 U
		5/20/2008	0.32 U	**13.8**	**0.87 I**	0.54 U	**10.8**
		11/12/2008	0.32 U	**5.8**	**0.79 I**	0.54 U	**9.3**
		5/18/2009	0.32 U	**7.6**	**0.67 I**	0.54 U	**11.8**
		11/10/2009	0.15 U	**5.9**	0.13 U	0.16 U	**7.8**
		5/18/2010	0.12 U	**4.5**	**0.61 I**	0.41 U	**6.0**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**3.4**	**0.49 I**	0.13 U	**5.4**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**1.1**	**0.36 I**	0.16 U	**1.9**
		5/13/2013	0.16 U	**1.1**	**0.42 I**	0.16 U	**2.4**
		11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	**0.93 I**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
PRES-IW0009	40 to 50	11/17/2014	0.5 U	**4.3**	0.5 U	0.5 U	**2.9**
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**11**	0.39 U	0.26 U	**2.7**
		6/2/2020	0.35 U	**3.3**	0.22 U	0.32 U	**1.2**
		3/9/2023	0.89 U	**1.7**	0.73 U	NS	0.71 U
PRES-IW0010	40 to 50	11/17/2014	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
SATV-IW0009I	22 to 27	2/28/2003	**1.8 J**	**56.6**	**44.2**	2 U	**1.6**
		2/5/2004	**3.7**	**103.0**	**77.0**	**1.2 J**	**12.4**
		8/11/2004	**2.6**	**65.0**	**51.7**	0.59 J	**52.2**
		5/5/2005	**0.78 J**	**14.8**	**27.3**	0.50 U	**37.2**
		10/31/2005	**3.6**	**66.5**	**52.8**	**0.71 I**	**28.4**
		5/18/2006	**1.0**	**20.0**	**35.3**	0.50 U	**47.1**
		11/8/2006	**3.3**	**48.8**	**41.9**	**0.62 I**	**22.0**
		5/22/2007	**2.7**	**18.2**	**8.2**	0.50 U	0.50 U
		11/13/2007	**2.4**	**35.9**	**28.4**	0.23 U	**18.9**
		5/27/2008	**0.82 I**	**10.1**	**32.3**	0.54 U	**40.7**
		11/13/2008	**1.6**	**24.6**	**29.3**	0.54 U	**31.9**
		5/19/2009	0.32 U	**1.9**	**16.8**	0.54 U	**26.6**
		11/10/2009	**0.63 I**	**11.0**	**25.0**	0.16 U	**24.0**
		5/19/2010	**0.92 I**	**12.0**	**23.0**	0.41 U	0.16 U
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	**0.61 I**	**6.0**	**17.0**	0.13 U	**16.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	**0.98 I**	**16.0**	**19.0**	**0.26 I**	**10.0**
		5/13/2013	**1.2**	**34.0**	**31.0**	**0.45 I**	**15.0**
		11/17/2014	0.5 U	**1.2**	**1.9**	0.50 U	0.50 U
		5/25/2016	0.5 U	**2.7**	**2.7**	0.50 U	0.50 U
		10/9/2018	0.61 U	**1.5**	**1.8 I**	0.26 U	0.26 U
		6/3/2020	**0.40 I**	**7.2**	**5.1**	0.32 U	0.41 U
		3/8/2023	0.89 U	**14.0**	**9.0**	NS	0.71 U
SATV-IW0010	35 to 45	11/17/2014	**1.4**	**16.0**	**12.0**	0.5 U	0.5 U
		5/25/2016	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
VAB-IW0005D (MLPV-VAB-IW0005D)	52 to 57	10/4/2018	0.61 U	**2.0**	0.39 U	0.26 U	**8.0**
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/9/2023	0.89 U	**3.2**	0.73 U	NS	**2.5**
VABU-IW0001I	20 to 30	10/4/2018	0.61 U	0.32 U	0.39 U	0.26 U	0.26 U
		6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
		3/10/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0001SR	2.5 to 12.5	9/29/2003	0.15 U	**16.0**	**1.5**	0.10 U	**21.0**
		3/4/2004	0.15 U	**12.0**	**1.2**	0.10 U	0.14 U
		11/3/2004	0.54 U	**130.0**	**5.9**	0.80 U	**14.0**
		5/9/2005	0.50 U	**58.6**	**2.6**	0.50 U	**13.4**
		10/31/2005	0.50 U	**47.3**	**2.1**	0.50 U	**9.2**
		5/18/2006	0.50 U	**36.4**	**3.4**	0.50 U	**79.8**
		11/7/2006	0.50 U	**62.8**	**3.2**	0.50 U	**20.5**
		5/18/2007	0.50 U	**62.7**	**3.0**	0.50 U	**14.5**
		11/14/2007	**0.40 I**	**45.8**	**2.2**	0.23 U	**12.2**
		5/22/2008	0.32 U	**65.1**	**4.2**	0.54 U	**24.5**
		11/12/2008	0.32 U	**40.9**	**2.3**	0.54 U	**16.3**
		5/19/2009	0.32 U	**63.3**	**3.3**	0.54 U	**25.7**
		11/6/2009	0.15 U	**55.0**	**3.2**	0.16 U	**19.0**
		5/18/2010	0.12 U	**28.0**	**1.8**	0.41 U	**10.0**
		11/8/2010	NS	NS	NS	NS	NS
		5/11/2011	0.16 U	**36.0**	**2.1**	0.16 U	**21.0**
		11/11/2011	NS	NS	NS	NS	NS
		11/28/2012	0.16 U	**46.0**	2.5	0.16 U	**20.0**
		5/13/2013	0.16 U	**15.0**	**0.63 I**	0.16 U	**3.3**

Table 4
Vehicle Assembly Building (VAB) Area - Chlorinated Volatile Organic Compounds (CVOCs) Analytical Results
Mobile Launch Platform (MLP) Rehabilitation Sites and Vehicle Assembly Building (VAB) Area

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	1,1-DICHLOROETHENE	VINYL CHLORIDE
State of Florida GCTLs (µg/L)			3	70	100	3	1
State of Florida NADCs (µg/L)			300	700	1000	300	100
Location ID	Screened Interval (ft bls)	Sample Date					
WCPS-IW0001SR (continued)	2.5 to 12.5	11/17/2014	0.50 U	**7.9**	0.50 U	0.50 U	**20**
		5/25/2016	0.50 U	**9.0**	0.50 U	0.50 U	**28**
		10/4/2018	0.61 U	**4.2**	**0.80 I**	0.26 U	**25**
		6/3/2020	0.35 U	**1.4**	**0.67 I**	0.32 U	**49.5**
		9/14/2020	NS	**2.5**	**0.93**	NS	**54.3**
		3/9/2023	0.89 U	**2.0**	**1.2**	NS	**38.0**
WCPS-IW0002SRR	3 to 13	3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0006S	3 to 13	6/3/2020	0.35 U	0.28 U	0.22 U	0.32 U	0.41 U
WCPS-IW0005S	2 to 12	9/14/2020	NS	0.28 U	0.22 U	NS	0.41 U
		3/9/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0015S	3 to 13	9/14/2020	NS	0.28 U	0.22 U	NS	0.41 U
		3/14/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
WCPS-IW0016	15 to 25	11/17/2014	0.50 U	**1.8**	0.50 U	0.50 U	**1.9**
		5/25/2016	0.50 U	**6.0**	0.5 U	0.50 U	0.50 U
		10/4/2018	0.61 U	**4.0**	0.39 U	0.26 U	**1.9**
		6/3/2020	0.35 U	**1.2**	0.22 U	0.32 U	**0.80 I**
		3/9/2023	0.89 U	**0.77 I**	0.73 U	NS	0.71 U

Notes:
Bolded results indicate the presence of an analyte at the specified concentration
Red font indicates an exceedance of FDEP GCTLs or Site Approved Target Levels for UIC Sampling
Yellow Highlighted cell indicates an exceedance of FDEP NADCs
FDEP = Florida Department of Environmental Protection
Blank cells indicate the analyte was not analyzed for that specific well and date
ft bls = feet below land surface
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
UIC = Underground Injection Control
I = Indicates that the analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
J = Indicates an estimated value
L = Indicates value exceeds calibration range
U = Indicates the analyte was not detected
µg/L = micrograms per liter
June 2020: MLPV-IW0001D, MLPV-IW0002I (could not locate), MLPV-SAMW0002 and WCPS-IW0006S were added to 2020 sampling plan following analytical assessement of 2018 data.
September 2020: Samples collected outside of biennial sampling frequency to obtain additional data in order to complete August ADP action items. Monitoring wells IW-006IR and IW0001D were sampled to gain additional data from the biosparge treatment area, therefore data for these wells is illustrated in the Biosparge Area figure

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August 30, 2023

Mr. Ryan O'Meara
Remediation Project Manager
National Aeronautics and Space Administration
Mail Code SI-E2
Building K6-1547 (Logistics Facility)
John F. Kennedy Space Center
Kennedy Space Center, FL 32899-0001

Subject: **Mobile Launch Platform (MLP) Rehabilitation Sites and the Vehicle Assembly Building (VAB) Area, (Solid Waste Management Unit [SWMU] 056), Former Hot Spot 2 (HS 2) Remedial Alternative Evaluation (RAE) Advanced Data Package (ADP) for the October 2023 Kennedy Space Center Remediation Team (KSCRT) Meeting**

Reference: **Indefinite Delivery Indefinite Quantity (IDIQ) Contract 80KSC019D0010**

Dear Mr. O'Meara:

AECOM Technical Services, Inc. (AECOM) is pleased to provide Kennedy Space Center (KSC), National Aeronautics and Space Administration (NASA), with the ADP for the MLP/VAB Area (SWMU 056). The purpose of the ADP is to present the evaluation of alternative remediation approaches within the former HS 2 area, especially targeting the finer grained clayey unit where matrix diffusion to sand of predominantly vinyl chloride (VC) is prolonging natural attenuation and operation of the down-gradient biosparge barrier.

The objective of the selected approach is to reduce mass flux and achieve Groundwater Cleanup Target Levels upgradient of the biosparge barrier to eliminate the need for continued operation. Using the most recent groundwater monitoring data and known soil characteristics, three options are presented and evaluated for sustainability, feasibility, cost, timeframe, and effectiveness. The recommended alternative includes in-situ chemical reduction (ISCR) using two permeable reactive barriers (PRB). The first barrier will mitigate mass flux in sand from the former source area. The second barrier will mitigate mass flux upgradient of the biosparge barrier.

The following consensus statements will be presented to the KSCRT:

1. Option 2 - ISCR PRBs is the recommended remedial alternative to achieve corrective action objectives.
2. Model the fate and transport of VC at the site to support selection and optimal design of an ISCR remedy to manage matrix diffusion, and to support cost evaluation and confirm shorter remediation time frame for ISCR alternatives.

Should you require additional information, please contact Linnea King Clark at linnea.king@aecom.com or via phone at 407.456.1535.

Sincerely,

AECOM Technical Services, Inc.

Linnea King Clark
Task Order Manager

Jennifer Gootee, PE
Program Manager

Enclosure

Cc: FDEP
Richard Smith, HGL
Mark Speranza, Tetra Tech

Former Hot Spot 2
Remedial Alternatives Evaluation

Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB)

Solid Waste Management Unit (SWMU) 056

October 2023

Delivering a better world

This Advance Data Package (ADP) was prepared for NASA to aid in evaluation of site conditions and remedial actions. This is not a decision document. New information may come to light that makes this ADP outdated.

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Outline

1. Former Hot Spot 2 History
2. Site Characterization Summary
3. Remedial Alternative Evaluation (RAE)
4. Recommendations and Proposed Path Forward
5. Test Consensus

Goal

- Present RAE
- Obtain team consensus on the remedial alternative
- Obtain team consensus on modeling to develop optimal remedy design

Response to Comments

- HGL Comment #1: Slide #2 – Please note that the second goal, obtain team consensus on the treatment area, does not appear to align with the second consensus statement in the cover letter. The second consensus statement in the cover letter is to conduct fate and transport modeling to support the remedial design.
- *Response: The goals were revised to be consistent with the consensus statements.*

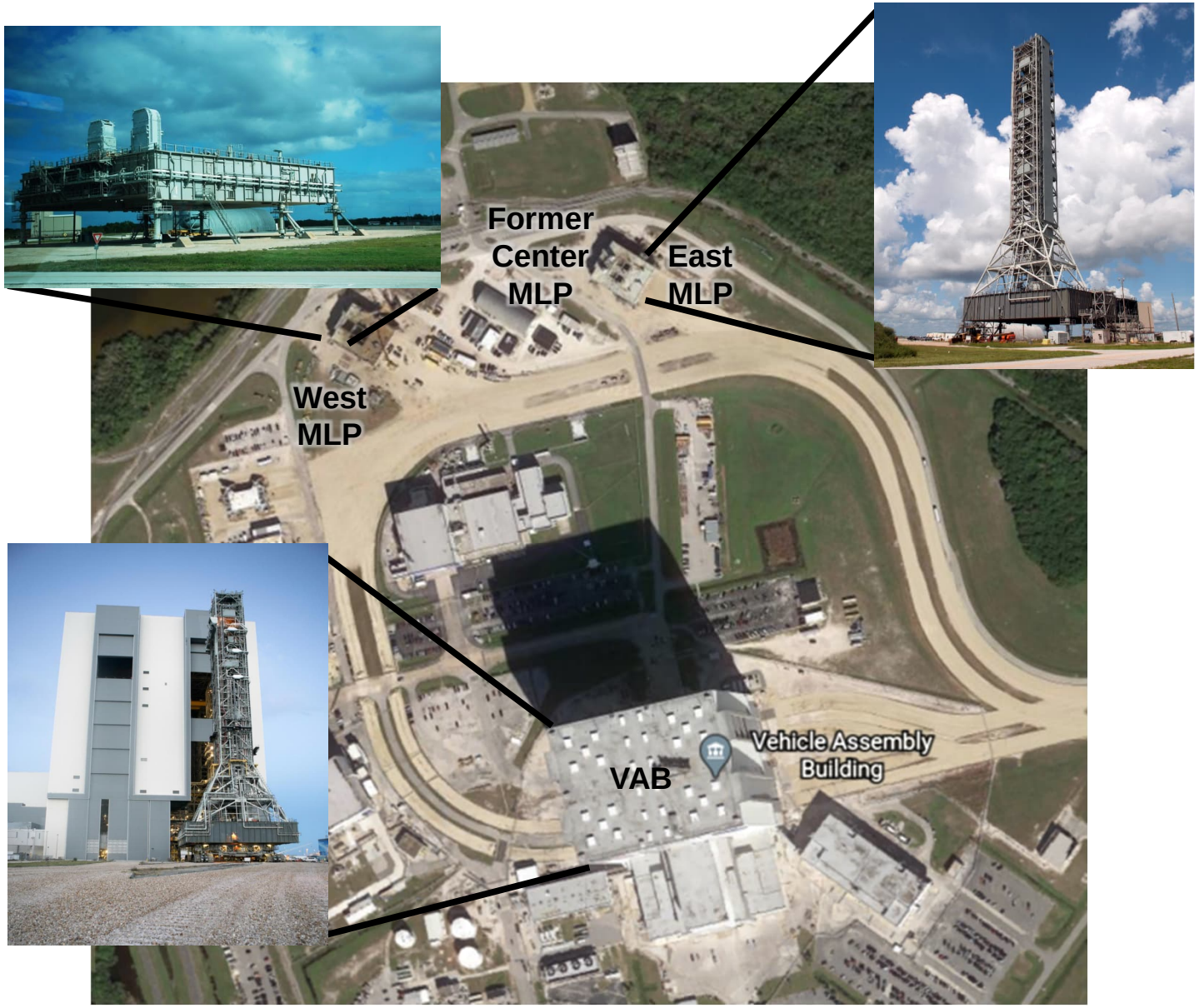
Abbreviations and Acronyms

ADP	Advanced Data Package
AS	Air Sparging
Bls	Below Land Surface
CAO	Corrective Action Objective
CCR	Construction Completion Report
cDCE	Cis 1,2-dichloroethane
CMD	Corrective Measures Design
CMI	Corrective Measures Implementation
COCs	Contaminants of concern
CVOC	Chlorinated Volatile Organic Compounds
DPT	Direct-push Technology
ERD	Enhanced Reductive Dechlorination
EZVI	Emulsified Zero Valent Iron
GCTL	Groundwater Cleanup Target Level
GHG	Greenhouse Gases
HCP	High Concentration Plume
HS2	Former Hot Spot 2
IGM	Interim Groundwater Monitoring
IM	Interim Measures
ISCO	In-situ Chemical Oxidation
ISCR	In-situ Chemical Reduction
LCP	Low Concentration Plume
LTM	Long-term Monitoring
LUCIP	Land Use Control Implementation Plan
MLP/VAB	Mobile Launcher Platform Rehabilitation Sites/Vehicle Assembly Building Area
MMBTU	One million British thermal units
NADC	Natural Attenuation Default Concentration
NOx	Nitrous Oxides
PM10	Particulate matter smaller than 10 microns in diameter
PRB	Permeable Reactive Barrier
RAE	Remedial Alternative Evaluation
ROI	Radius of Influence
RCRA	Resource Conservation and Recovery Act
SB	Soil Boring
SOx	Sulfur Oxides
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
tDCE	Trans 1,2-dichloroethane
VC	Vinyl chloride
10xNADC	10x Natural Attenuation Default Concentration
µg/L	Micrograms per liter
µm	Micrometers

Former Hot Spot 2 History

Site Use

- Mobile Launcher Platform (MLP) area and Vehicle Assembly Building (VAB) were constructed in the mid-1960s
- MLP area historical site use:
  - Original construction sites for the Apollo Mobile launchers; consisted of three park sites
  - Area was used to repair corrosion and blast damage on the mobile launchers following launches
  - Center MLP site was replaced with a storage building in 1991.
- VAB historical use:
  - Used to stack and prepare the space vehicles prior to launch.
- Current Use:
  - VAB and MLP areas are construction sites
  - Facilities within the Solid Waste Management Unit (SWMU) boundary have been leased to tenants



Former Hot Spot 2 History

Timeline

2000 2005 2010 2015 2020

2000-2003 RFI 2004 CMD

- **Delineate 115-acre CVOC Plume**

LTM of low-concentration plume in VAB Area

Biosparge Barrier **2016 Expanded**

- **Source: Hot Spot 1 (HS1)**

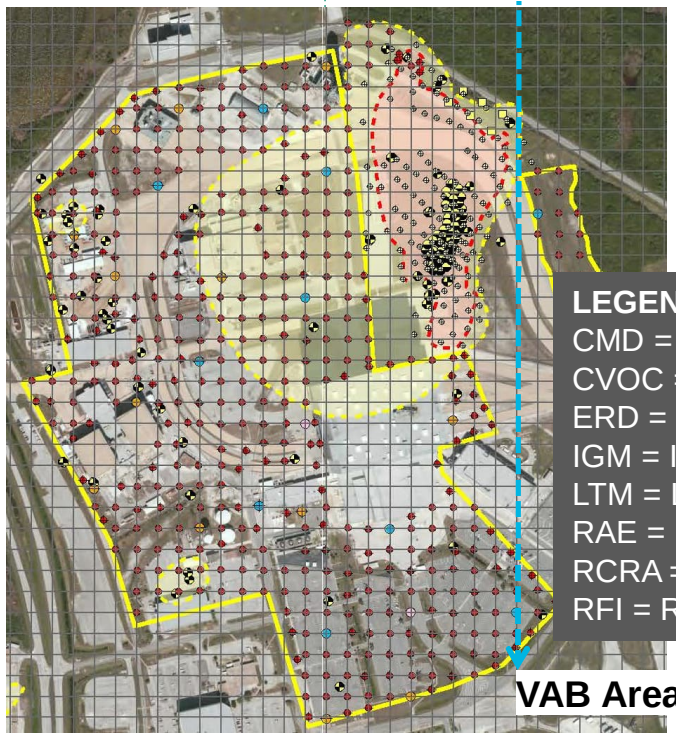
Bio-ERD **IGM** **LTM**

2011
- Assessment
- RAE

2021 **2022**
Site characterization

Becomes "former" Hot Spot 2

Hot Spot 2 (HS2) **Air Sparge** **IGM**



VAB Reassessment sampling locations (2012-2015)

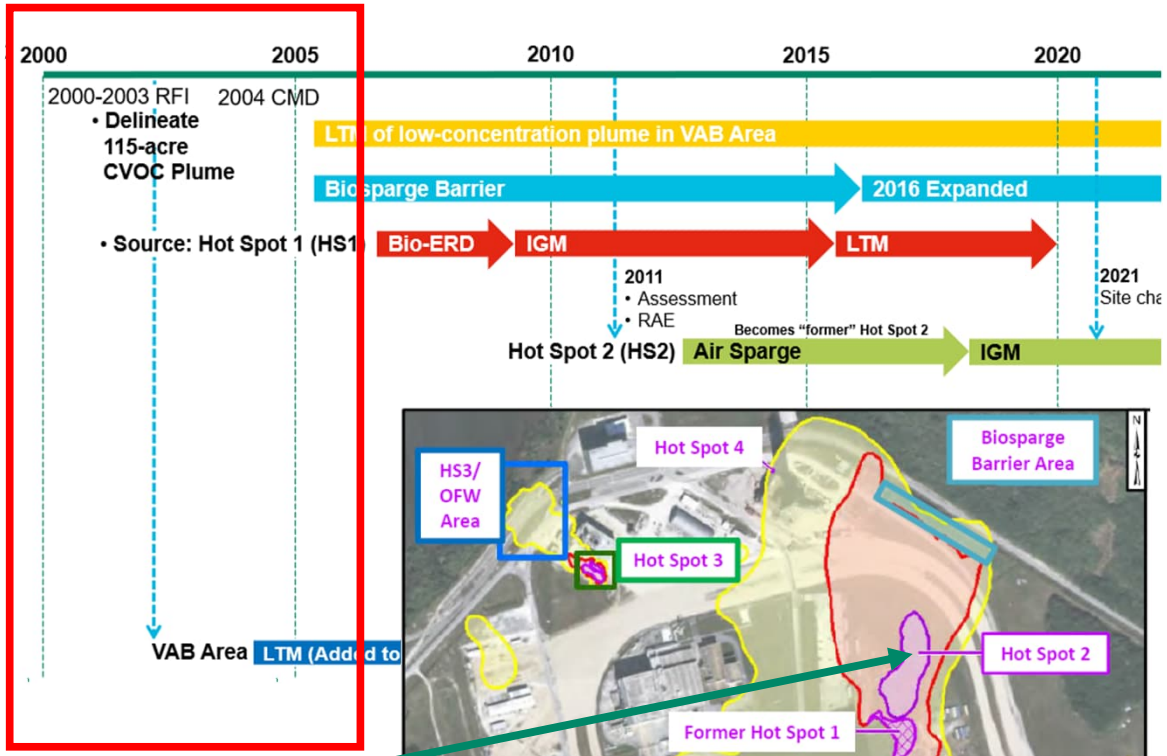
LEGEND
CMD = Corrective Measures Design
CVOC = Chlorinated Volatile Organic Compounds
ERD = Enhanced Reductive Dechlorination
IGM = Interim Groundwater Monitoring
LTM = Long-term Monitoring
RAE = Remedial Alternatives Evaluation
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation

VAB Area **LTM (Added to the MLP Rehabilitation Sites and the VAB Area in 2020)**

Former Hot Spot 2 History

Timeline

- **2000 and 2003** – Resource Conservation and Recovery Act (RCRA) Facility Investigation
  - Delineated 115-acre chlorinated volatile organic compound (CVOC) plume
- **2004** – Corrective Measures Design (CMD) incorporated multi-component remedial strategy
  - Biosparge barrier to treat vinyl chloride (VC) plume swath above Natural Attenuation Default Criteria (NADC) migrating northeast of VAB area (downgradient of former Hot Spot 2)
  - Biostimulation using ethyl lactate in source area (Former Hot Spot 1, upgradient of former Hot Spot 2)
  - Long-term Monitoring (LTM) of low concentration dissolved plume (primarily VC) surrounding Hot Spot 2
    - LTM details were reported separately through 2018 under a VAB LTM program
- After Corrective Measures Implementation (CMI)
  - 3 Hot Spots identified during multiple assessment phases
    - Hot Spot 2 (1.17 acres) identified during MLP/VAB Assessment activities. Defined as area where trichloroethene (TCE) > 300 micrograms per liter (µg/L) and cis-1,2-dichloroethylene (cDCE) > 7,000 µg/L

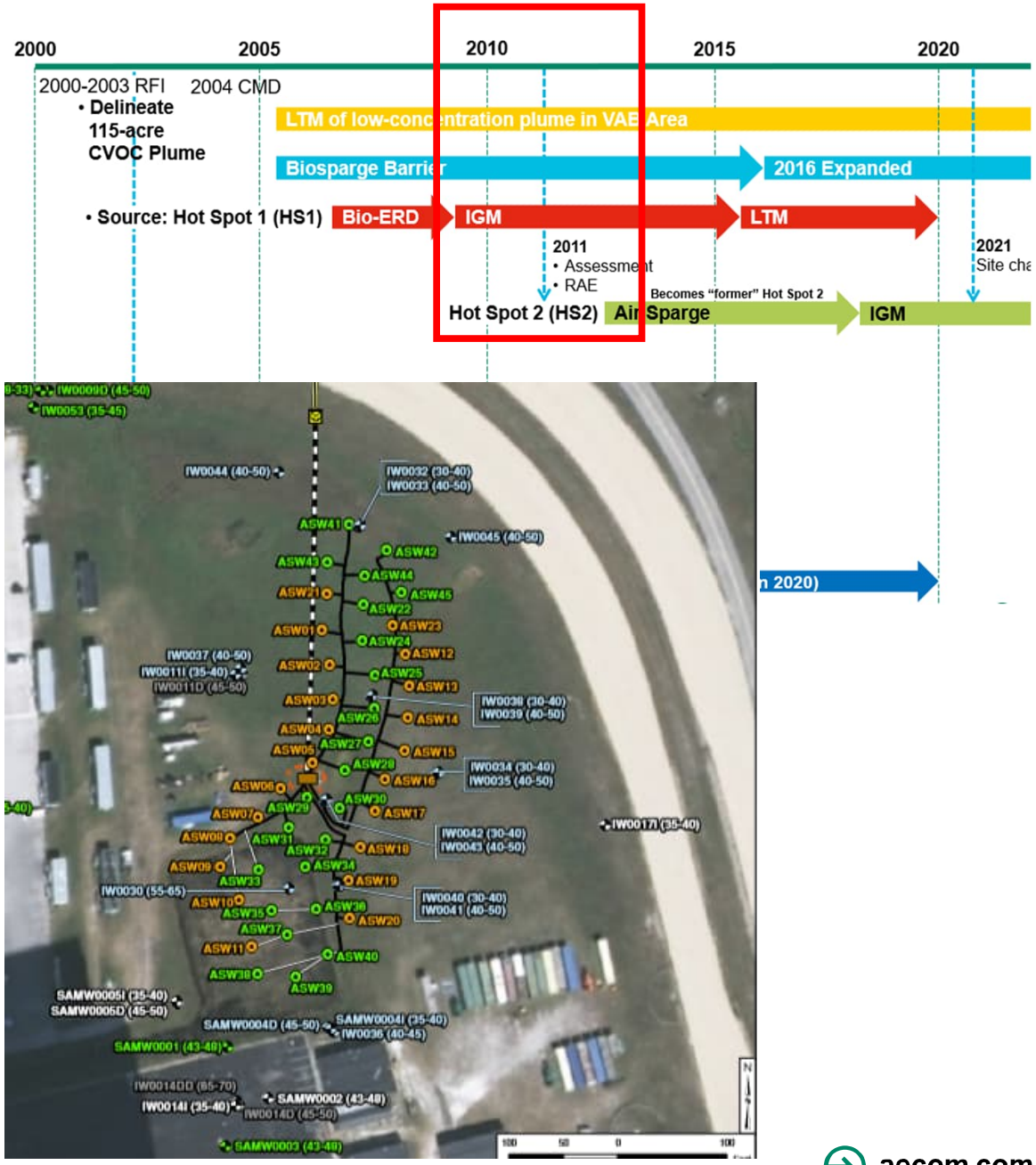


Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

Former Hot Spot 2 History

Timeline

- 2011 - RAE presented in May 2011 received Florida Department of Environmental Protection approval for air sparge system installation with objective of reducing CVOCs to less than NADC within the treatment area
- 2012 [October Construction Completion Report (CCR)]
  - Air sparging installed Treatment area was the area with TCE greater than 300 µg/L and cDCE greater than 7,000 µg/L
  - 45 Air sparge wells set ~42 feet below land surface (bls) and ~46 feet bls (wells set just above lower permeability layer)
  - Corrective action objectives were achieved
  - This area is now referred to as the former Hot Spot 2 area
  - Semi-annual groundwater sampling is on-going



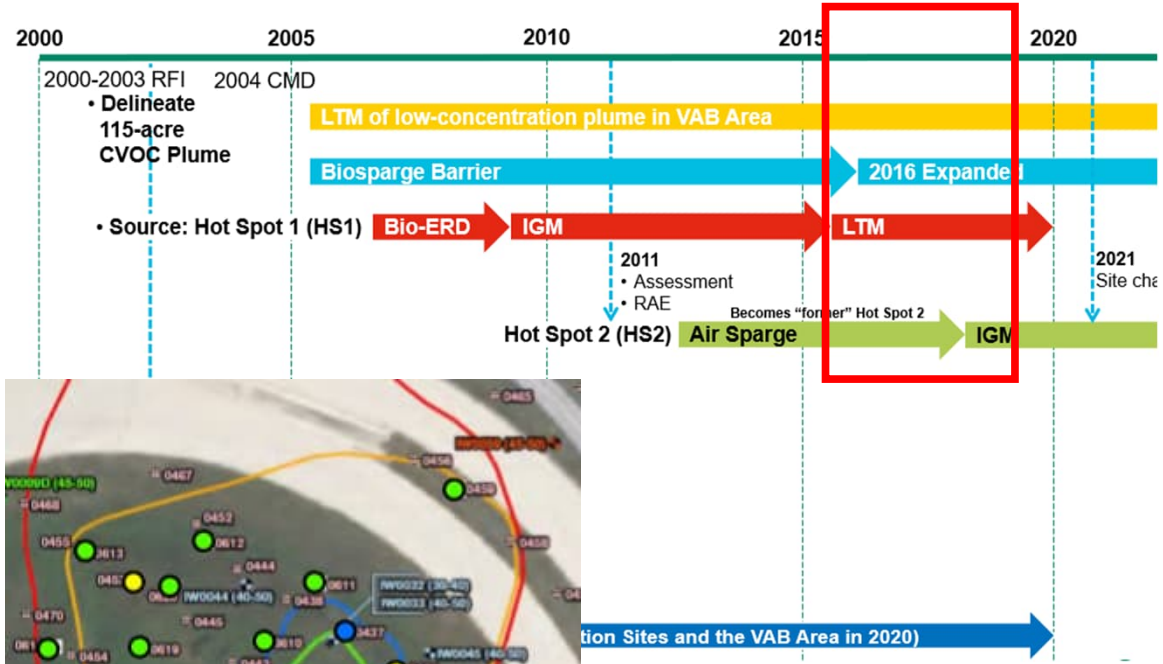
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Former Hot Spot 2 History

Timeline

- 2016 [2016 Annual CMI and Interim Measures (IM) Advanced Data Package (ADP)] – System operated through 2018.
  - Direct-Push Technology (DPT) groundwater sampling conducted to evaluate CVOC reduction in low permeability lithology within air sparge treatment area
  - CVOC concentrations reduced, but remained above NADCs

- 2018 (2019 Annual CMI and IM ADP) – Additional DPT groundwater sampling performed in treatment area to:
  1. Evaluate concentrations within cDCE above NADC and VC above 10xNADC
  2. Utilize data to evaluate necessity for expansion of air sparge system

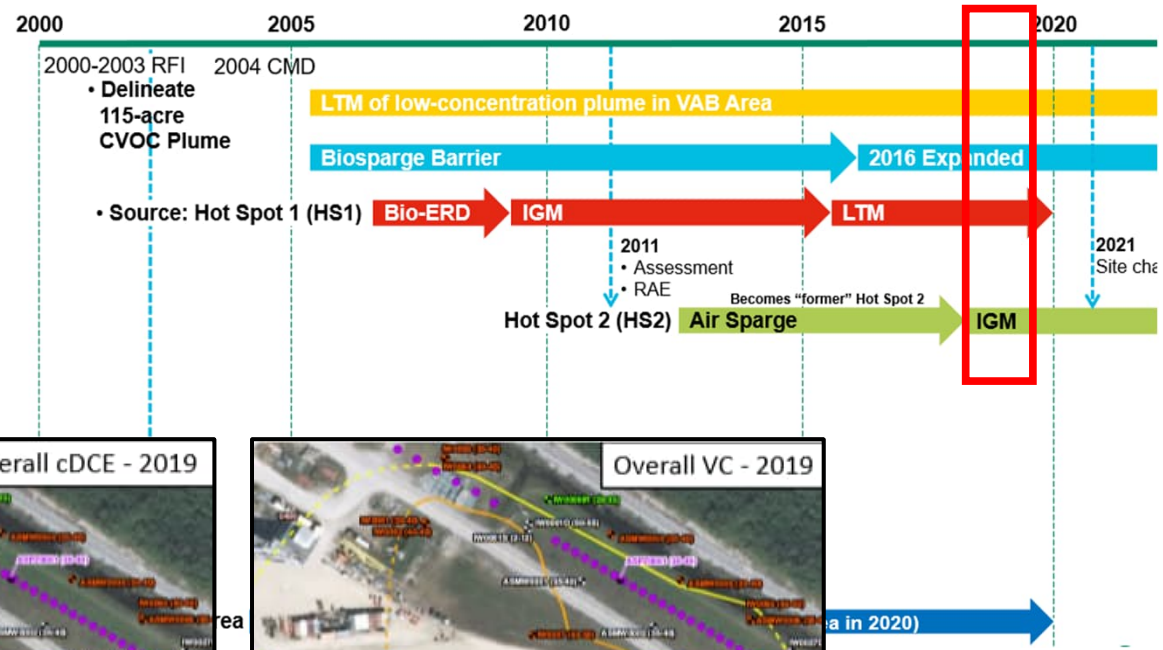




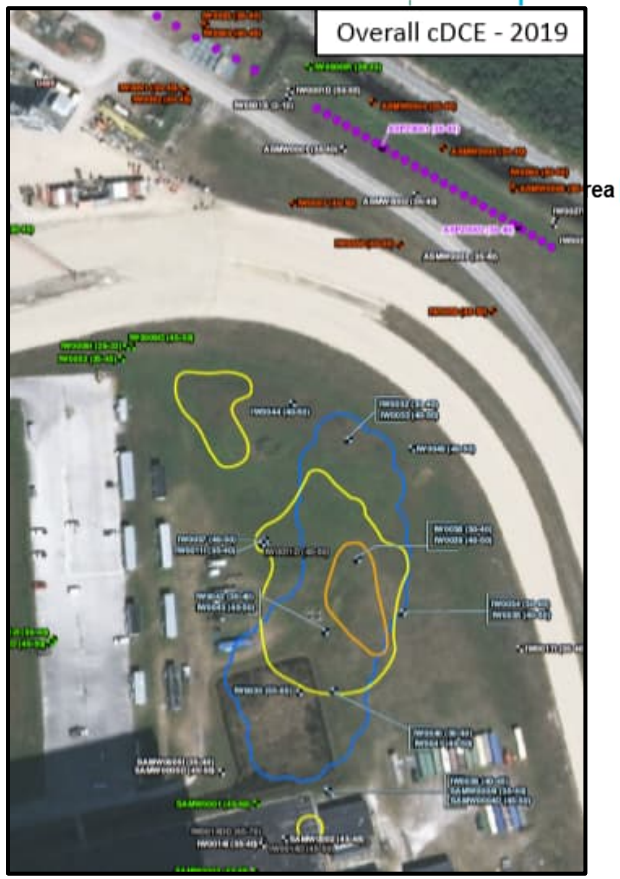
Former Hot Spot 2 History

Timeline

- 2019 (2019 Annual CMI and IM ADP) – Transition site to Interim Groundwater Monitoring (IGM) based on overall sampling results.
  - IGM continued through present day.



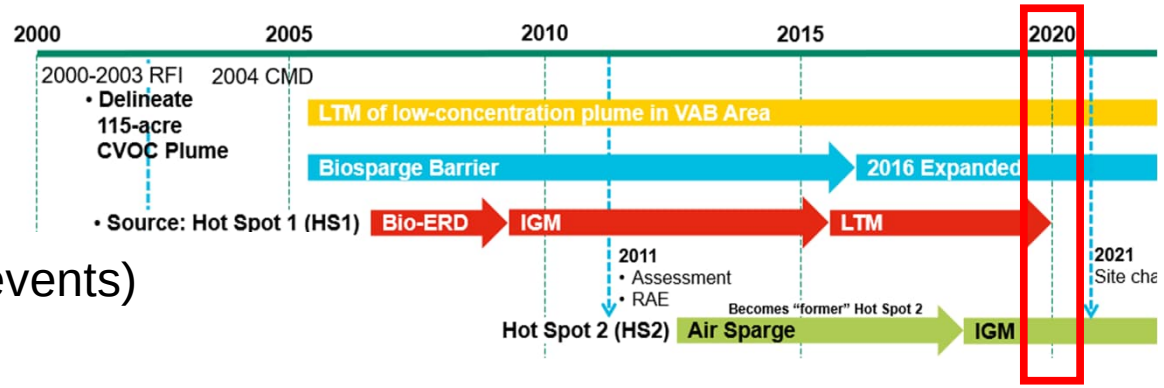






Former Hot Spot 2 History

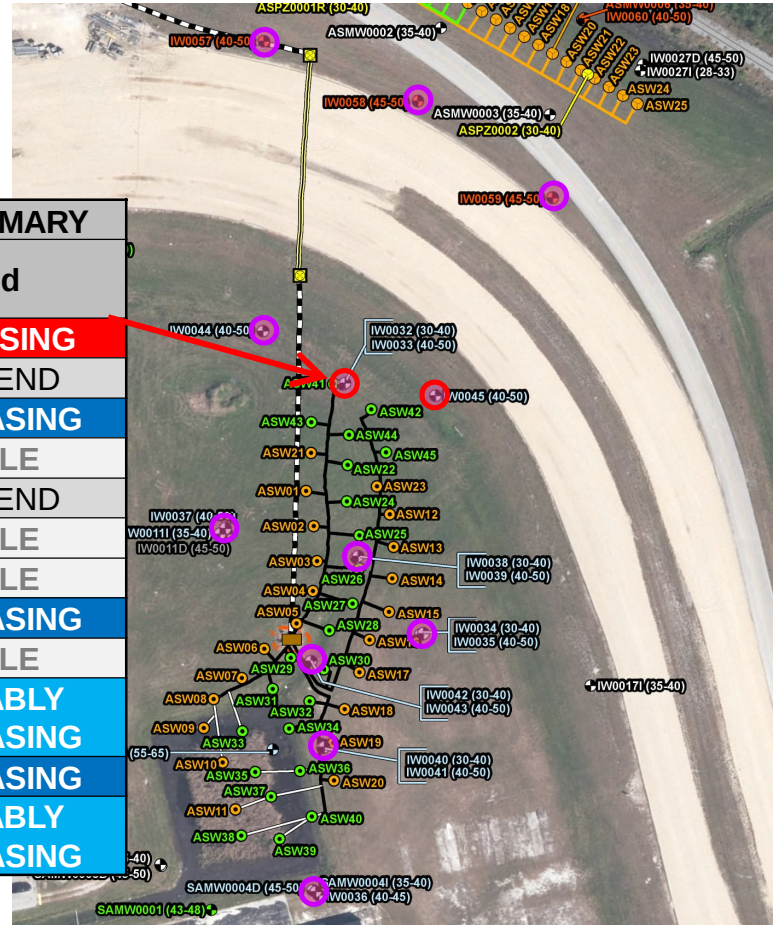
Timeline



- **2020** (2021 CMI and IM Update ADP) – Plume analytics conducted with data from 2018 through 2020 (5 sampling events)
  - Concluded CVOC plume is primarily stable
  - Significant mass and concentration of cDCE and VC remain in deep groundwater (40 to 50 ft bls)
  - Evaluate alternatives to decrease cDCE and VC mass in deep groundwater to shorten the lifetime of IGM and operation of the down-gradient biosparge system

cis-1,2-DICHLOROETHENE MANN-KENDALL ANALYSIS SUMMARY			
Well	M-K Statistic (S)	Confidence in Trend	Trend
MLPV-IW0033	8	95.8%	INCREASING
MLPV-IW0035	-2	59.2%	STABLE
MLPV-IW0036	-3	67.5%	STABLE
MLPV-IW0037	-4	75.8%	STABLE
MLPV-IW0039	0	40.8%	STABLE
MLPV-IW0041	0	40.8%	NO TREND
MLPV-IW0043	4	75.8%	NO TREND
MLPV-IW0044	-6	88.3%	STABLE
MLPV-IW0045	8	95.8%	INCREASING
MLPV-IW0057	-11	97.2%	DECREASING
MLPV-IW0058	-13	99.2%	DECREASING
MLPV-IW0059	-9	93.2%	PROBABLY DECREASING

VINYL CHLORIDE MANN KENDALL ANALYSIS SUMMARY			
Well	M-K Statistic (S)	Confidence in Trend	Trend
MLPV-IW0033	8	95.8%	INCREASING
MLPV-IW0035	2	59.2%	NO TREND
MLPV-IW0036	-8	95.8%	DECREASING
MLPV-IW0037	-6	88.3%	STABLE
MLPV-IW0039	4	75.8%	NO TREND
MLPV-IW0041	-2	59.2%	STABLE
MLPV-IW0043	0	40.8%	STABLE
MLPV-IW0044	-10	99.2%	DECREASING
MLPV-IW0045	-2	59.2%	STABLE
MLPV-IW0057	-9	93.2%	PROBABLY DECREASING
MLPV-IW0058	-13	99.2%	DECREASING
MLPV-IW0059	-9	93.2%	PROBABLY DECREASING



Response to Comments

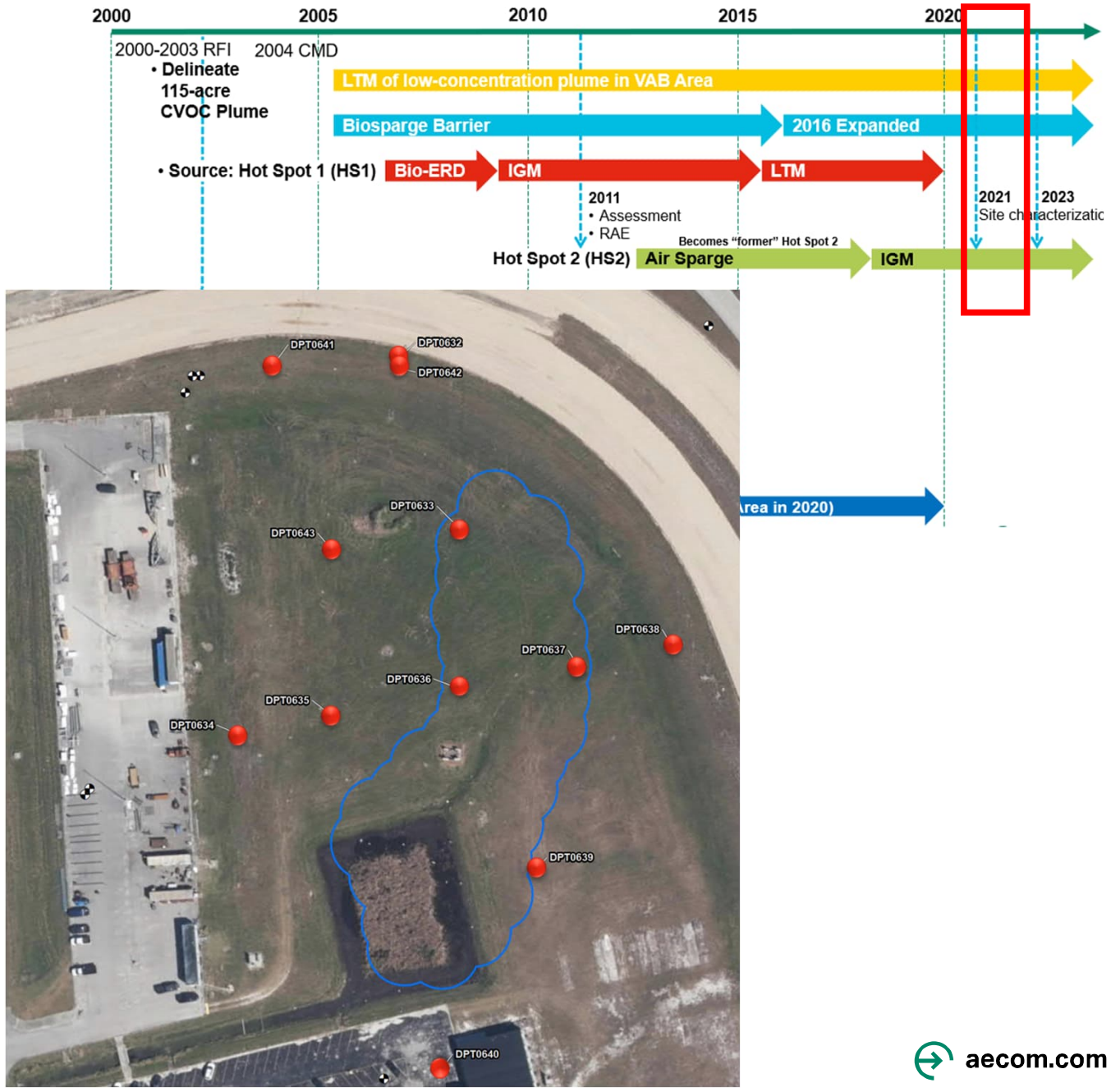
- HGL Comment #2: Slide #10 (new slide #11) – It would be helpful to specify the depths associated with the deep groundwater referenced on this slide. How many data points were used in the Mann-Kendall analysis?
- *Response: The first bullet was revised to state 5 sampling events were included in the Mann-Kendall trend analysis. At the time of the analysis, 5 groundwater sampling events were available for the analysis since shutdown of the air sparge system in April 2018. The second sub bullet was revised to show that deep groundwater refers to groundwater from 40 to 50 ft bls at the time of the Mann-Kendall trend analysis.*

Former Hot Spot 2 History

Timeline

- **2021** (2022 Annual CMI and IM Report) – DPT groundwater sampling in March and April to:

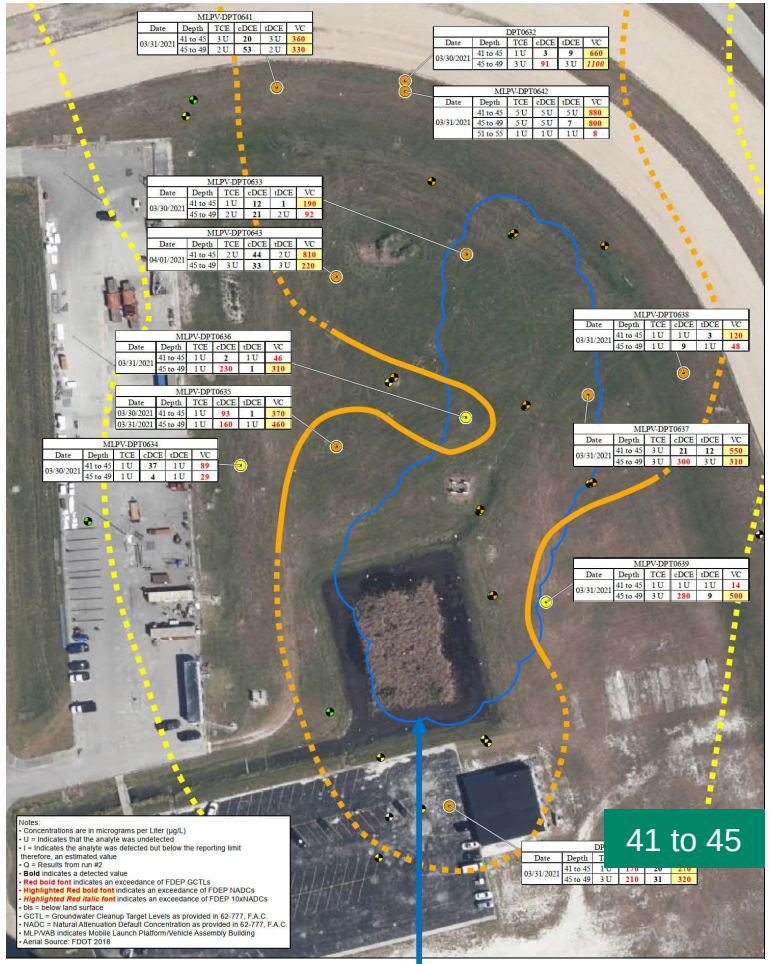
  1. Better evaluate current site conditions
  2. Determine possible remediation alternatives for treatment options in the fine-grained unit.
     - 25 samples from 12 locations collected from 4-foot intervals to depths of 41 to 55 feet bls
     - Samples analyzed for CVOCs [TCE, cDCE, trans-1,2-dichloroethane (tDCE) and VC]

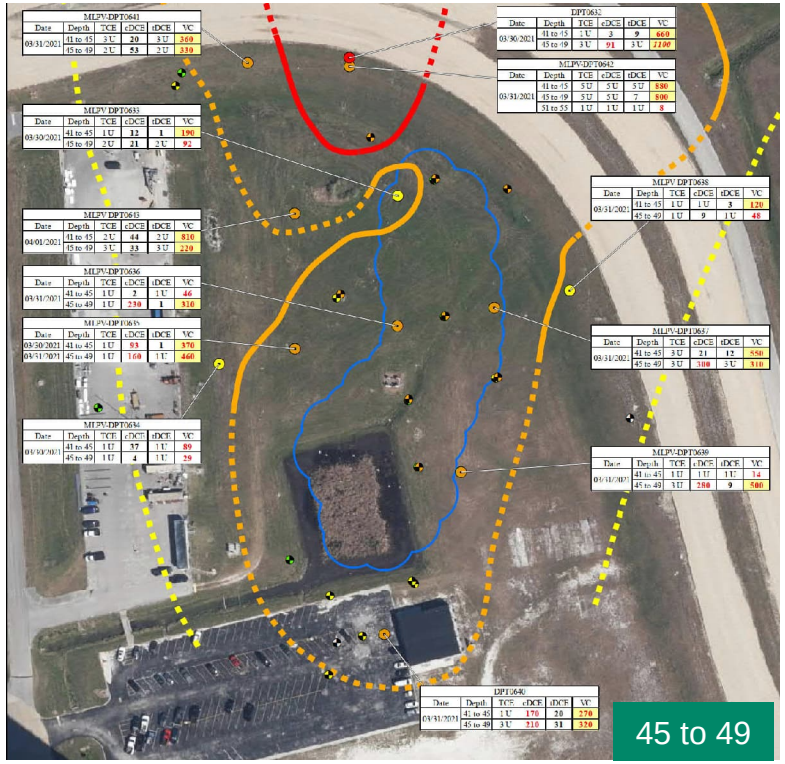


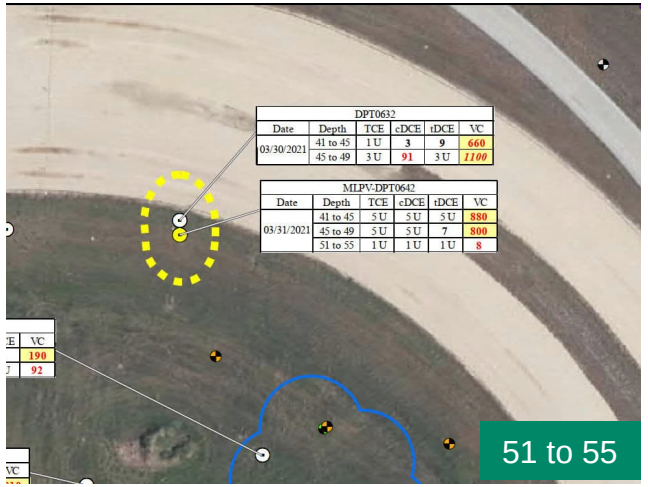
Former Hot Spot 2 History

2021 DPT Groundwater Sampling Summary

- **41 to 45 feet bls:**
  - VC exceeds NADC at 9 locations and Groundwater Cleanup Target Level (GCTL) only at 3 locations
  - cDCE exceeds GCTL at 2 locations
- **45 to 49 feet bls:**
  - VC exceeds 10xNADC at 1 location, NADC at 8 locations, and GCTL only at 3 locations
  - cDCE exceeds GCTL at 5 locations
- **51 to 55 feet bls:**
  - Only 1 sample collected to verify groundwater quality below treatment interval
  - VC exceeds GCTL







Former Air Sparge Area Radius of Influence (ROI)

Symbology Color Coding

- CVOC concentration less than or equal to GCTLs
- CVOC concentration greater than GCTLs
- CVOC concentration greater than NADCs and less than or equal to 10xNADC
- CVOC concentration greater than 10xNADC
- CVOC concentration greater than 100xNADC
- CVOC detection limit greater than GCTLs

Abbreviation	Analyte	GCTL	NADC
TCE	Trichloroethene	3	300
cDCE	cis-1,2-Dichloroethene	70	700
tDCE	trans--Dichloroethene	100	1000
VC	Vinyl Chloride	1	100

Greater than GCTL
Greater than NADC
Greater than 10xNADC

Former Hot Spot 2 History

2021 IGM

MLPV-IW0032 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	0.26 U
05/31/2018	0.61 U	**0.36 I**	0.39 U	0.26 U
03/06/2019	0.61 U	**0.74 I**	0.39 U	0.26 U
03/18/2020	0.35 U	**0.35 I**	0.22 U	0.41 U
11/30/2020	NS	**0.68 I**	0.22 U	**0.49 I**
03/16/2021	NS	**0.84**	0.22 U	1.6

MLPV-IW0011I (35 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**1.1**	0.67 U	0.26 U
5/31/2018	0.61 U	**0.93 I**	0.39 U	1.9
3/6/2019	0.61 U	**0.72 I**	0.39 U	1.4
10/31/2019	0.35 U	0.28 U	0.22 U	**0.48 I**
3/18/2020	0.35 U	**0.35 I**	0.22 U	**0.92 I**
9/15/2020	NS	0.28 U	0.22 U	0.41 U
3/16/2021	NS	0.28 U	0.22 U	**0.46**
9/13/2021	NS	0.28 U	0.22 U	0.41 U

MLPV-IW0034 (30 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	13.0
05/31/2018	0.61 U	**0.4 I**	0.39 U	5.5
03/06/2019	0.61 U	**1.4**	0.39 U	2.4
10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
9/15/2020	NS	0.28 U	0.22 U	0.41 U
3/15/2021	NS	**0.41**	0.22 U	0.41 U
9/14/2021	NS	0.28 U	0.22 U	0.41 U

MLPV-IW0042 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**0.86 I**	0.67 U	0.26 U
05/30/2018	0.61 U	**0.32 I**	0.39 U	**0.34 I**
03/06/2019	0.61 U	0.32 U	0.39 U	0.26 U
03/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
03/16/2021	NS	**1.2**	0.22 U	**0.42**

MLPV-IW0040 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	0.26 U
05/30/2018	0.61 U	**0.58 I**	0.39 U	**0.36 I**
03/05/2019	0.61 U	0.32 U	0.39 U	0.26 U
03/18/2020	0.35 U	**0.39 I**	0.22 U	0.41 U
03/15/2021	NS	**0.50**	0.22 U	0.41 U

MLPV-IW0044 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	6.1 U	**18.0**	**14.0**	1,500
05/30/2018	1.2 U	**7.5**	**6.4**	810
03/05/2019	1.2 U	**3.7**	**2.9 I**	510
10/31/2019	0.35 U	**2.9**	**1.8**	458
3/18/2020	0.35 U	**6.9**	**2.2**	325
11/30/2020	NS	**2.8**	**0.88 I**	307
3/16/2021	NS	**3.4**	**1.0**	249
9/14/2021	CNL			

MLPV-IW0033 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	100	**17.0**	470
11/07/2017	0.61 U	**24.0**	**6.3**	68.0
05/31/2018	0.61 U	**21.0**	**3.0**	120
03/06/2019	1.2 U	**46.0**	**6.0**	400
10/31/2019	1.7 U	**58.4**	1.1 U	365
3/18/2020	**0.44 I**	**55.9**	**9.6**	455
11/30/2020	NS	82.3	**7.7**	497
3/16/2021	NS	**49.6**	**6.3**	471
9/14/2021	CNL			

MLPV-IW0045 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**7.7**	**7.9**	200
05/30/2018	0.61 U	**2.4**	**10.0**	270
03/06/2019	0.61 U	**3.2**	**6.8**	170
10/31/2019	0.35 U	**4.8**	**3.6**	97.2
03/18/2020	0.35 U	**20**	**5.7**	207
09/15/2020	NS	**6.4**	**4.2**	205
03/16/2021	NS	75.8	**7.8**	295
09/14/2021	CNL			

MLPV-IW0037 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	150	**1.2**	280
05/31/2018	0.61 U	94.0	**1.2 I**	360
03/06/2019	0.61 U	160	**0.89 I**	270
10/31/2019	0.69 U	135	0.44 U	178
3/18/2020	0.86 U	132	**0.67 I**	245
9/15/2020	NS	**55.4**	**0.52 I**	208
03/16/2021	NS	138	**0.71**	269
09/13/2021	NS	**25.1**	**0.47**	99.3

MLPV-IW0038 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**0.78 I**	0.67 U	0.26 U
5/31//2018	0.61 U	**0.48 I**	0.39 U	0.26 U
03/06/2019	0.61 U	**0.94 I**	0.39 U	**1.1**
03/18/2020	0.35 U	**0.54 I**	0.22 U	0.41 U
03/15/2021	NS	**1.2**	0.22 U	2.3

MLPV-IW0039 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	**2.6**	200	**11.0**	250
11/07/2017	**1.5**	92.0	**5.1**	55.0
05/31/2018	**1.3 I**	**45.0**	**3.2**	55.0
03/06/2019	**0.83 I**	160	**7.1**	250
10/31/2019	0.86 U	198	**4.6**	241
3/18/2020	0.86 U	128	**4.4**	228
9/15/2020	NS	92.1	**3.9**	276
3/15/2021	NS	161	**6.5**	236
9/14/2021	NS	76.9	**3.3**	191

MLPV-IW0035 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**1.8**	**5.4**	220
05/31/2018	0.61 U	**1.2**	**6.9**	330
03/06/2019	0.61 U	**2.3**	**3.3**	150
10/31/2019	0.86 U	0.69 U	0.55 U	152
3/18/2020	0.35 U	**3.2**	**4.0**	192
9/15/2020	NS	0.28 U	**3.0**	205
3/15/2021	NS	**3.2**	**2.5**	124
9/14/2021	CNL			

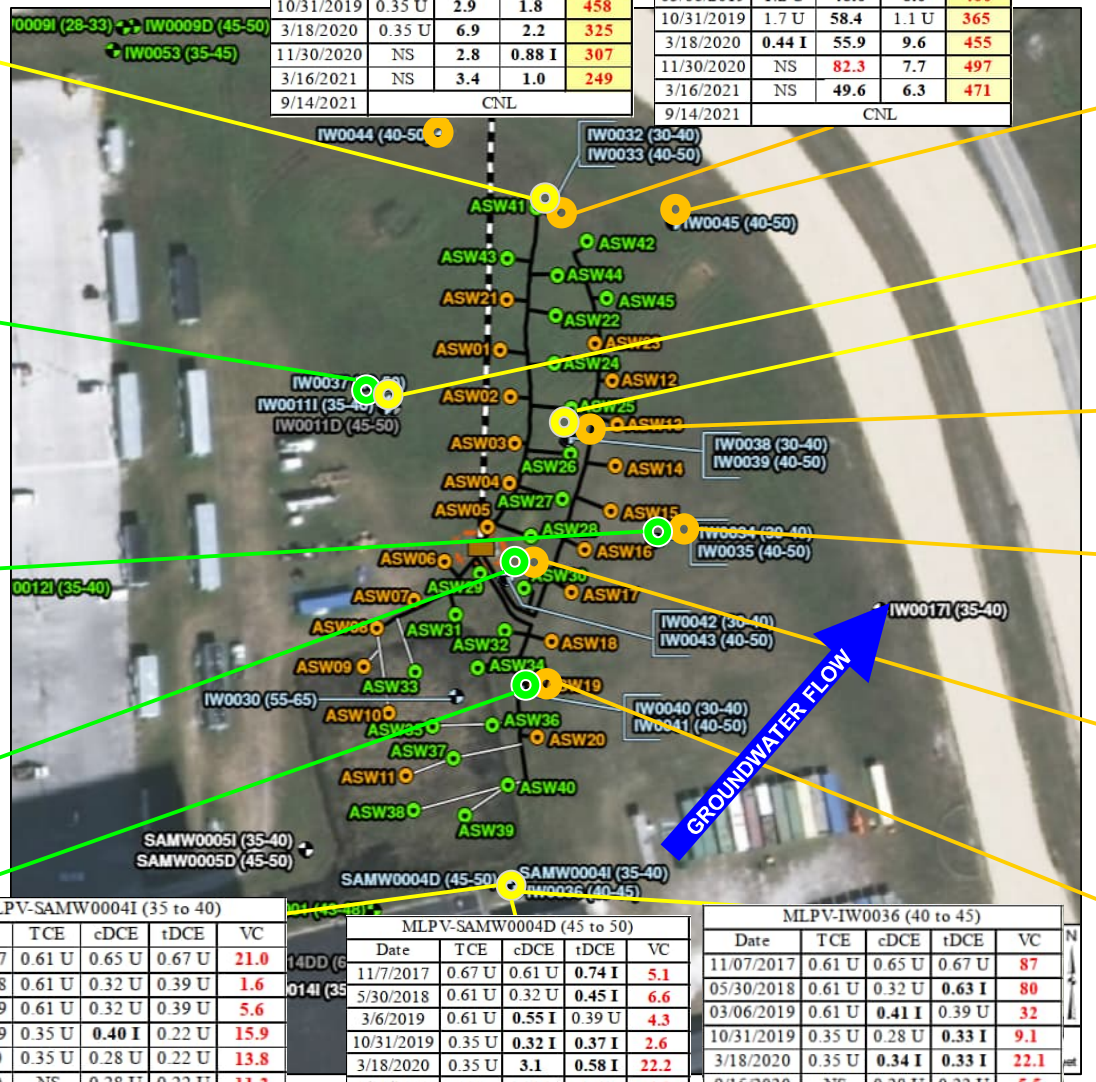
MLPV-IW0043 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	190	**4.9**	330
11/07/2017	0.61 U	**42.0**	**1.9**	120
05/30/2018	0.61 U	**31.0**	**0.96 I**	140
03/06/2019	**0.77 I**	100	**2.7**	150
10/31/2019	0.86 U	149	**2.4 I**	155
3/18/2020	**0.97 I**	193	**3.0**	131
9/15/2020	NS	73.2	**2.4**	146
3/16/2021	NS	249	**3.7**	180
9/14/2021	Well Submerged			

MLPV-IW0041 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	**63**	**3.8**	330
11/07/2017	0.61 U	140	**5.2**	300
05/30/2018	0.61 U	**9.7**	**3.9**	230
03/05/2019	**0.65 I**	76	**2.6**	260
10/31/2019	**0.39 I**	**14.0**	**2.3**	166
3/18/2020	0.35 U	106	**3.3**	183
9/15/2020	NS	**4**	**1.4**	201
3/16/2021	NS	113	**3.3**	259
9/14/2021	NS	**1.9 I**	**0.92**	146

MLPV-SAMW0004I (35 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	21.0
05/30/2018	0.61 U	0.32 U	0.39 U	1.6
03/06/2019	0.61 U	0.32 U	0.39 U	5.6
10/31/2019	0.35 U	**0.40 I**	0.22 U	15.9
3/18/2020	0.35 U	0.28 U	0.22 U	13.8
9/15/2020	NS	0.28 U	0.22 U	11.3
3/15/2021	NS	**0.61**	**0.41**	19.4
9/14/2021	NS	0.28 U	0.22 U	15.5

MLPV-SAMW0004D (45 to 50)				
Date	TCE	cDCE	tDCE	VC
11/7/2017	0.67 U	0.61 U	**0.74 I**	5.1
5/30/2018	0.61 U	0.32 U	**0.45 I**	6.6
3/6/2019	0.61 U	**0.55 I**	0.39 U	4.3
10/31/2019	0.35 U	**0.32 I**	**0.37 I**	2.6
3/18/2020	0.35 U	**3.1**	**0.58 I**	22.2
9/15/2020	NS	0.28 U	**0.60**	4.2
3/15/2021	NS	**2.4**	**0.59**	14.6
9/14/2021	NS	**0.65 I**	**0.67**	5.0

MLPV-IW0036 (40 to 45)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	87
05/30/2018	0.61 U	0.32 U	**0.63 I**	80
03/06/2019	0.61 U	**0.41 I**	0.39 U	32
10/31/2019	0.35 U	0.28 U	**0.33 I**	9.1
3/18/2020	0.35 U	**0.34 I**	**0.33 I**	22.1
9/15/2020	NS	0.28 U	0.22 U	5.5
3/15/2021	NS	**0.47**	0.22 U	24.9
9/14/2021	NS	**0.60**	0.22 U	32.3



97.2	indicates > GCTL
207	Indicates > NADC

<GCTL

>GCTL

>NADC

aecom.com

Former Hot Spot 2 History

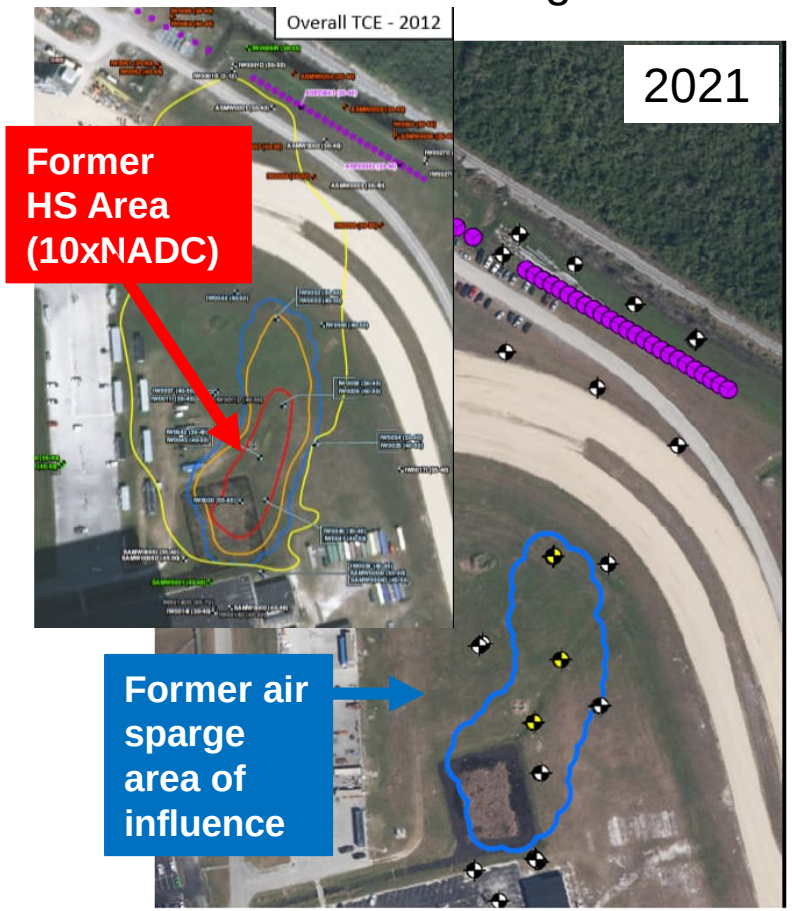
2021 IGM

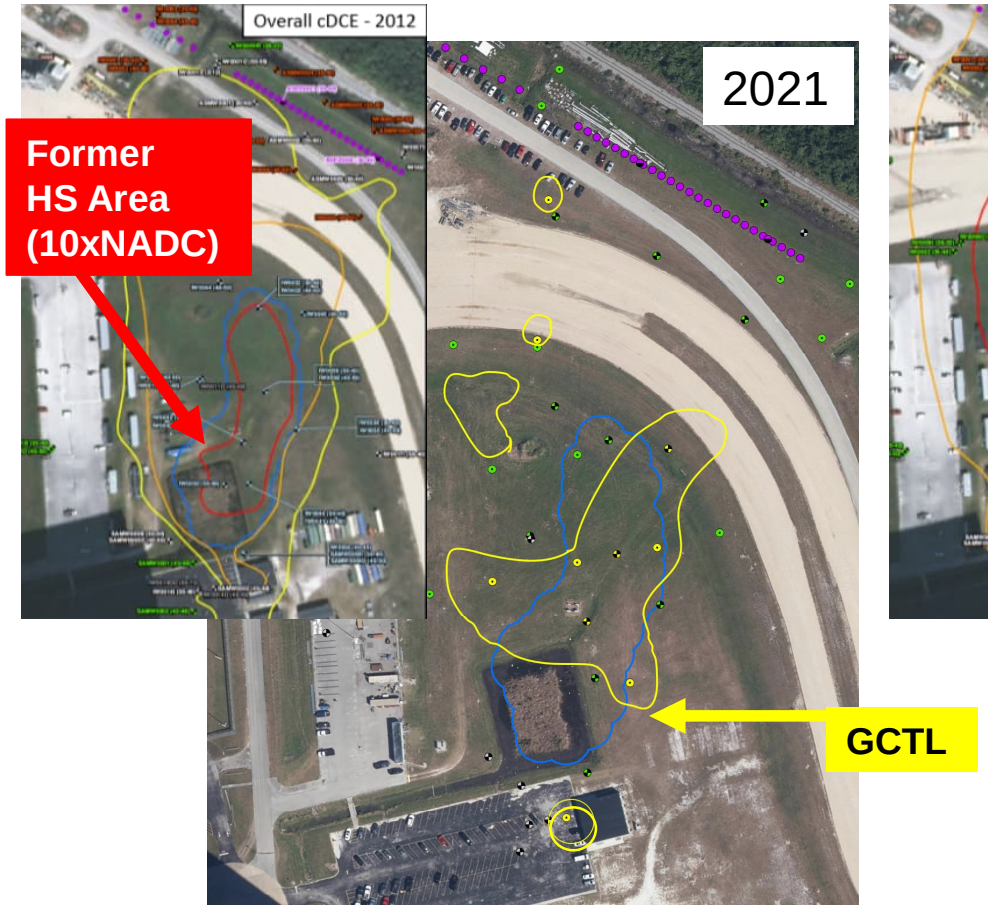
- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC: SAMW0004I (15.5 µg/L) exceeded GCTL in September 2021 – relatively unchanged since October 2019 (15.9 to 15.5 µg/L); IW0032 (1.6 µg/L) and IW0038 (2.3 µg/L) – first exceedances since 2015. Construction activities prevented subsequent sampling in September to evaluate trend
- **40 – 50 ft bls:**
  - cDCE: IW0039 (161 µg/L), IW0043 (249 µg/L), and IW0045 (75.8 µg/L) exceeded GCTL.
  - tDCE: less than GCTL
  - VC: IW0036 (24.9 µg/L) and SAMW0004D (14.6 µg/L) exceeded GCTL – relatively unchanged concentrations. Flux recorded in March correlates with a 1.5-to-2-foot average drop in the water table elevation (seasonal fluctuation). September sampling indicated IW0036 (32.3 µg/L) and SAMW0004D (5.0 µg/L) remained above GCTL
  - VC exceeds NADC in IW0033 (471 µg/L), IW0035 (124 µg/L), IW0037 (269 µg/L), IW0039 (236 µg/L), IW0041 (259 µg/L), IW0043 (180 µg/L), IW0044 (249 µg/L), and IW0045 (295 µg/L). September sampling indicated: IW0037 decreased below NADC (99.3 µg/L); and IW0039 (191 µg/L) and IW0041 (146 µg/L) remained relatively unchanged. Remaining wells could not be evaluated due to construction activities in the area.

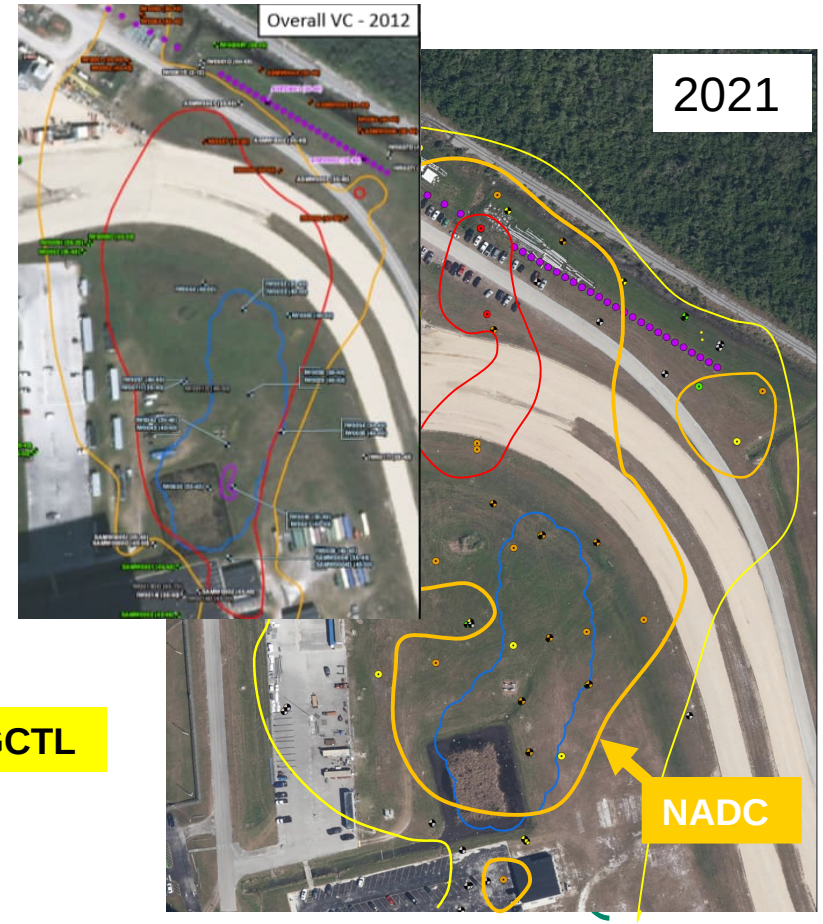
Former Hot Spot 2 History

2021 DPT and Monitoring Well Combined Data

- Overall reduction since 2012
- Though the 2020 plume analytics evaluation of groundwater monitoring data indicated a stable plume, DPT data indicated the high concentration plume (HCP, with concentrations greater than NADCs) is migrating toward the treatment barrier at higher concentrations and confirms the need for additional remediation efforts







Historical Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

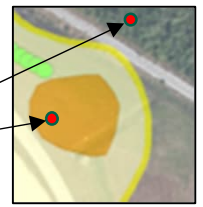
Former Hot Spot 2 History

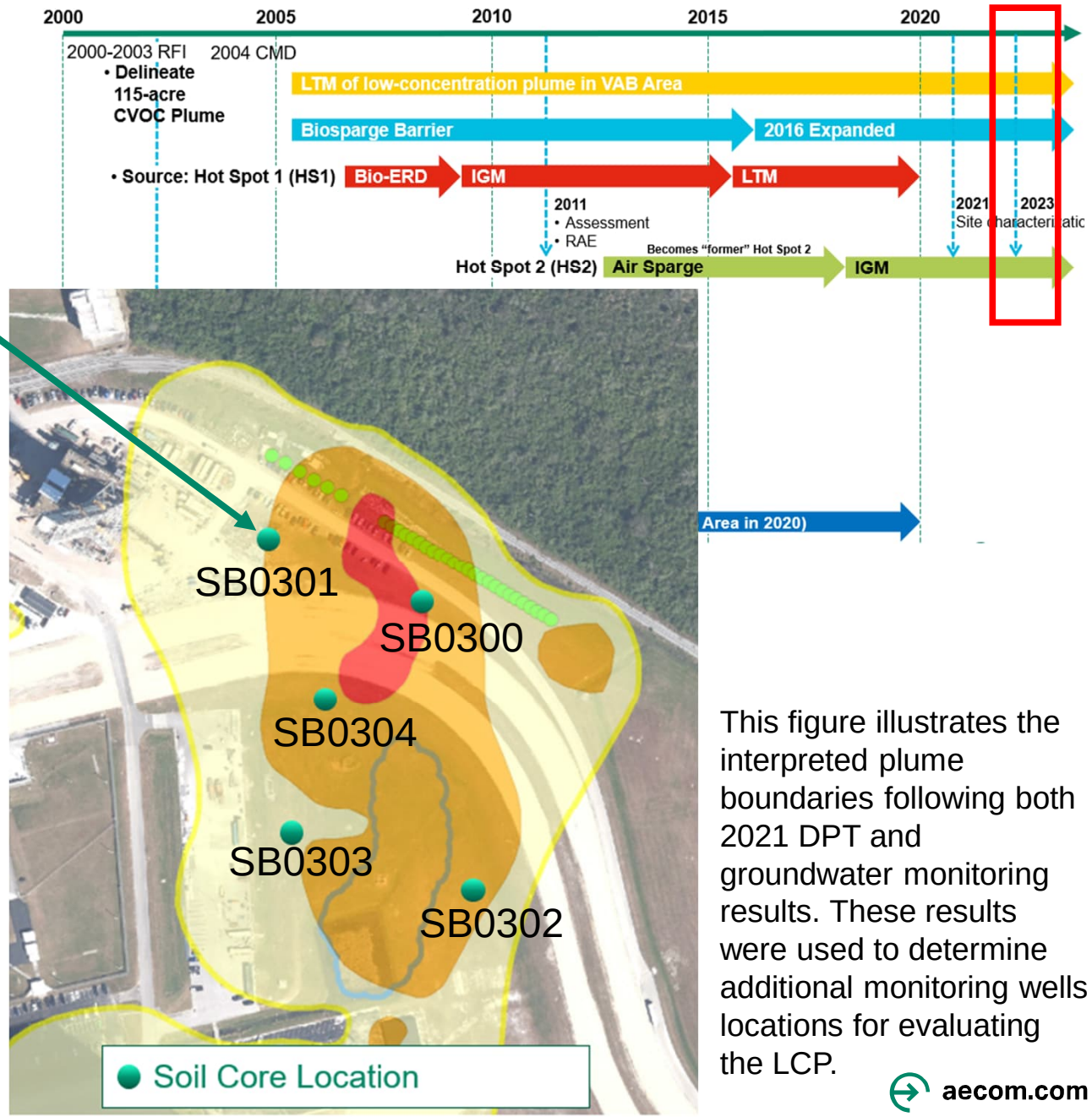
Timeline

- **2022** – IGM sampling continued, and five soil cores collected in areas with limited soil classifications for permeability analysis to:
  1. Gain an understanding of current soil characteristics in the lower permeability soil layer
  2. Aid in the RAE

- **2023** – IGM sampling along with sampling in low-concentration plume (LCP) monitoring well network performed in March and April throughout Biosparge Area and Former Hot Spot 2 for continued evaluation of site conditions

- **2024 (pending)** – Additional monitoring wells will be installed southeast of the biosparge barrier to verify NADC exceedances detected during 2021 DPT event.





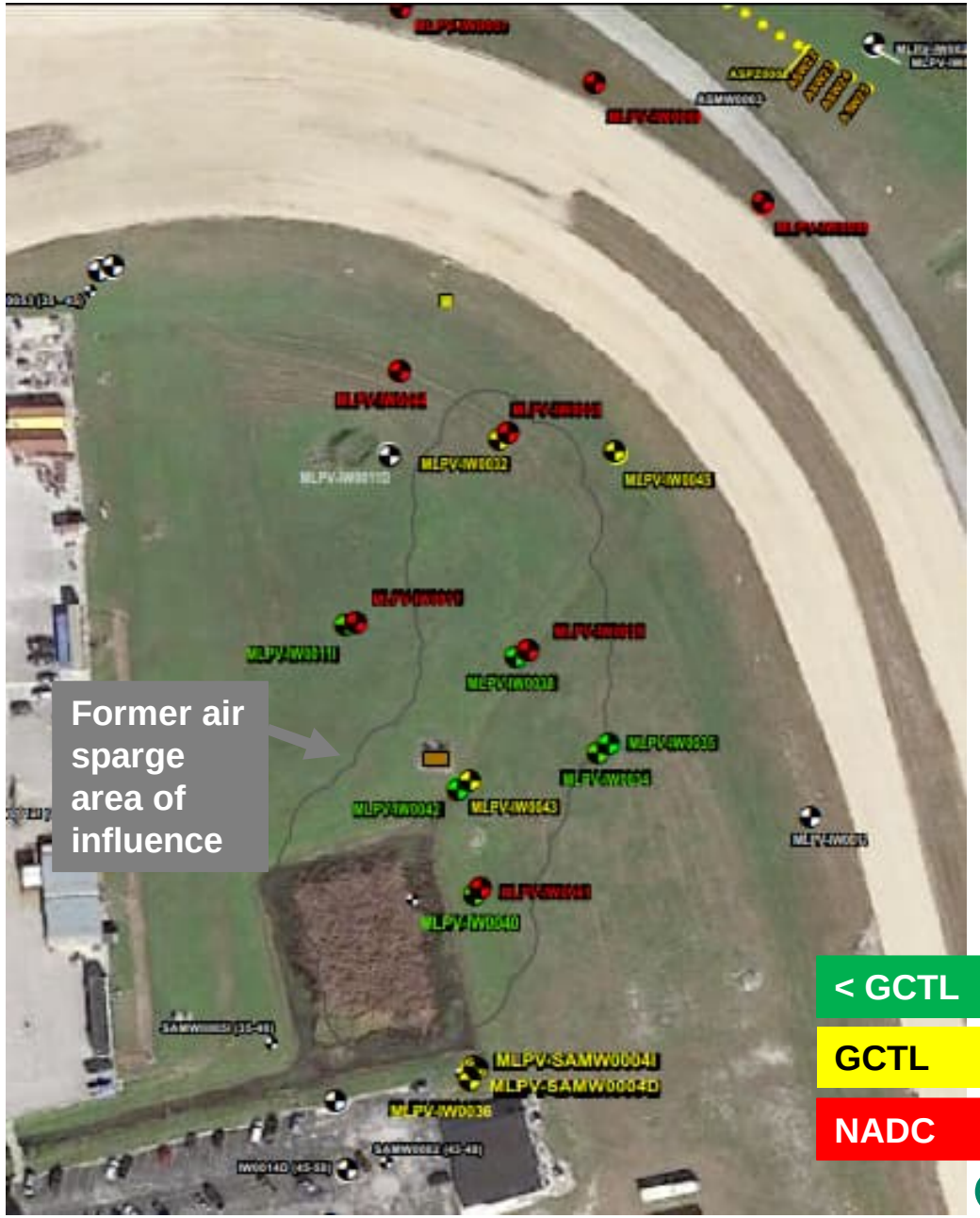
This figure illustrates the interpreted plume boundaries following both 2021 DPT and groundwater monitoring results. These results were used to determine additional monitoring wells locations for evaluating the LCP.

Source: 2021 CMI and IM Update ADP, Slide 44.

Former Hot Spot 2 History

Spring 2022 IGM

- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC exceeds GCTL in IW0032 (3.1 µg/L) and (SAMW0004I (15 µg/L)
- **40 – 50 ft bls:**
  - cDCE: IW0037 (100 µg/L), IW0039 (140 µg/L), and IW0043 (98 µg/L) exceeded GCTL
  - tDCE: less than GCTL
  - VC: IW0036 (44 µg/L), IW0043 (88 µg/L), IW0045 (92 µg/L), and SAMW0004D (17 µg/L) exceeded GCTL
  - VC exceeds NADC in IW0033 (950 µg/L), IW0037 (200 µg/L), IW0039 (160 µg/L), IW0041 (150 µg/L), and IW0044 (200 µg/L)

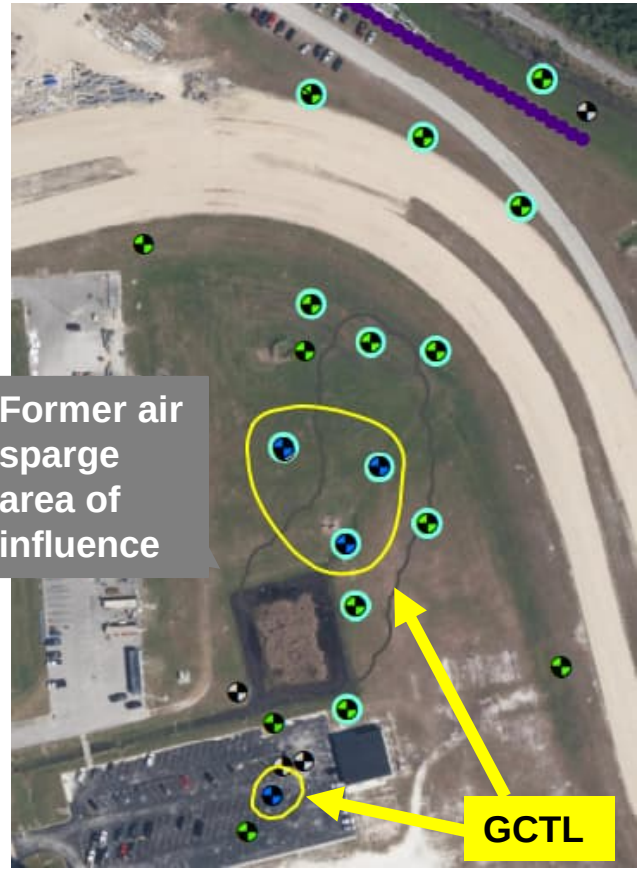


Former Hot Spot 2 History

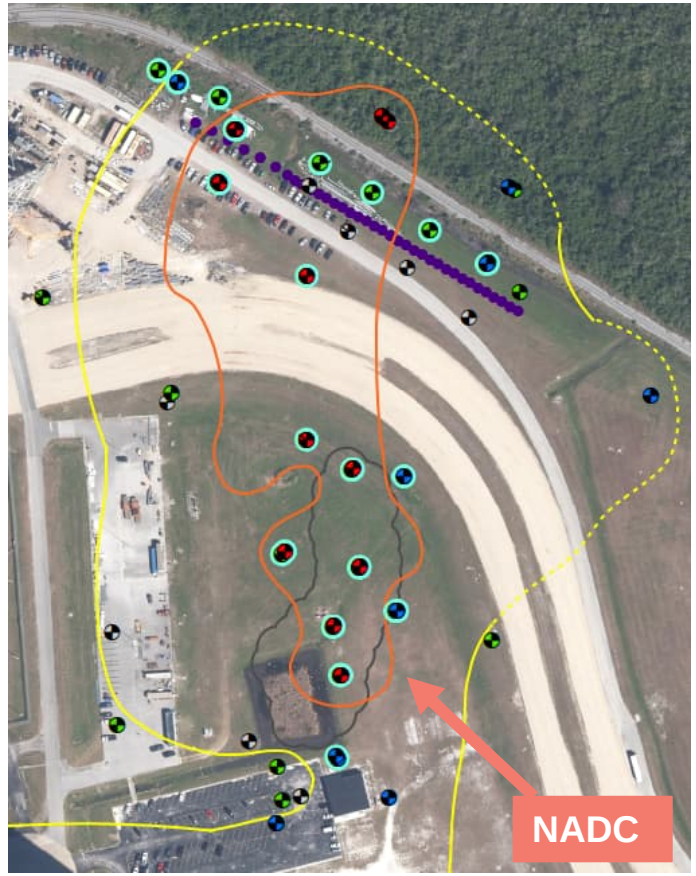
Spring 2023 IGM

- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC exceeding GCTL: SAMW0004I (12 µg/L) – relatively unchanged since October 2019 (15.9 to 12 µg/L); IW0038 (1.8 µg/L) – consistent with sampling results from March 2021 (2.3 µg/L)
- **40 – 50 ft bls:**
  - cDCE: IW0037 (79 µg/L), IW0039 (150 µg/L), and IW0043 (170 µg/L) exceeded GCTL
  - tDCE: less than GCTL
  - VC: IW0035 (78 µg/L), IW0036 (29 µg/L), IW0045 (59 µg/L), and SAMW0004D (18 µg/L) exceeded GCTL – IW0035 decreased to below NADC for first time in over 10 years, and IW0045 below NADC for second year
  - VC exceeds NADC in IW0033 (560 µg/L), IW0037 (170 µg/L), IW0039 (270 µg/L), IW0041 (130 µg/L), IW0043 (280 µg/L), and IW0044 (620 µg/L) – concentrations relatively unchanged since October 2019

2023 Composite cDCE Plume



2023 Composite VC Plume



Site Characterization Summary

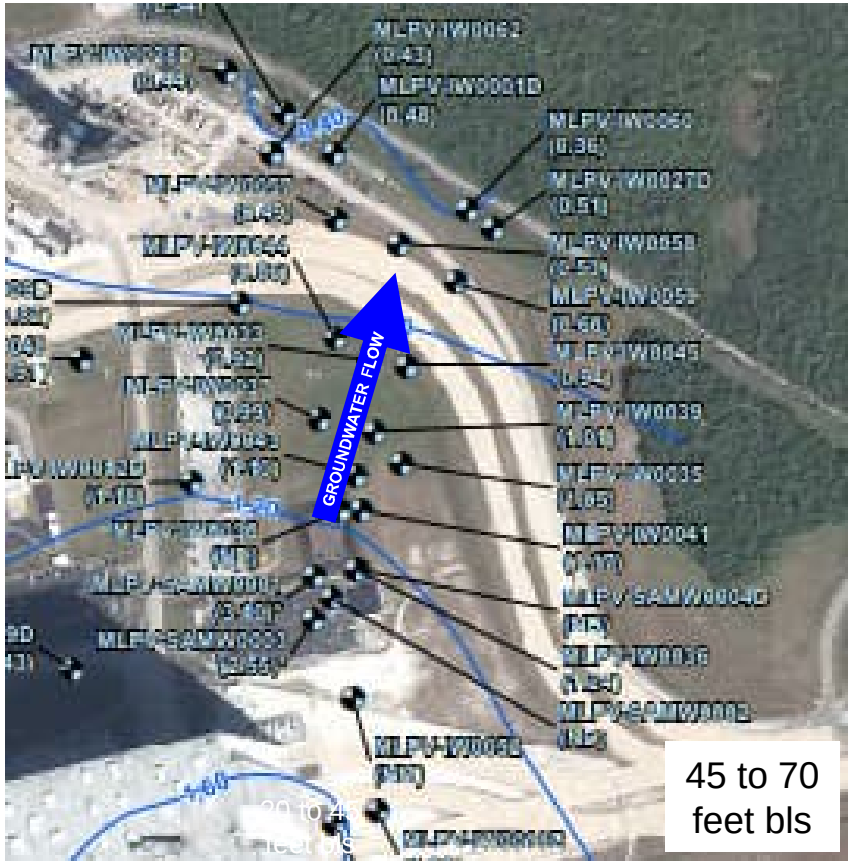
Site Characterization Summary

Site-Wide Hydrogeology

- 2021 Average depth to water in the dry season (November through April) ranged from 3 to 4 ft bls
- Wet season water level measurements are scheduled for 2023
- Groundwater generally flows to N and NE on the north side of the VAB in Former HS2 area



INTERMEDIATE

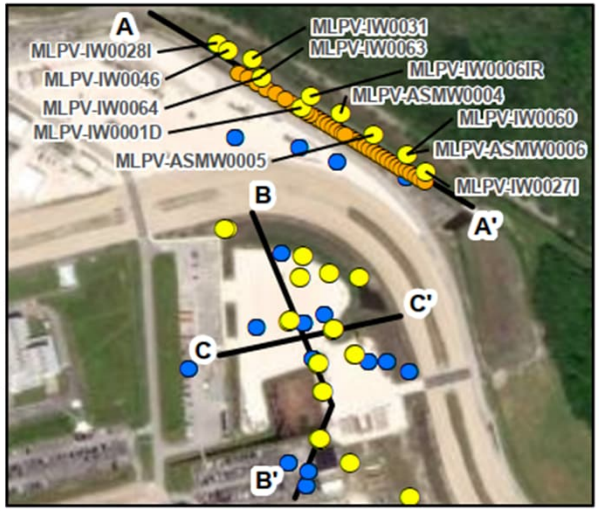


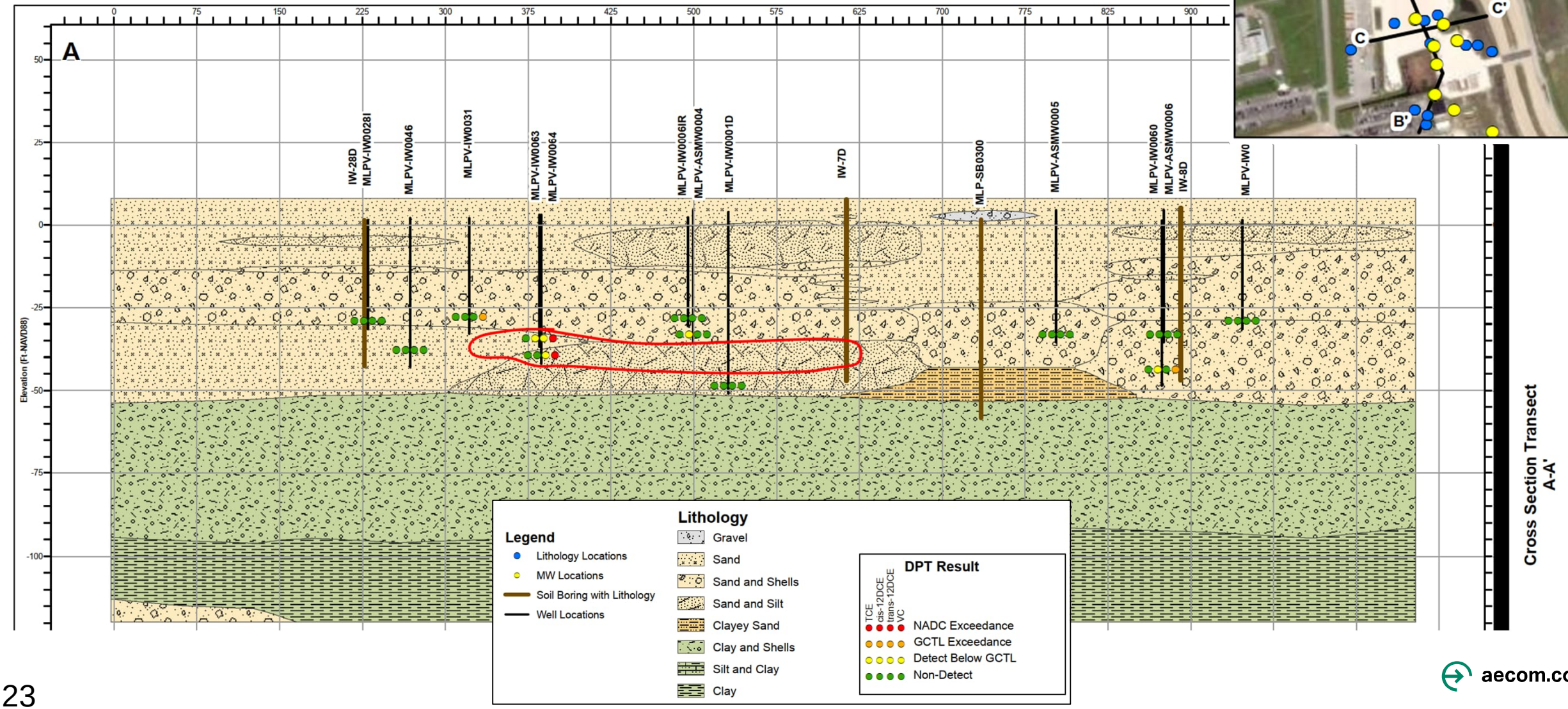
DEEP

Site Characterization Summary

Site-wide Lithology, North-South (A-A') – 2022-2023 MW Data

Lithology: NADC plume at 35-45 ft bls, silty sands, downgradient of former HS2 HCP



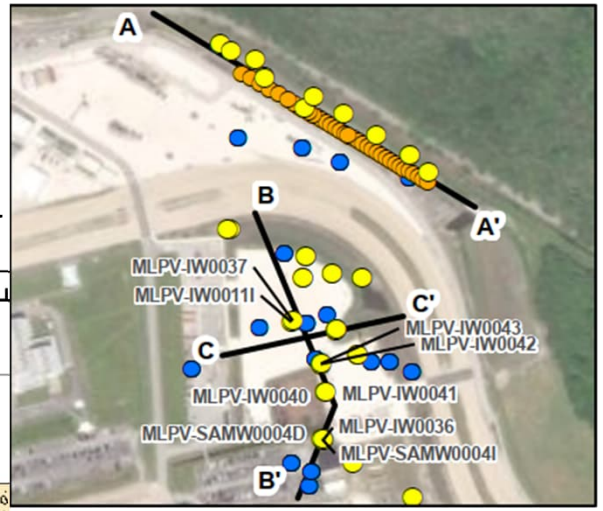


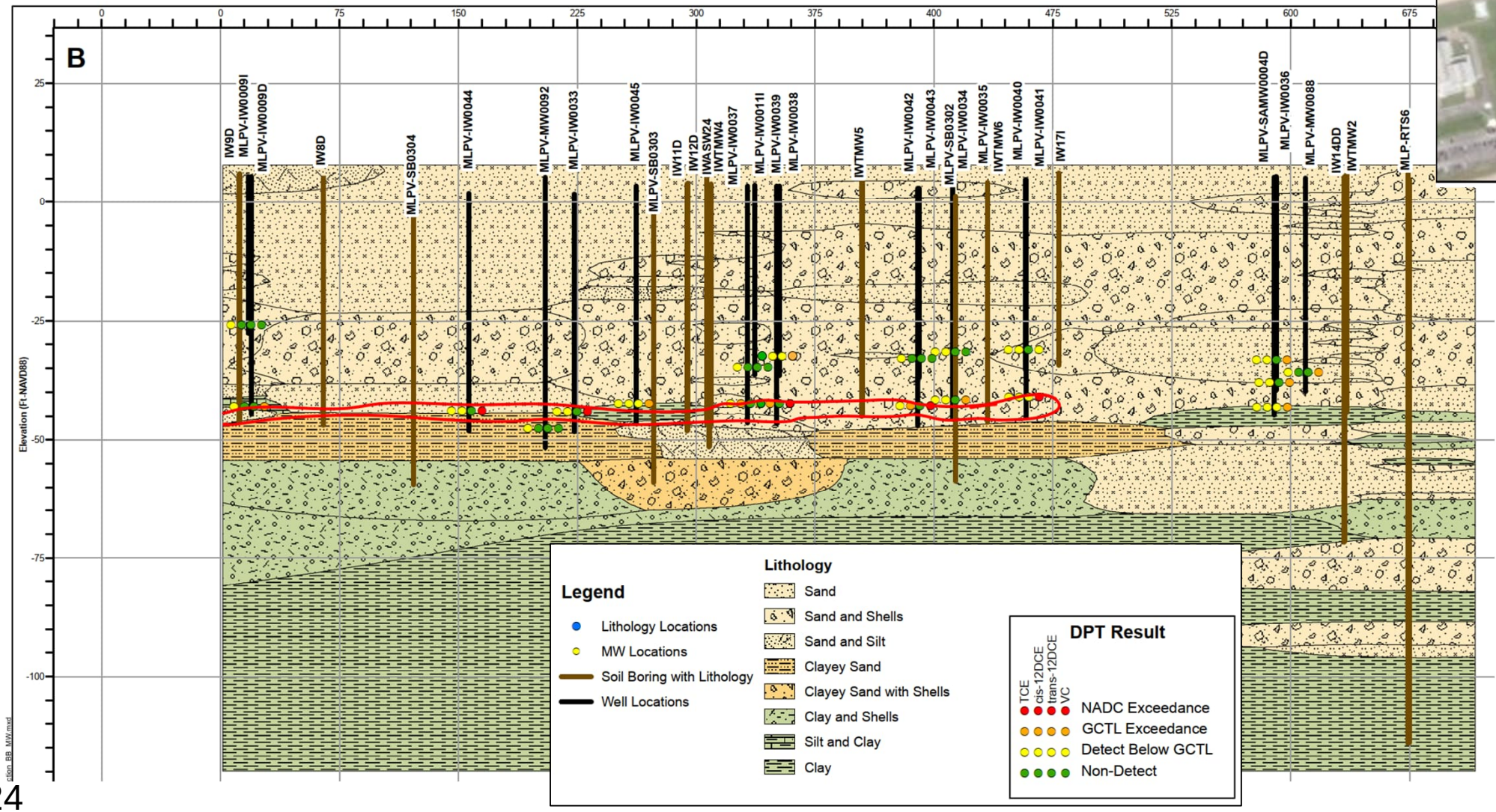
aecom.com

Site Characterization Summary

Site-wide Lithology, North-South (B-B') – 2022-2023 MW Data

Lithology: NADC plume at 40 to 50 ft bls, silty sands, sands and shells, former HS2 area



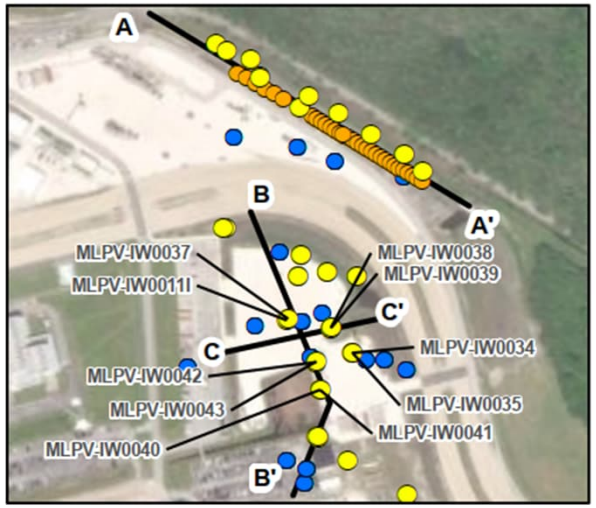


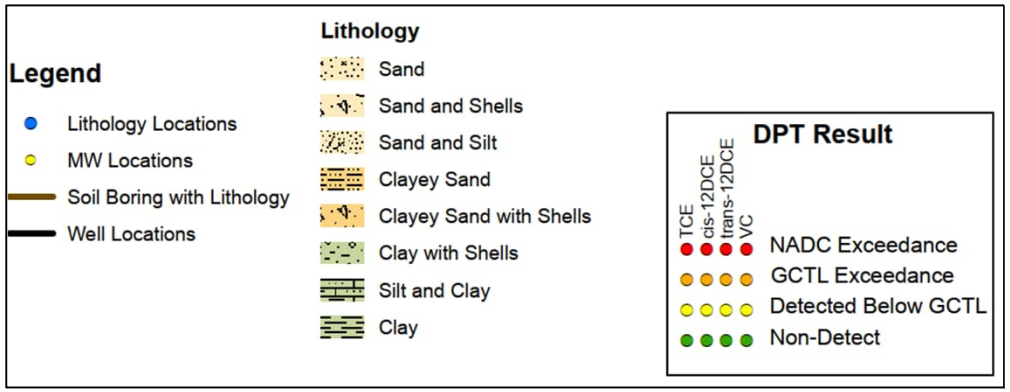
aecom.com

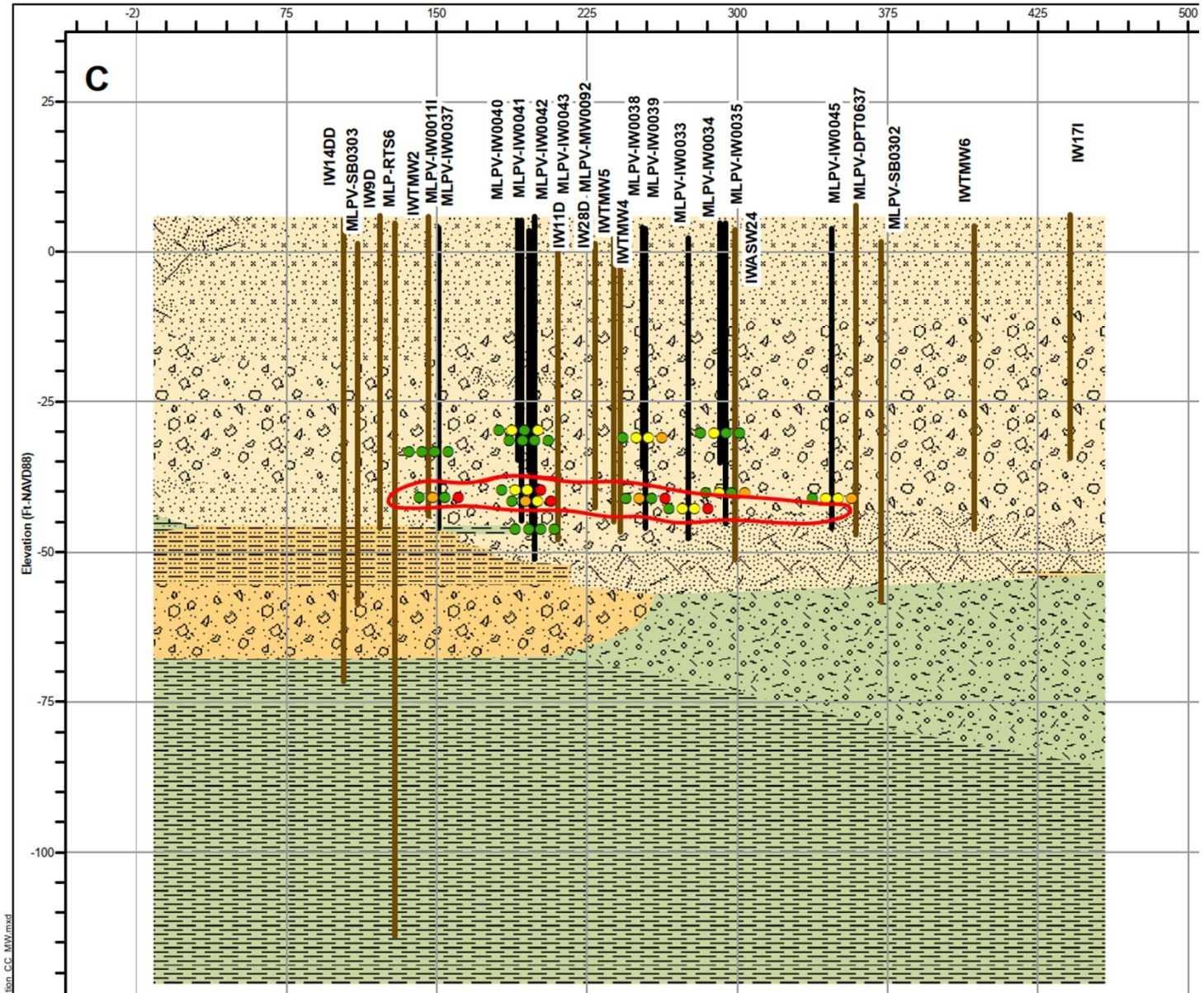
Site Characterization Summary

Site-wide Lithology, East-West (C-C') – 2022-2023 MW Data

Lithology: NADC plume at 35 to 45 feet bls, silty sands, sands and shells, former HS2 area







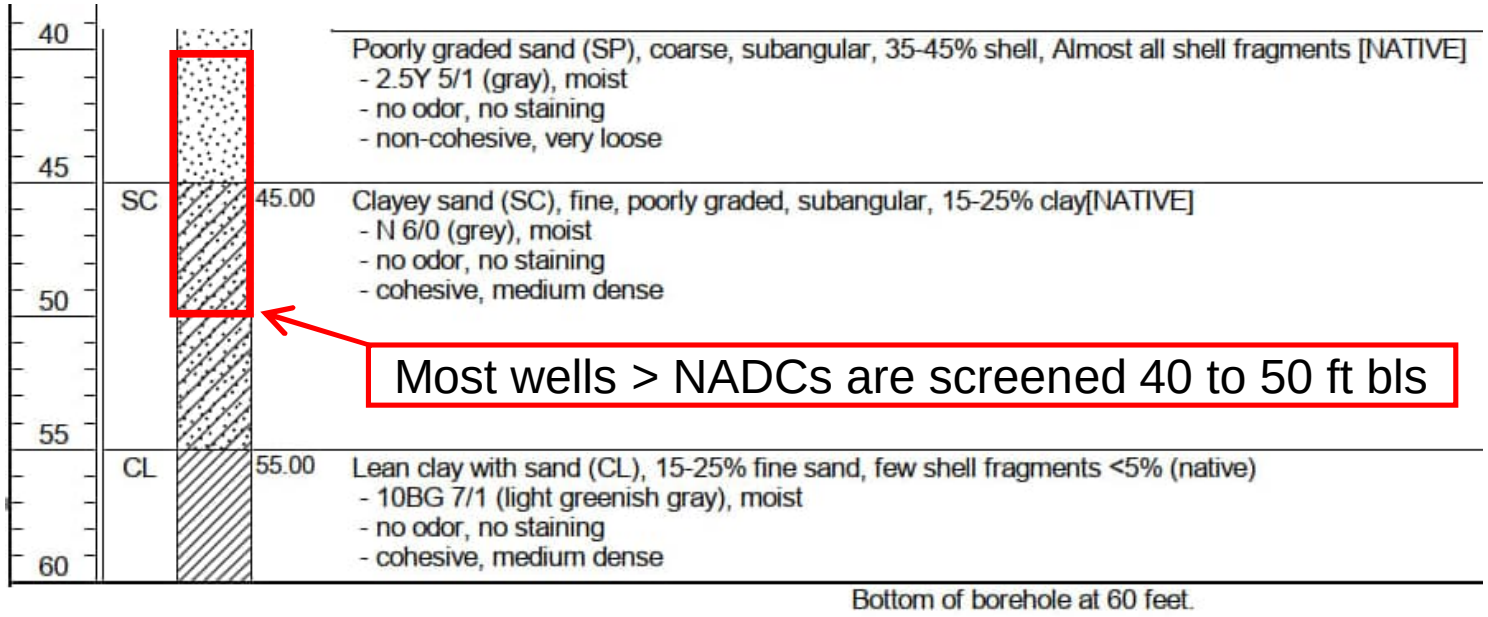
Site Characterization Summary

Relevant Site Conditions for RAE

Lithology

- Former HS2 air sparge wells were screened to approximately 46 bls to stay above finer-grained soil
- NADC plumes in former HS2 area are primarily located in groundwater below 45 bls.
- Five soil borings (MLPV-SB0300 to MLPV-SB0304) were collected in November 2022 to refine understanding of lithology
- Eight (8) soil samples were collected between 50 and 60 ft bls from the SBs to test for grain size and hydraulic conductivity (and evaluate feasibility of air sparging)

From MLPV-SB0300 (Typical)



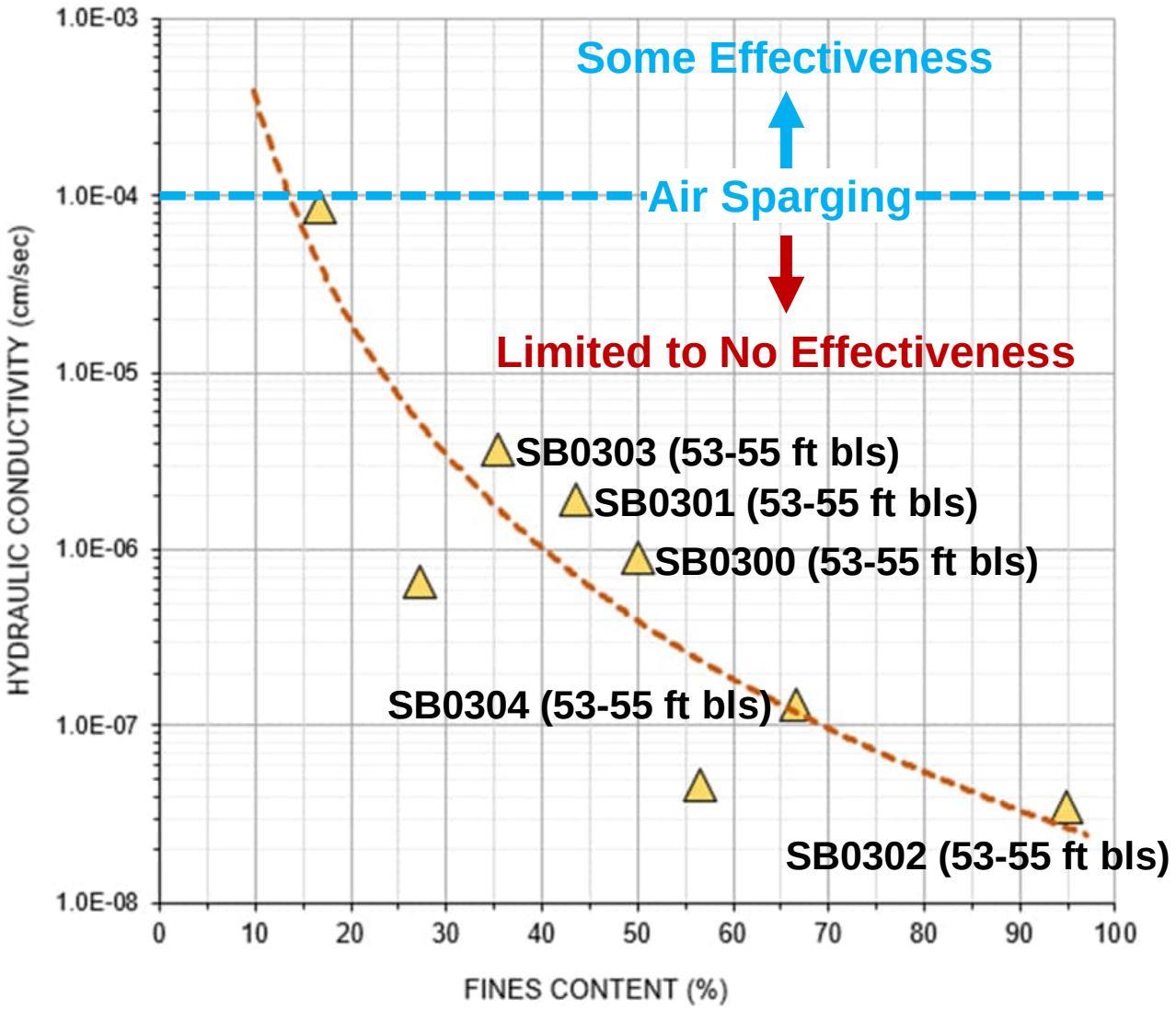
- Sands dominate to approximately 45 ft bls
- Clayey sand (or silty sand) observed from 45 to 55 ft bls
- Lean clay with sand observed from 55 to 60 ft bls

Site Characterization Summary

Relevant Site Conditions for RAE

Soil Geotech Results

- Fines content (<75µm, ≤silt) in soil samples ranged from 17 to 95%
- Hydraulic conductivity ranged from 3.5E-8 cm/s to 8.7E-5 cm/s
- Guidance documents from the Interstate Technology and Regulatory Council and Environmental Protective Agency indicate the practical hydraulic conductivity limit for air sparging is greater than 1E-3 to 1E-4 cm/s
- Air Sparging below 45 ft bls is not expected to be effective and is not retained during technology screening
  - Low K (high fines content) limits ability to inject air
  - ROI would be limited
  - Pilot study would be required



Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

Observations

- Groundwater above 40 ft bls is < GCTLs or NADCs
- Wells screened from 40 to 50 ft bls most likely represent groundwater conditions from 40 to 45 ft bls because of lithology changes around 45 ft bls from sand to clayey sand
- Limited monitoring network screened exclusively in (clayey sand) less permeable lithology below 45 ft bls

Objectives

- Monitor CVOC rebound/trends in former HS2 area after air sparging stopped in April 2018
- Evaluate CVOC trends in deep groundwater (40-45 ft bls and below 45 ft bls)
- Evaluate if natural attenuation can potentially mitigate mass flux to the biosparge barrier

Trend Analysis at Individual Wells

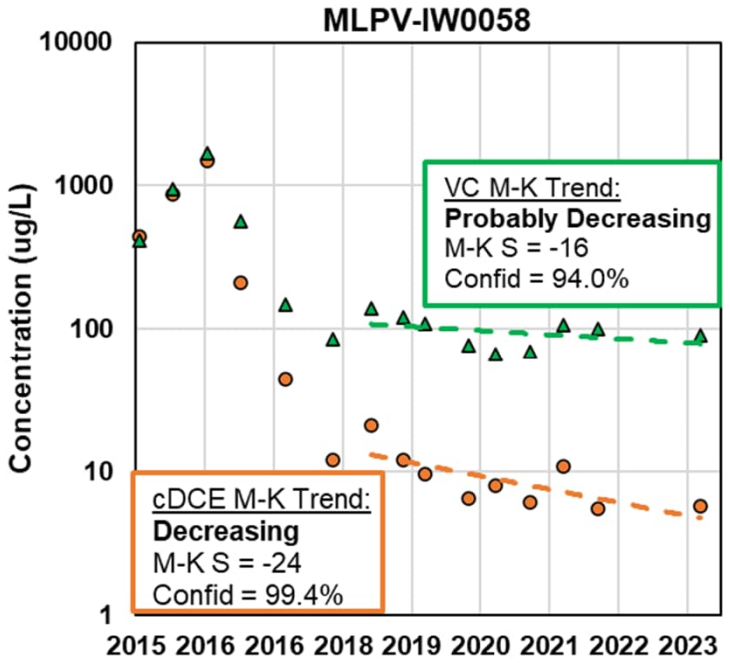
- IW0057, IW0058, IW0059, IW0062 located between former HS2 and immediately upgradient of biosparge barrier
- Concentration trends indicative of changes in mass discharge from former HS2 to biosparge barrier (40 to 45 ft bls at IW0057 and IW0062 and 45 to 50 ft bls at IW0058 and IW0059)

Plume Metrics (40 to 45 ft bls)

- Evaluated trends in plume area, dissolved mass, average concentration, and center of mass
- cDCE plume defined by GCTL (70 ug/L, no NADC exceedance)
- VC plume defined by NADC (100 ug/L)
- 5 snapshots of plumes available since April 2018

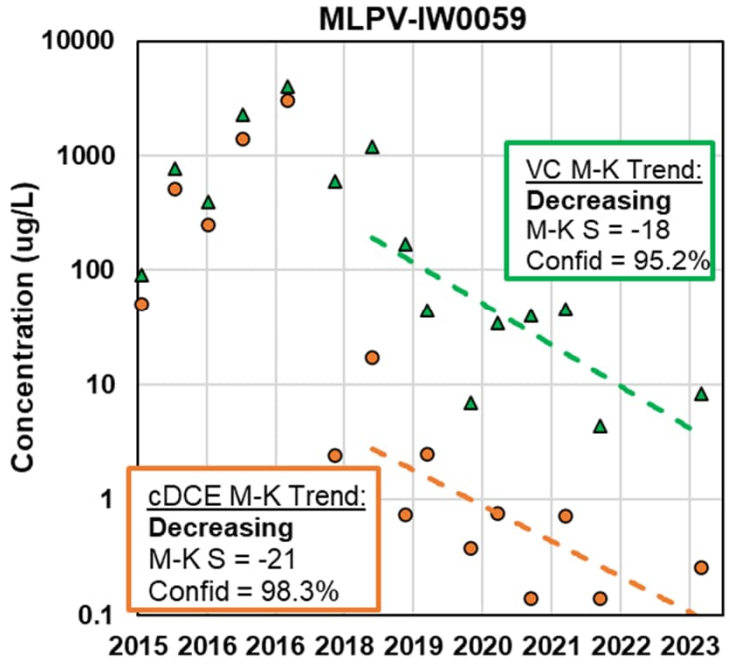
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



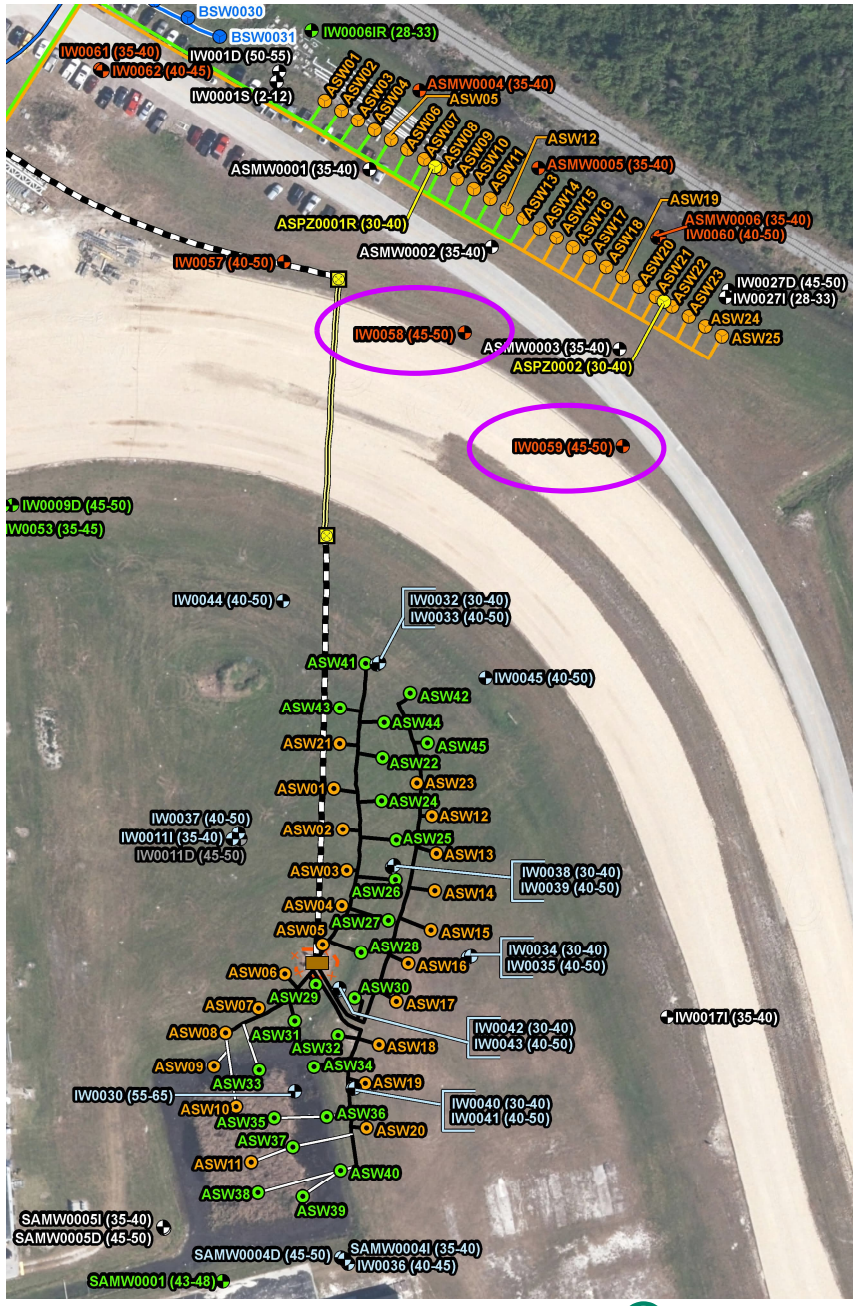
IW0058 (45-50)

- cDCE < GCTL
- VC < NADC and likely decreasing
- Indicates decreasing mass flux and discharge from former HS2 near plume center



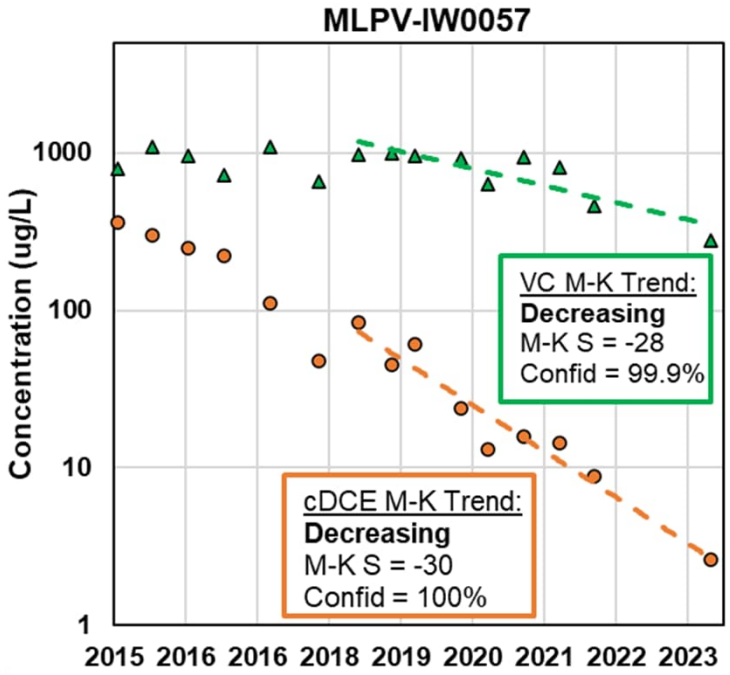
IW0059 (45-50)

- cDCE < GCTL
- VC < NADC and decreasing
- Indicates decreasing and minimal mass flux and discharge from former HS2 near plume eastern boundary



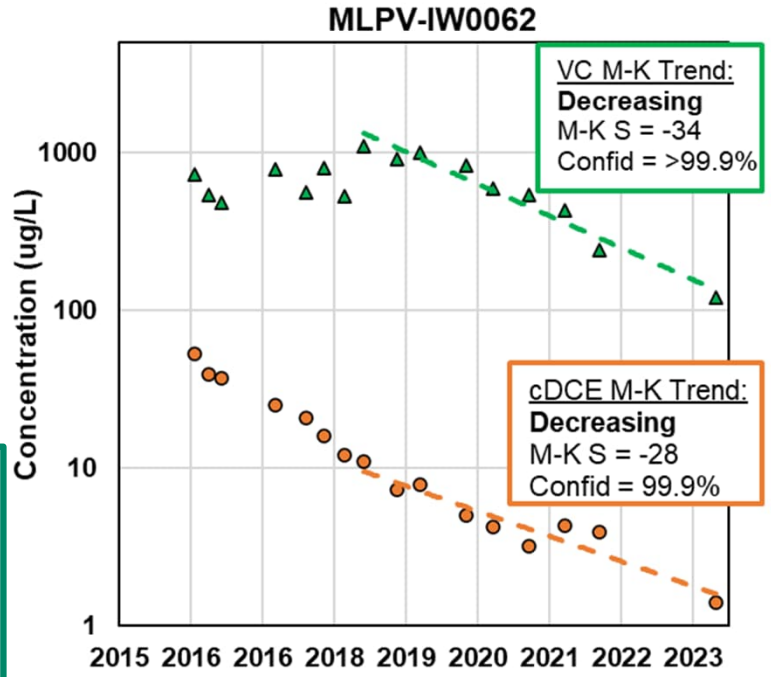
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



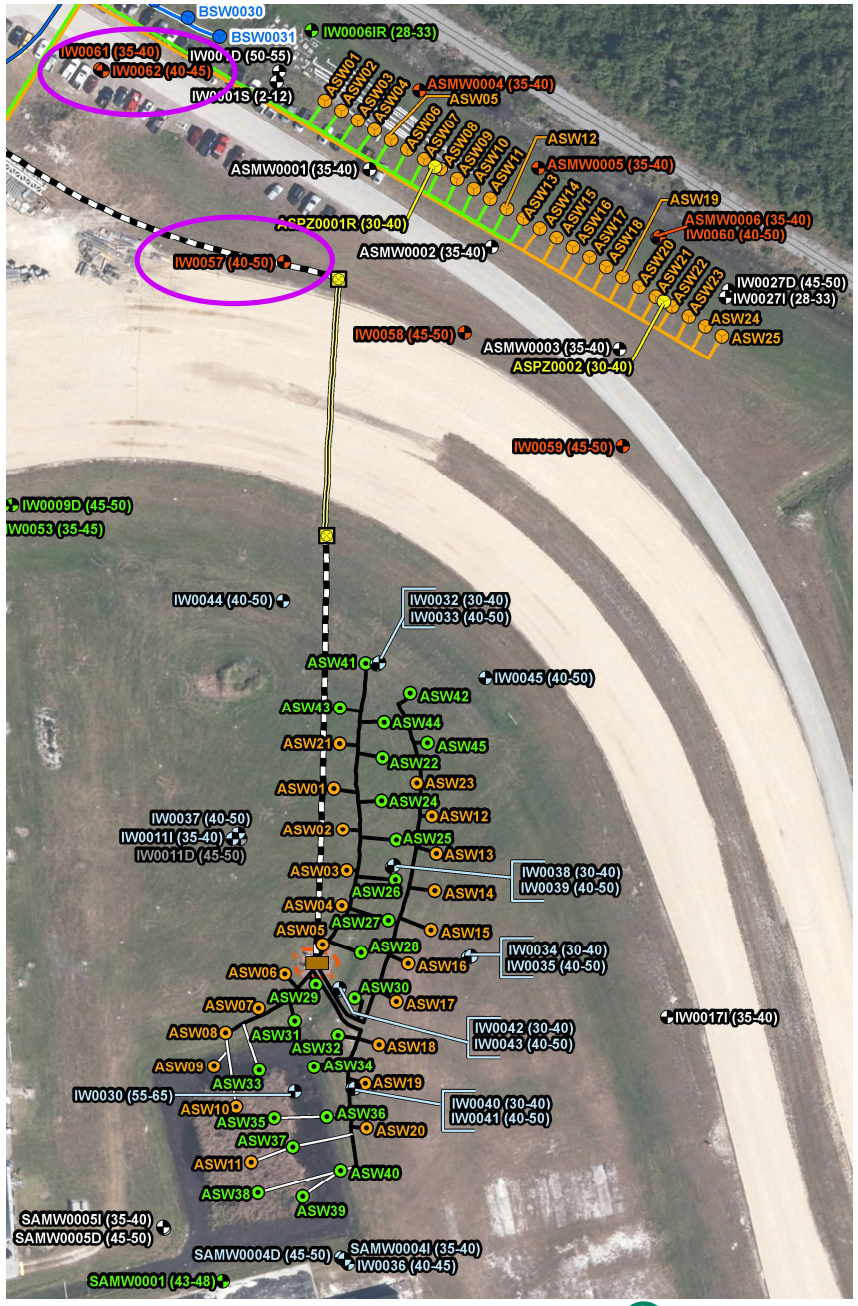
IW0057(40-50) & IW0062(40-45)

- cDCE is ND in 2023
- VC > NADC at IW0057
- VC > NADC at IW0062



Trend Analysis Summary

- Decreasing concentration trends for cDCE and VC indicates mass discharge to biosparge barrier is decreasing
- Greatest mass flux likely near center of biosparge barrier (IW0057 and IW0058)

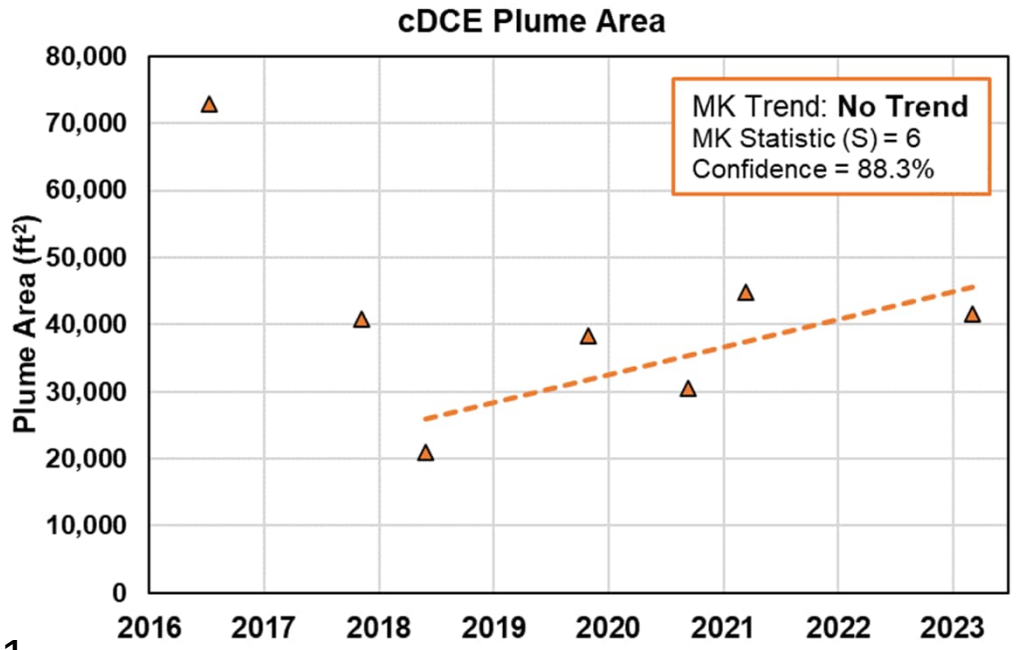


Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

cDCE Trend Analysis Summary (40 to 45 ft bls)

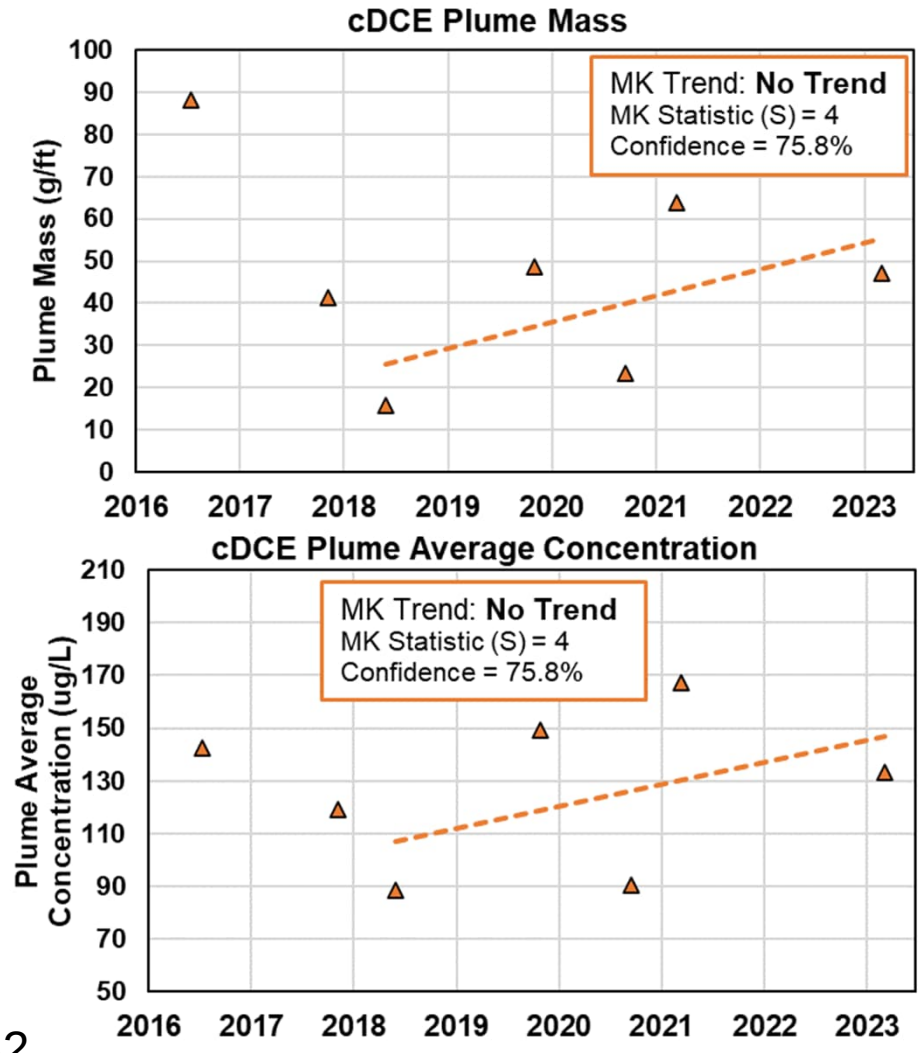
- cDCE < NADC in former HS2 area
- No statistically significant trends in plume area, mass, and average concentration since April 2018
- No significant movement in plume center of mass





Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



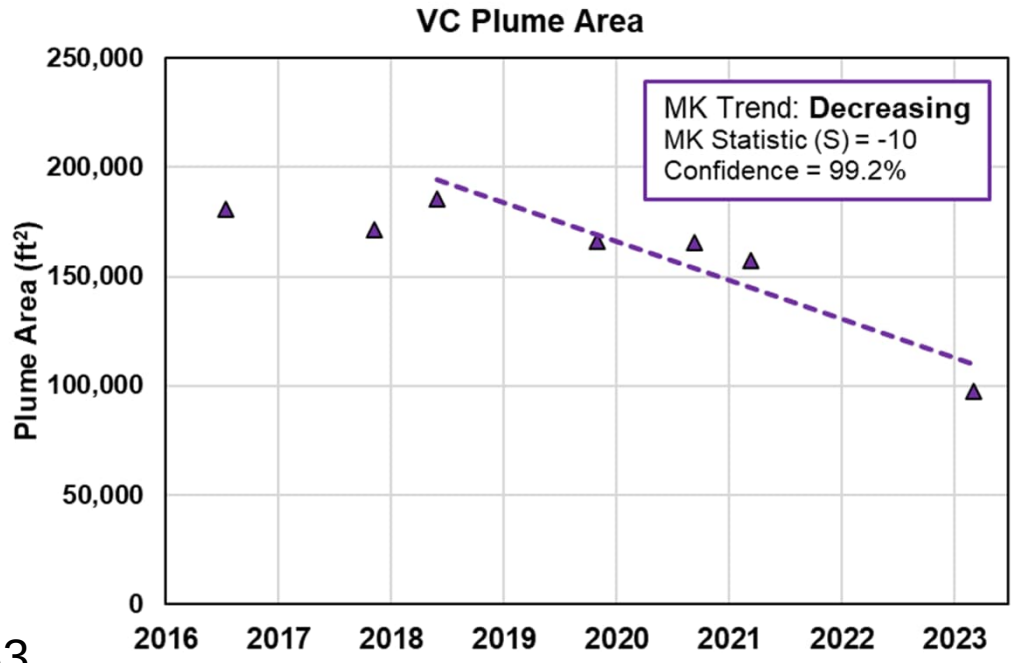


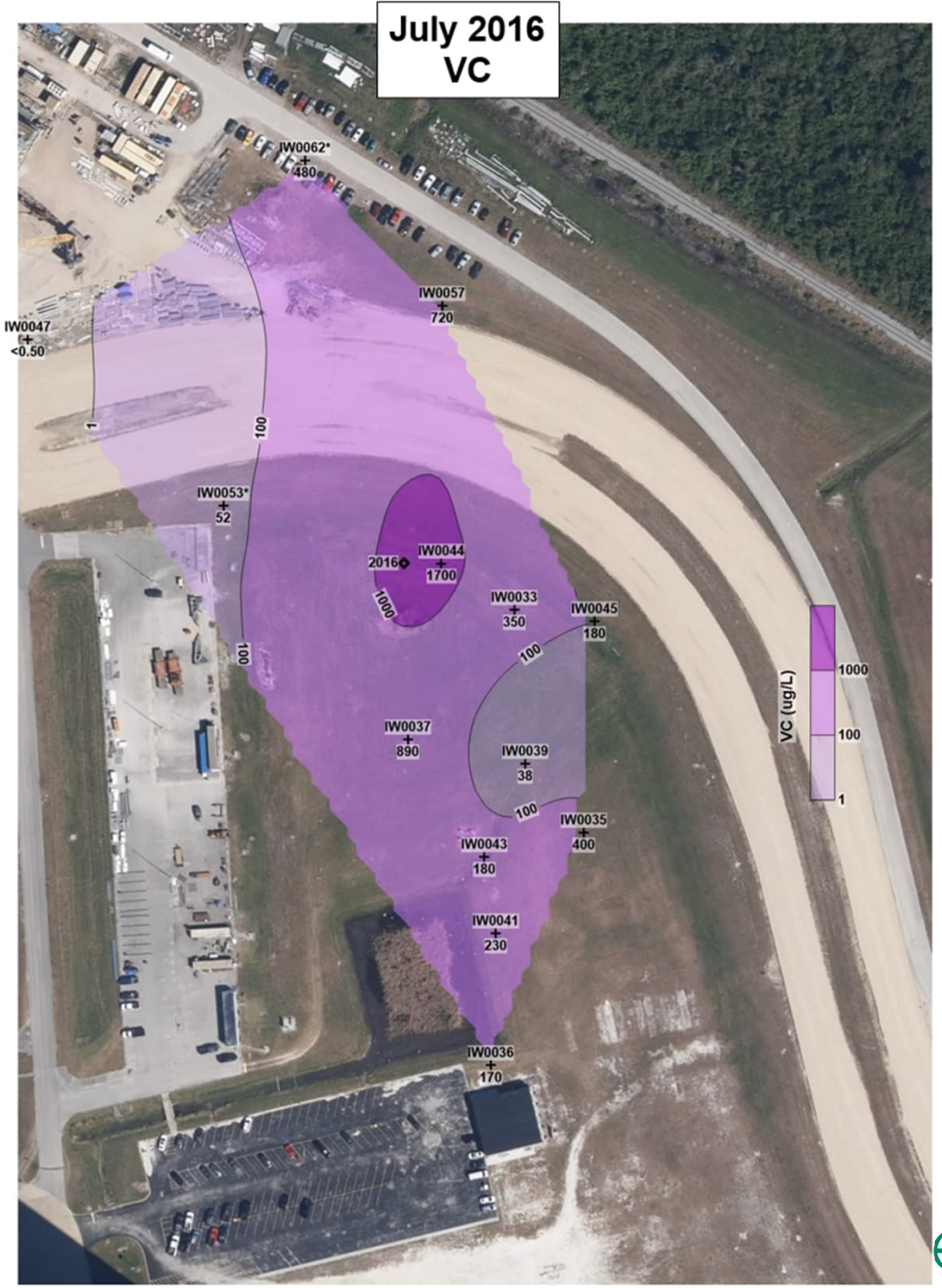
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

VC Trend Analysis Summary (40 to 45 ft bls)

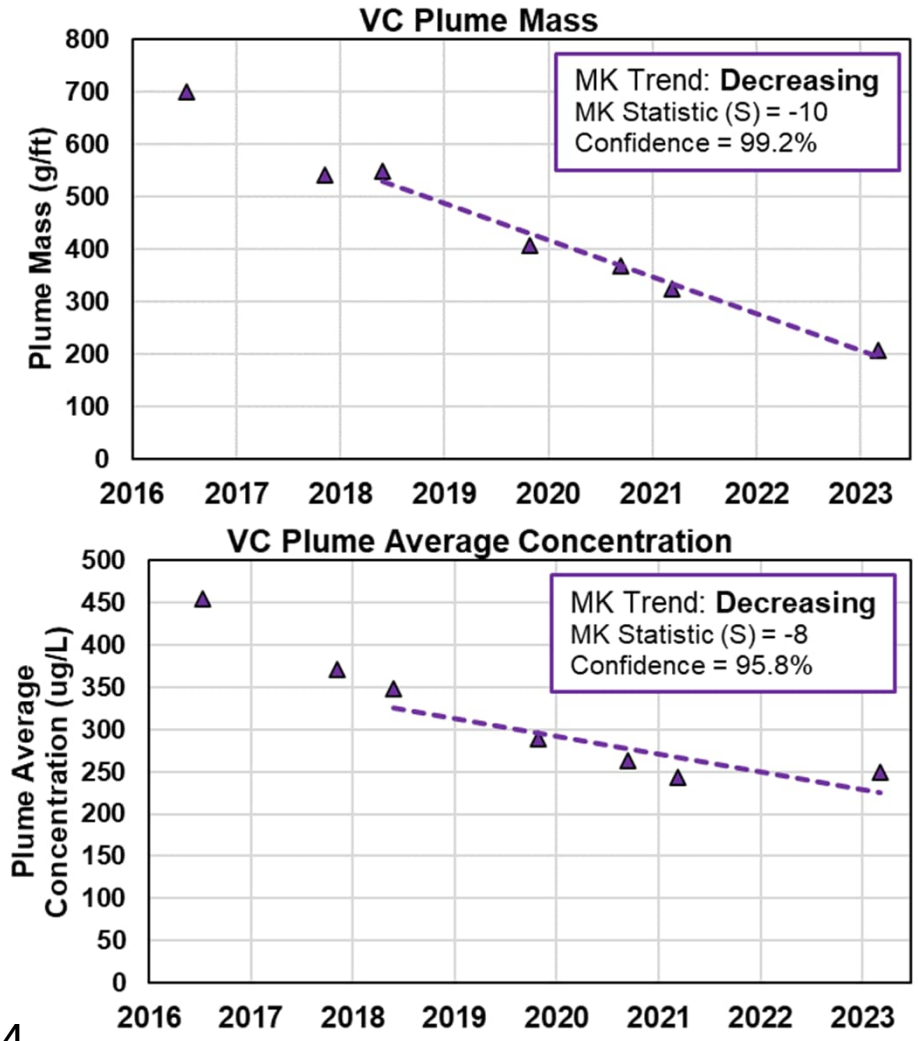
- VC > NADC in former HS2 area
- Decreasing trends in plume area, mass, and average concentration
- Plume center of mass moving opposite direction of groundwater flow (receding)

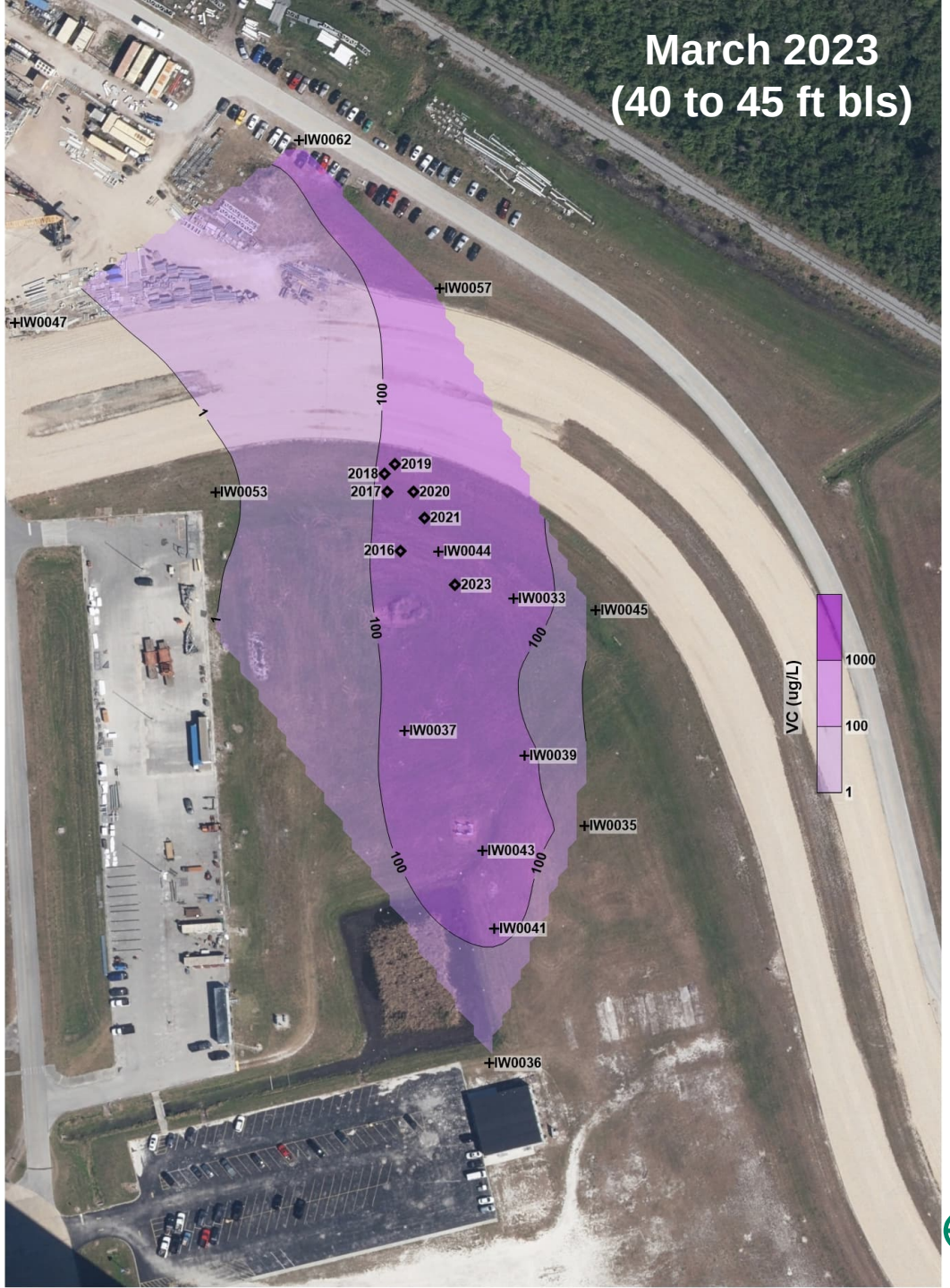




Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)





Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes (DPT versus IWs)

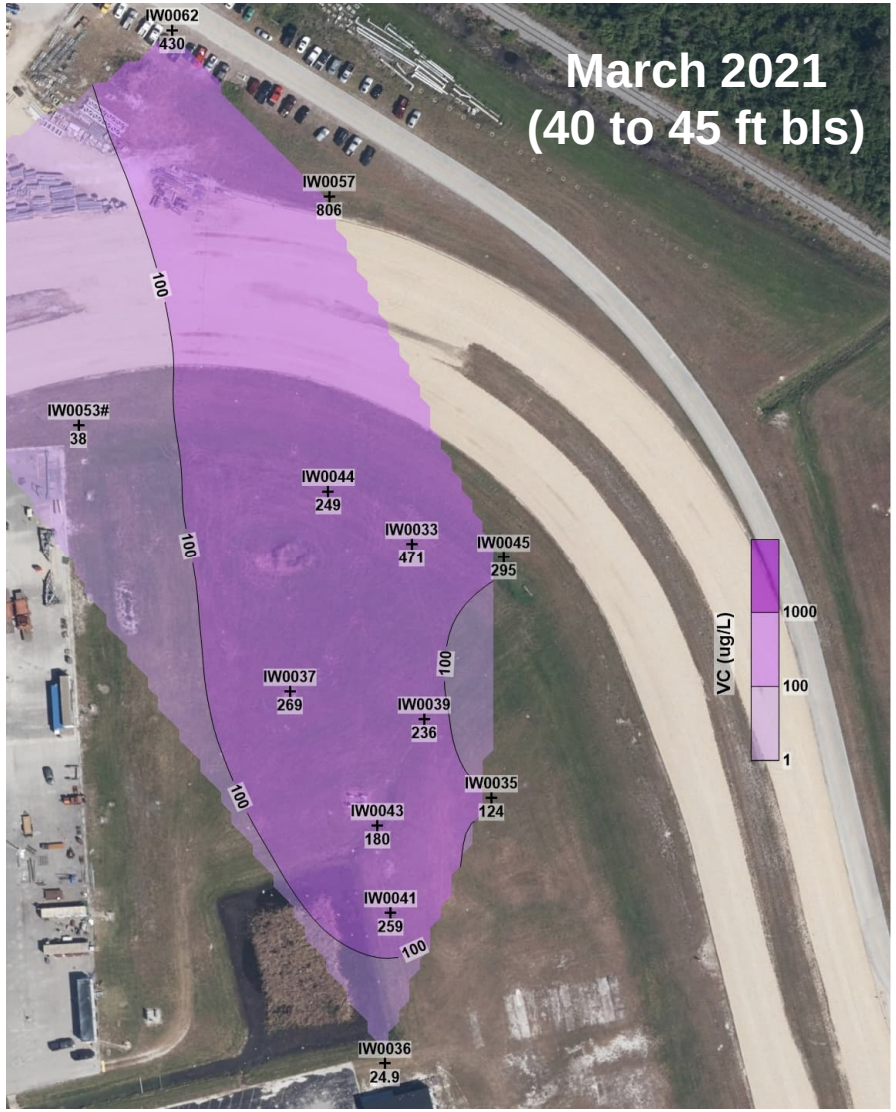


- cDCE concentrations at 2021 DPT and monitoring wells (IWs) generally agree from 40 to 45 ft bls
- 2021 DPT data indicates cDCE GCTL plume is not well defined to southwest by IW monitoring network

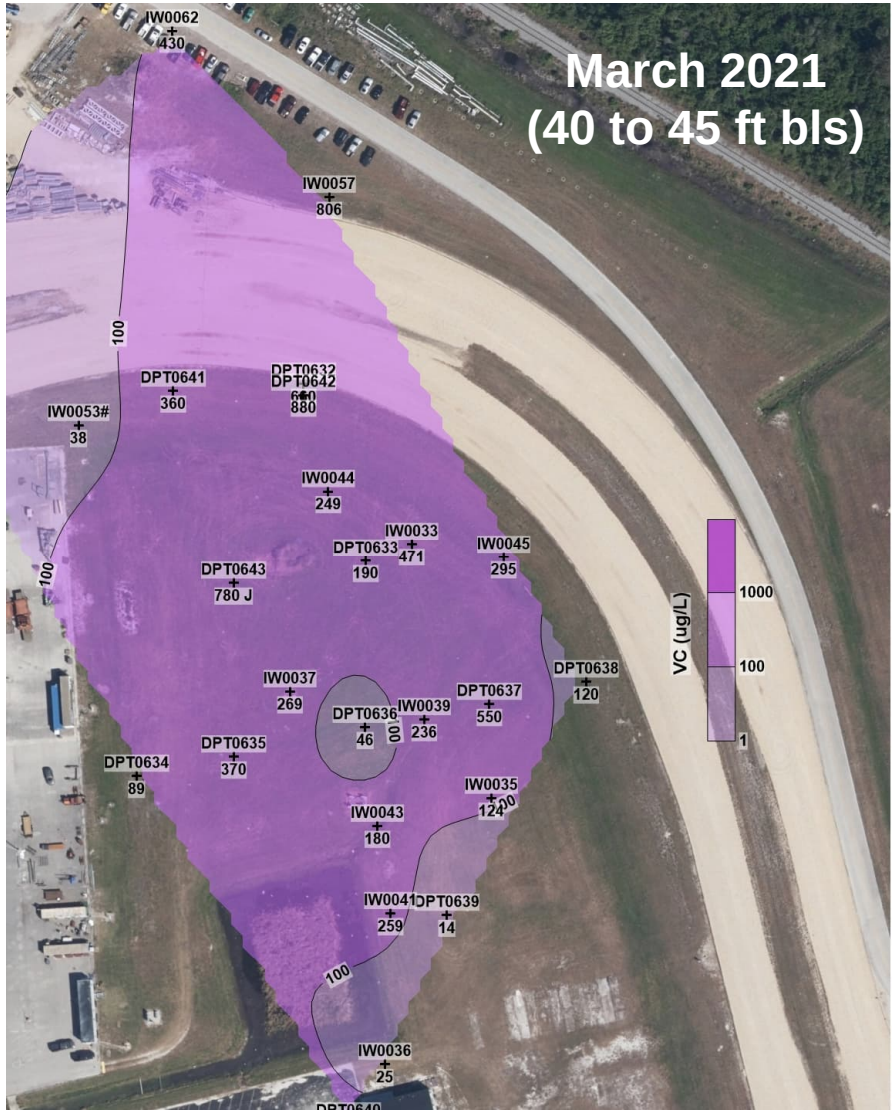


Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes (DPT versus IWs)

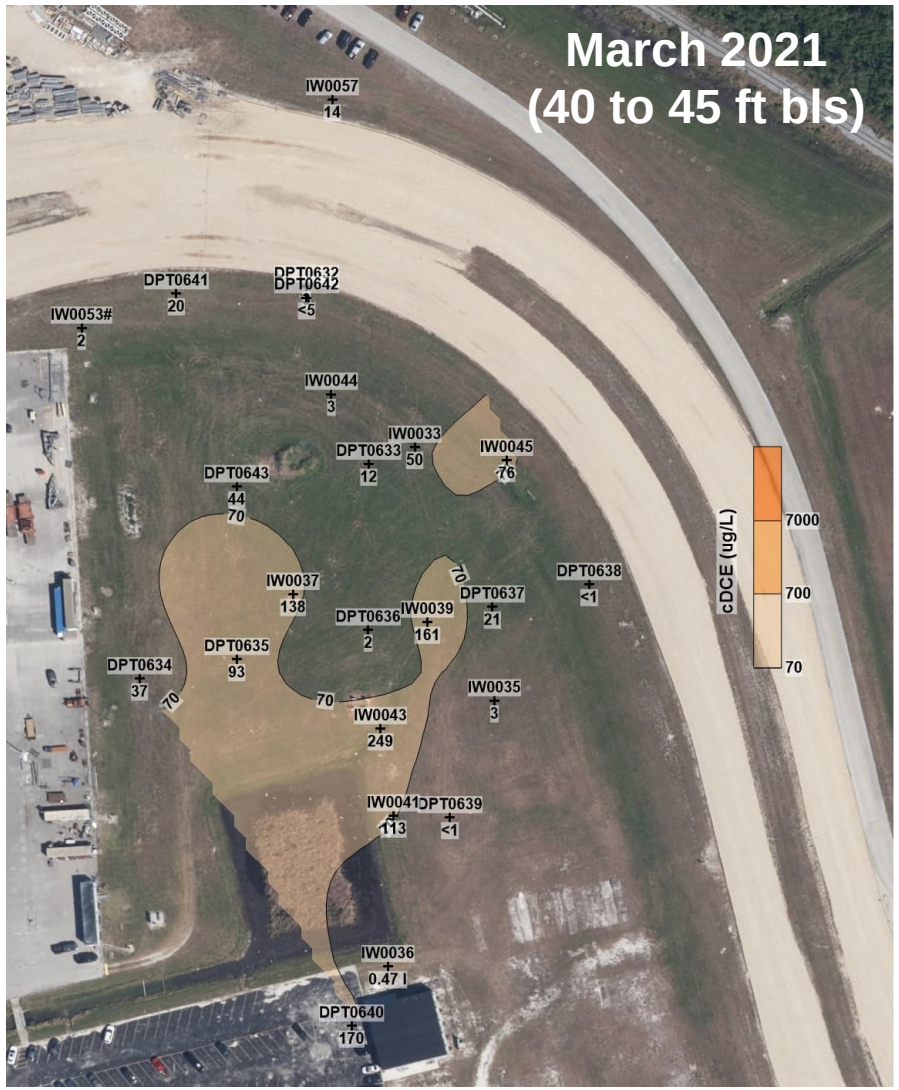


- VC concentrations at 2021 DPT and monitoring wells (IWs) generally agree from 40 to 45 ft bls
- 2021 DPT data indicates VC NADC plume may extend further west than estimated from monitoring network



Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes

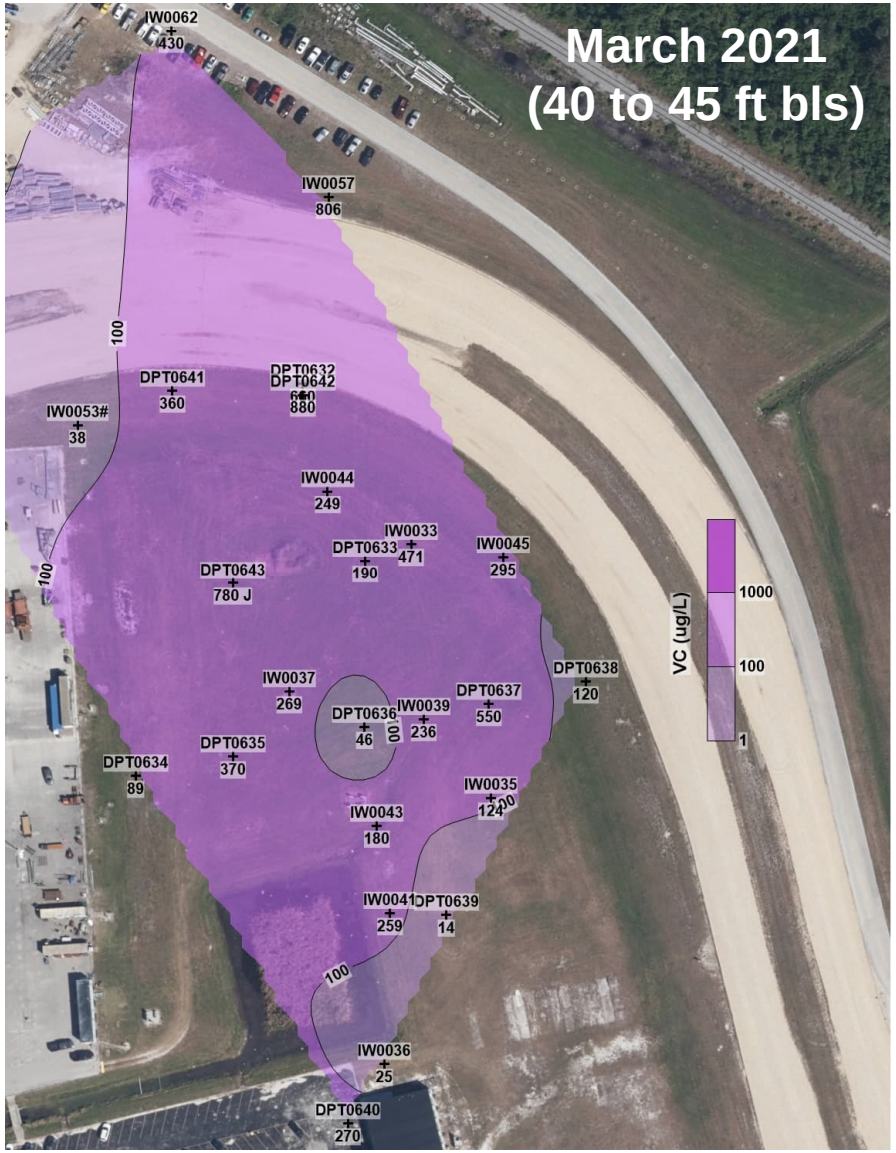


- Extents of cDCE GCTL plumes are similar in sand (40 to 45 ft bls) and clayey sand (45 to 50 ft bls)
- cDCE concentrations in GCTL plume are greater in the clayey sand (45 to 50 ft bls) and is likely current source of cDCE in sand (40 to 45 ft bls) via matrix diffusion

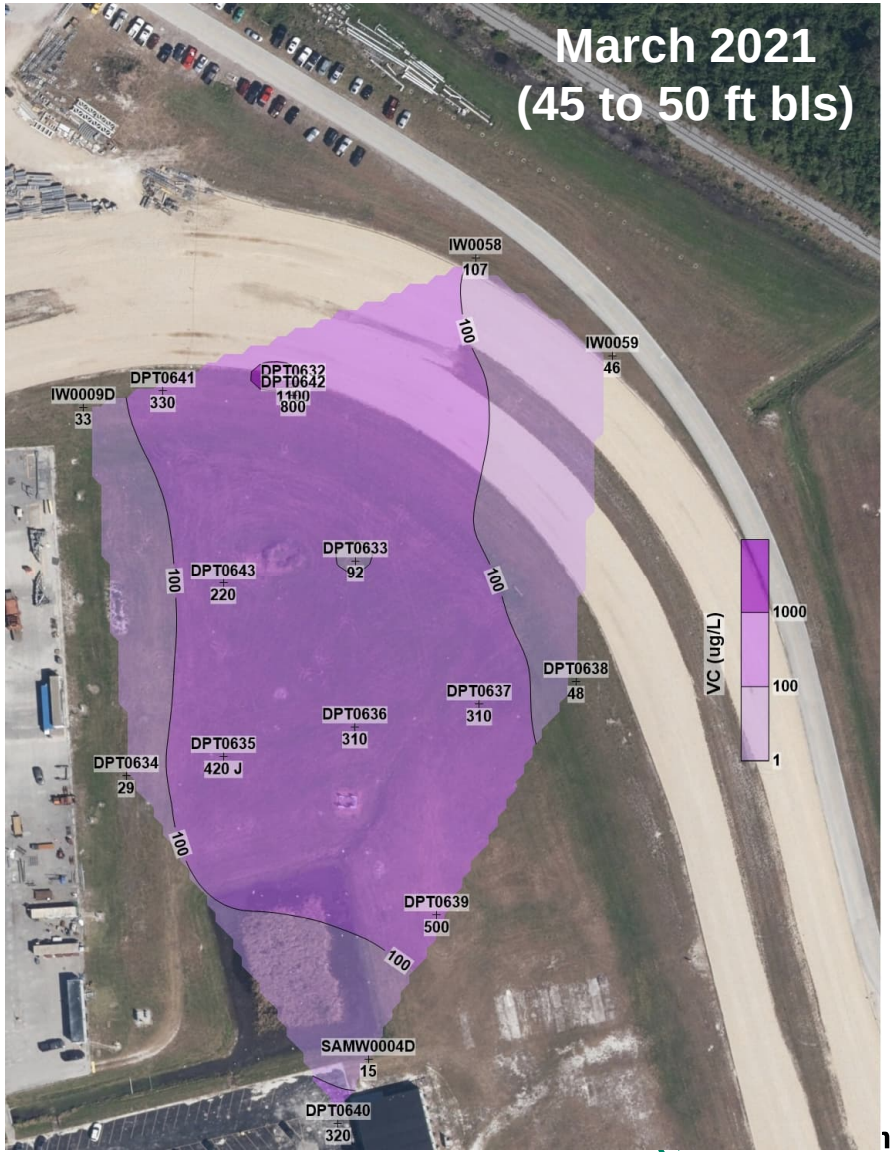


Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes



- Extents of VC NADC plumes are similar in sand (40 to 45 ft bls) and clayey sand (45 to 50 ft bls)
- VC concentrations in NADC plumes in the clayey sand (45 to 50 ft bls) and sand (40 to 45 ft bls) are similar
- VC in clayey sand is a likely current source of VC in sand



Site Characterization Summary

Conceptual Site Model Summary

- Prior to implementation of Air Sparging in former HS2 area, CVOCs diffused into clayey sand (below 45 ft bls) from primary migration pathway in sands (above 45 ft bls) towards the current biosparge barrier location
- Air Sparging (2012 to 2018)
  - Targeted removal of CVOCs in sand (above 45 ft bls)
  - Enhanced diffusion and removal of CVOCs from clayey sand (below 45 ft bls)
  - Decreased CVOCs mass flux to biosparge barrier
- Following Air Sparging (post 2018)
  - Mass of CVOCs, primarily VC, in sand is attenuating
  - VC mass flux to biosparge barrier is decreasing
  - 2021 DPT investigation showed cDCE and VC mass remains in clayey sand and is the source of VC in the sand via matrix diffusion
  - Although natural attenuation of VC in the sand appears to be greater than the rate of matrix diffusion to the sand from the clayey sand, concentration trends indicate that VC concentrations are expected to remain greater than its NADC and GCTL and require operation of the biosparge barrier for many years

Remedial Alternatives Evaluation

Corrective Action Objective (CAO)

- Reduce VC mass flux from former Hot Spot 2 area and achieve GCTLs upgradient of the biosparge barrier to eliminate need for continued operation of the system, which serves to prevent downgradient migration of concentrations greater than GCTLs.

Technology Screening

- Considerations:
  - Technologies to treat NADC plumes within a lower permeability interval

No Action	No Action	No Activity	Eliminate	Not protective of human health and environment and does not provide for monitoring of effectiveness.
Limited Action	Institutional Controls	Groundwater Use Restrictions	Retain	Land Use Control Implementation Plan (LUCIP) prohibiting groundwater use is already in place. LUCIP is required until cleanup and closure.
	Natural Attenuation	Long-term Groundwater Monitoring	Retain	Statistical analyses indicate plume has been actively attenuating. Natural attenuation can be combined with other technologies to achieve GCTLs.
Containment	Hydraulic Containment	Groundwater Extraction and Treatment	Eliminate	Biosparge barrier is currently containing plume with less capital and long-term costs.
	Physical	Impermeable Barrier	Eliminate	Biosparge barrier is currently containing plume with less capital and long-term costs.
		Air Sparging Barrier	Eliminate	Biosparge barrier is currently containing plume using similar technology.
Removal	Physical Removal	Groundwater Extraction and Treatment	Eliminate	High costs and uncertainty with implementability.
		Soil Vapor Extraction	Eliminate	Not expected to be needed in combination with air sparging.
		Traditional Excavation	Eliminate	Not feasible for dissolved plumes and costs are high.
		Lage Diameter Auger	Eliminate	Not feasible for dissolved plumes and costs are high.
Ex-Situ Treatment	Physical Treatment	Air Stripping	Eliminate	Not needed since groundwater extraction was not retained.
		Adsorption	Eliminate	Not needed since groundwater extraction was not retained.

Technology Screening

- Retained Technologies:
  - Monitored Natural Attenuation
  - In Situ Chemical Reduction (ISCR) with Bioaugmentation
    - Grid
    - Permeable Reactive Barrier(s) (PRB)

In-Situ Treatment	Biological	Anaerobic Enhanced Bioremediation	Eliminate	Enhanced reductive dechlorination (ERD) only will not be retained because of electron donor longevity but will be part of an ISCR alternative.
		Aerobic Enhanced Bioremediation	Eliminate	Air sparging for mass removal is expected to be more effective for similar cost
		Bioaugmentation	Retain	ERD only is not retained, but bioaugmentation will be evaluated with in-situ chemical reduction (ISCR).
	Chemical/Physical	Air Sparging	Eliminate	Previous use at the site was effective. NADC plumes are in lithology with hydraulic conductivity too low for air sparging.
		Large Diameter Augur Mixing	Eliminate	High-cost technology typically implemented in CVOC source areas, not plumes.
		In-Situ Chemical Oxidation (ISCO)	Eliminate	Although CVOC mass would be destroyed, effectiveness may be limited by background oxidant demand and need for multiple injections.
		ISCR	Retain	ISCR along with natural attenuation can be readily implemented to achieve GCTLs. Typically combined with anaerobic enhanced bioremediation.
		Powdered Activated Carbon	Eliminate	Although mass is removed, long-term destruction is uncertain.
		Permeable Reactive Barrier (PRB)	Retain	ISCR PRBs will be evaluated/compared to an ISCR grid approach to achieve GCTLs. A single PRB to mitigate the need of the biosparge barrier will be evaluated.
	Thermal	Electrical Resistance Heating	Eliminate	Technology is better for CVOC source area and high concentrations, not NADC plumes.
Disposal	On-Site	Re-injection Wells	Eliminate	Not retained when groundwater extraction is not retained.

Remedial Alternatives Evaluation

Option	Description	Type
1	**Monitored Natural Attenuation by Long-Term Monitoring (LTM)** • Current remedy for cDCE and VC plumes • Operate biosparge barrier until CAO met	**Least Aggressive**
2	**In Situ Chemical Reduction (ISCR) – Permeable Reactive Barrier (PRB)** • Multiple ISCR PRBs that span NADC plumes (~35 to 47 ft bls) • Natural attenuation between PRBs to achieve GCTLs • Operate biosparge barrier until CAO met	**Aggressive**
3	**ISCR – Grid** • Grid approach in NADC plumes (~40 to 45 ft bls) • Operate biosparge barrier until CAO met	**Most Aggressive**

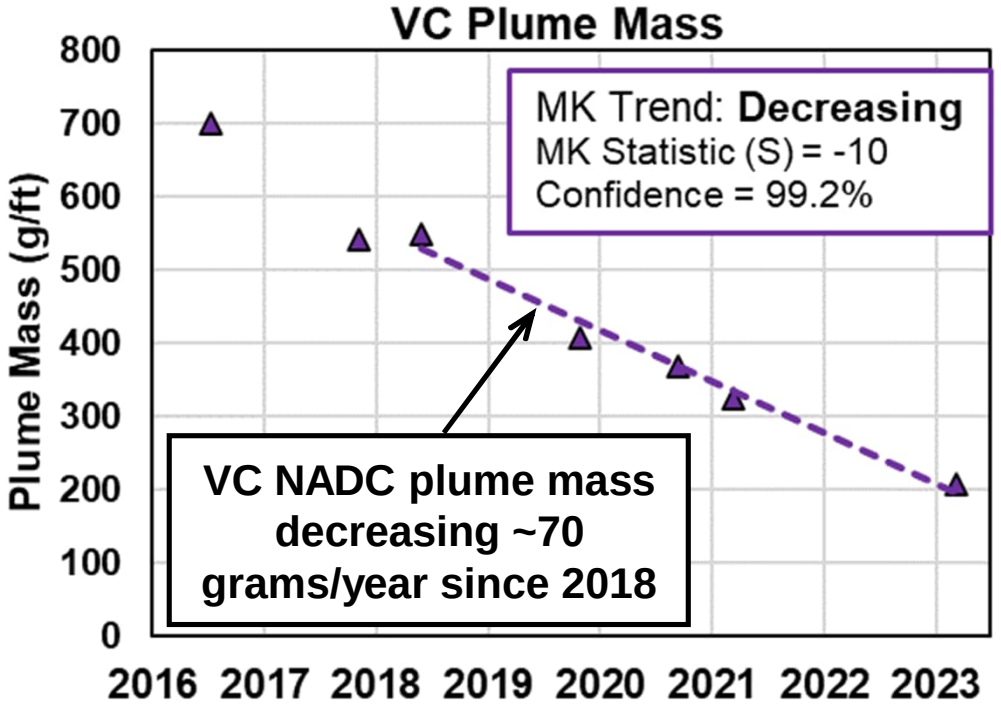
Option 1 – Monitored Natural Attenuation

Natural Attenuation Strategy

- Current site strategy since air sparging stopped in April 2018
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

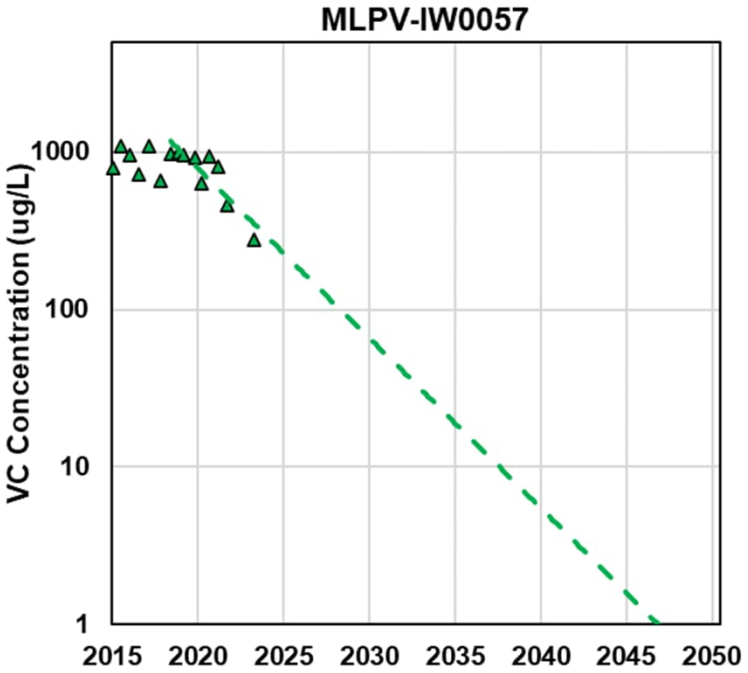
- Review and optimize current monitoring program to support evaluation of LTM
- Review plume metrics and behavior every 1 to 2 years to confirm reduction in dissolved VC plume mass and extent
- Time to achieve CAOs is uncertain

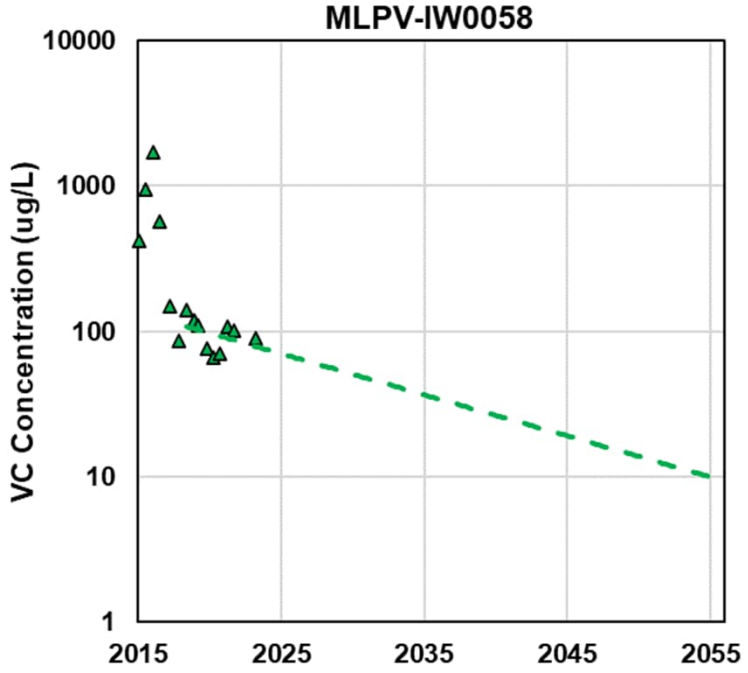


Option 1 – Monitored Natural Attenuation

Implementation

- Time to achieve CAOs at boundary with biosparge barrier is greatest near centerline of VC plume (IW0057 and IW0058)
  - IW0057: VC > NADC, ~20 years to GCTL at current exponential decay trend
  - IW0058: VC < NADC, >30 years to GCTL at current exponential decay trend





Option 2 – ISCR PRBs

ISCR PRB Strategy

- Treat cDCE and VC mass flux in primary migration pathway from 40 to 45 ft bls to decrease mass flux to biosparge barrier
- Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC
- Install PRB in VC NADC plume to decrease mass flux of VC upgradient of biosparge barrier
- Install PRBs in more permeable sand and key into clayey sand (~35 to 47 ft bls)
- cDCE and VC mass to naturally attenuate upgradient of PRBs
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

- Conceptual design for ISCR product, injection spacing, and costs are from recent design of the ISCR remedy in the IMWP for Hot Spot 3
  - ISCR product: Provect-IR (zero-valent-iron, time-released organic carbon, O_2 scavenger, and other)
  - Dosing rate is 0.6% of soil mass (injection rate of 424 pounds per foot of injection interval)
  - Estimated radius of distribution is 15 feet (injection point spacing is 20 feet)
  - No bioaugmentation

Response to Comments

- HGL Comment #4: Slide #45 (new slide #47) – The second bullet refers to cDCE NADC plume. However, the 2021 data described on prior slides did not show cDCE concentrations greater than NADC.
- Tetra Tech Comment #2: Slide #45 (new slide #47) – Second bullet under ISCR PRB Strategy does not agree with site characterization slides (no cDCE NADC plume shown on site characterization slides).
- *Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."*

- Tetra Tech Comment #1: Slides #45 and #47 (new slides #47 and #51) – Bioaugmentation was retained as a technology on Slide 41 (new slide #43). However, there is no mention of this technology being combined with ISCR in Options 2 and 3 or costs associated with it in the attachments. Was bioaugmentation eliminated after further evaluation?
- *Response: Bioaugmentation with a microbial consortia including Dhc was not eliminated but is not included in the conceptual designs for Options 2 and 3. Similar to the ISCR design at Hot Spot 3, bioaugmentation is not included because Dhc is likely present and the primary degradation pathway is expected to be abiotic. However, bioaugmentation can be added, if needed, during the remedial design phase with limited effect on remedy costs. A note was added to the slides to indicate that bioaugmentation is not included.*

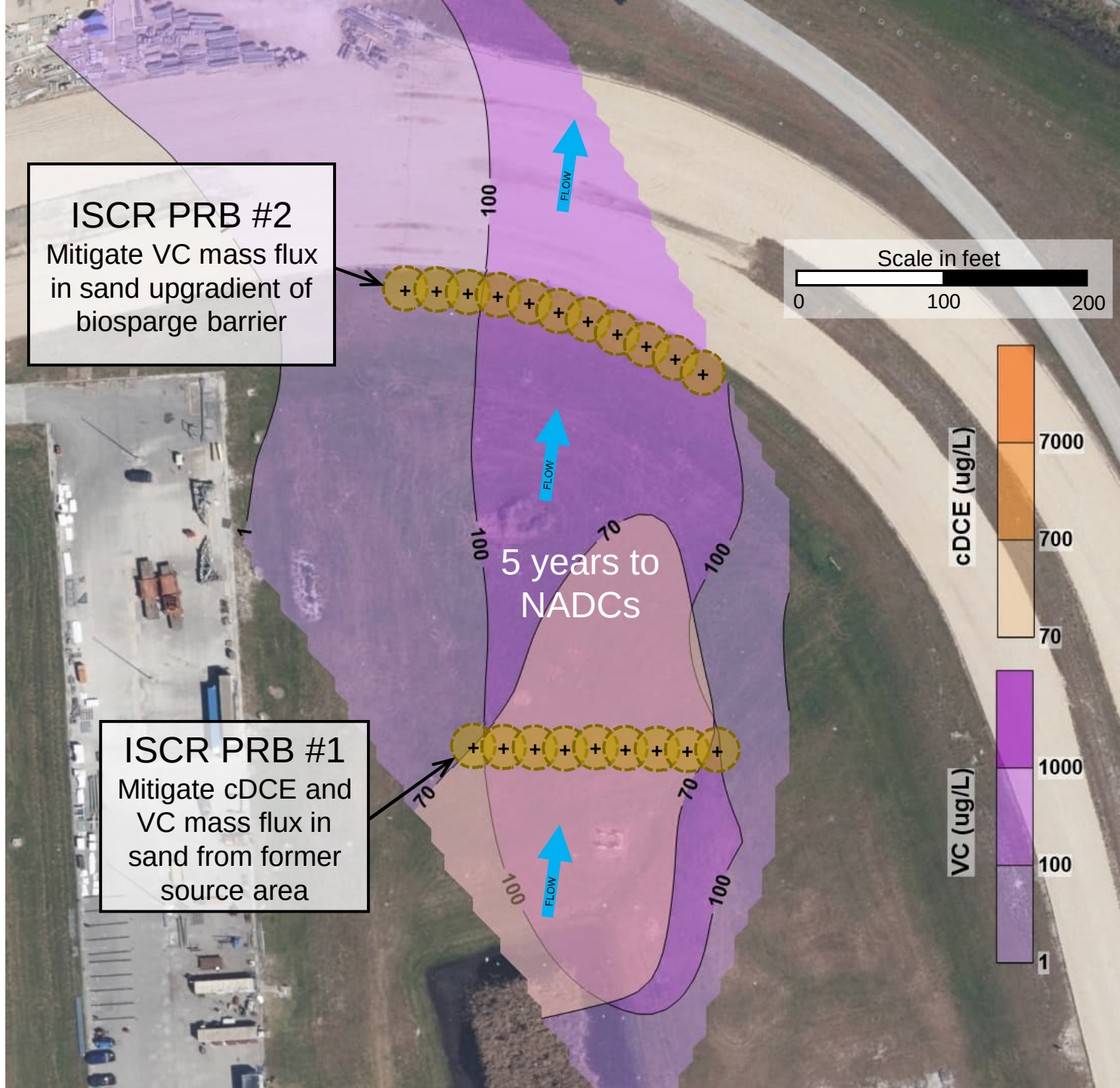
Option 2 – ISCR PRBs

Conceptual Design

- 20 injection points
- 12-foot injection interval (35 to 47 ft bls)
- ~102,000 lbs of Provect-IR
- Direct-push injection in 4-foot intervals
- Treatment lifespan is 5 to 10 years

Time to Achieve CAOs

- 5 years to reach GCTLs at biosparge barrier (~250 feet downgradient of PRB)
  - Depends on travel time between PRB #2 and biosparge barrier (data need),
  - Attenuation rate of CVOCs, and
  - Rate of matrix back-diffusion from clayey sand to sand
- 5 years to reach NADCs in former HS2 area plus 10 years of LTM to achieve GCTLs



Response to Comments

- HGL Comment #5: Slide #46 (new slide #49) – this option assumes 15 years of active treatment by the PRBs. Will the PRBs need to be replenished with amendment during that timeframe?
- Tetra Tech Comment #4: Slide #46 (new slide #49) – Please specify the expected lifespan of the PRBs on this slide. Costing for Option 2 appears to be one injection event to install PRBs. Are the PRBs expected to last through the estimated treatment timeframe (~15 years)?
- *Response: The expected treatment lifespan of the ISCR PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on the slide, the time to achieve the CAO of GCTLs upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.*
- HGL Comment #6: Options 1 and 3: What is the estimated distance between PRB#2 or the downgradient edge of the treatment grid and the current bio barrier?
- *Response: The biosparge barrier injection wells are approximately 250 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3. This distance was added to new slides #49 and #52. Note that the monitoring well network upgradient of the biosparge barrier is approximately 150 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3.*

Option 3 – ISCR Grid

ISCR Grid Strategy

- Treat cDCE and VC mass in primary migration pathway from 40 to 45 ft bls to decrease mass flux to biosparge barrier
- Treats matrix diffusion of cDCE and VC from clayey sand to sand while mass in clayey sand naturally attenuates
- Treatment area is extents of VC NADC plume
- Target treatment interval is permeable sands (~40 to 45 ft bls)
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

- Conceptual design for ISCR product, injection spacing, and costs are from recent design of the ISCR remedy in the IMWP for Host Spot 3
  - ISCR product: Provect-IR (zero-valent-iron, time-released organic carbon, O_2 scavenger, and other)
  - Dosing rate is 0.6% of soil mass (injection rate of 424 pounds per foot of injection interval)
  - Estimated radius of distribution is 15 feet (injection point spacing is 25 feet for grid)
  - No bioaugmentation

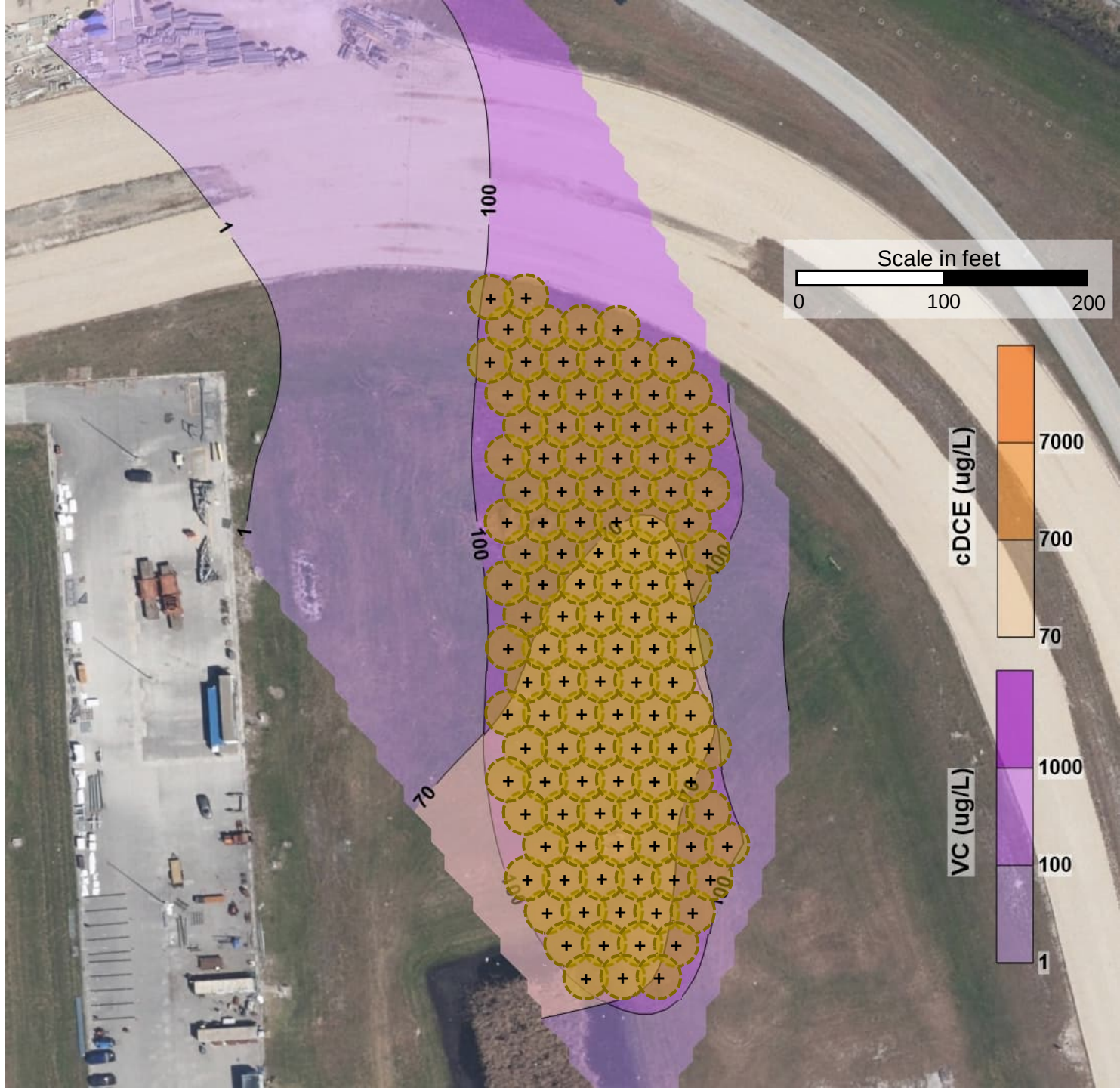
Option 3 – ISCR Grid

Conceptual Design

- 118 injection points
- 5-foot injection interval (40 to 45 ft bls)
- ~250,000 lbs of Provect-IR
- Direct-push injection in 5-foot interval
- Treatment lifespan is 5 to 10 years

Time to Achieve CAOs

- 5 years at biosparge barrier (~250 feet downgradient of grid)
  - Depends on travel time between ISCR grid and biosparge barrier (data need),
  - Attenuation rate of CVOCs, and
  - Rate of matrix back-diffusion from clayey sand to sand
- 2 years to reach NADCs in former HS2 area plus 5 years of LTM to achieve GCTLs



Response to Comments

- Tetra Tech Comment #5: Slides #47 and #48 (new slides #51 and #52) – Third bullet under ISCR Grid Strategy is misleading (“NADC plumes”). Figure on slide 48 (slide 52) shows treatment area extent is the VC NADC plume with overlap of the cDCE GCTL plume.
- *Response: The third bullet was revised on slide #51 to read “VC NADC plume.” The text in the 1st sub-bullet on slide #52 was revised from “PRB #2” to “ISCR grid.”*

Cost Evaluation

Option 1 – LTM

- 20 to 30 years to achieve CAOs (GW monitoring and biosparge system operation)
- Total Cost: **$7.5M to $13.4M** (AS well abandonment, long-term annual costs)

Option 2 – ISCR PRB

- Capital Cost: $535K (design and install PRBs)
- Total Recurring Cost: $2.3M (15 years of GW monitoring, 5 years of biosparge system operation)
- Total: **$2.8M**

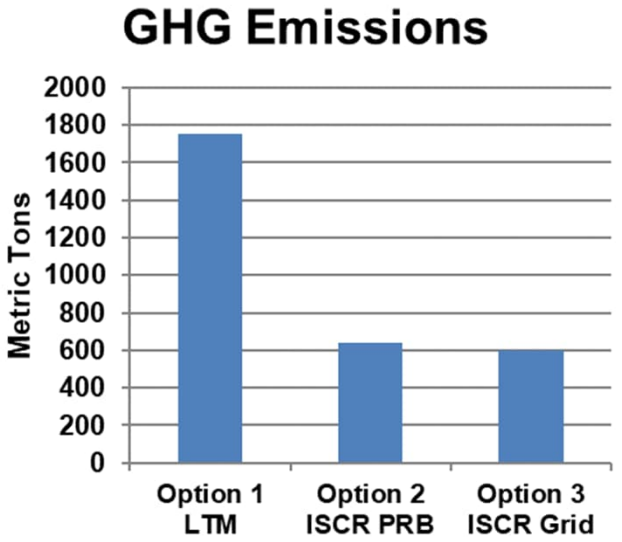
Option 3 – ISCR Grid

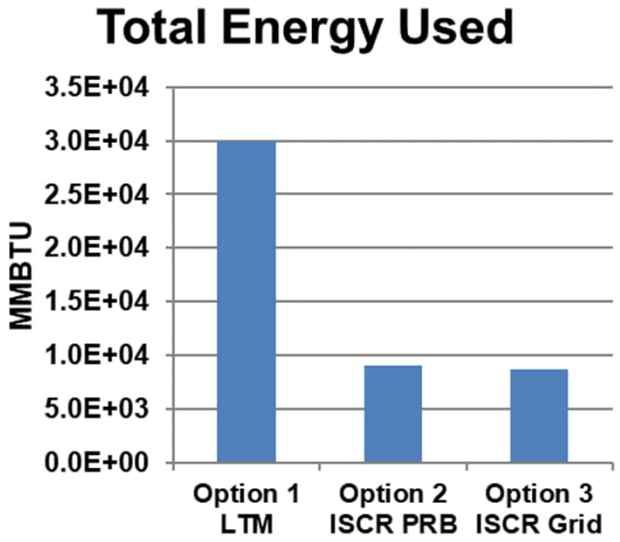
- Capital Cost: $1.1M (design and install grid)
- Total Recurring Cost: $1.6M (7 years of GW monitoring, 5 years of biosparge system operation)
- Total Cost: **$2.7M**

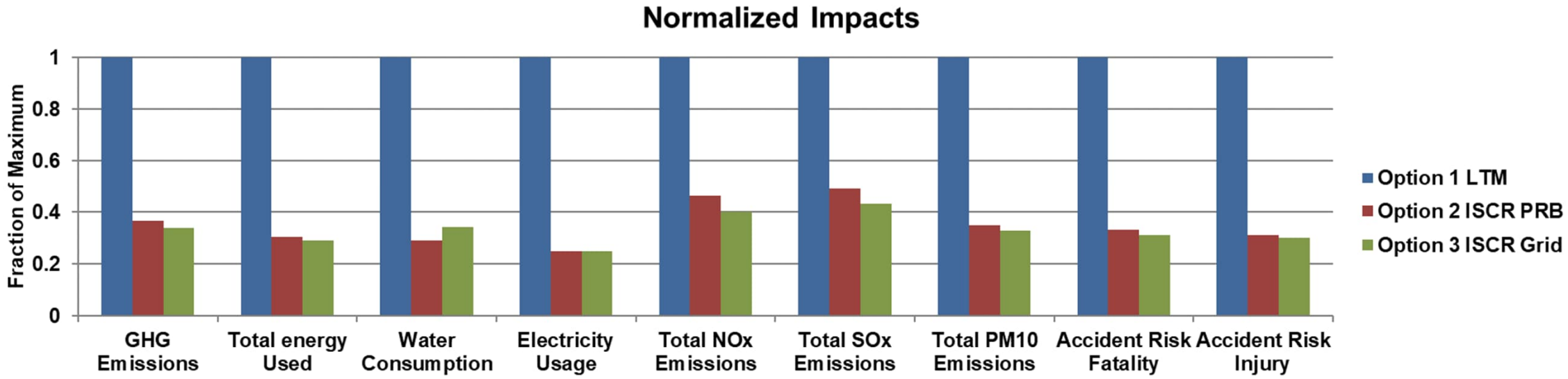
Costs are very sensitive to estimate of time to achieve CAOs.

Sustainability Evaluation

- Evaluation performed with SiteWise™ Version 3.2
- Primary driver in differences between LTM (Option 1) and ISCR (Options 2 & 3) is the difference in time of biosparge system operation (20 years for Option 1 and 5 years for Options 2 & 3)







GHG = greenhouse gas, **MMBTU** = one million British thermal units, **NOx** = Nitrous Oxides, **SOx** = Sulfur Oxides, **PM10** = Particulate matter smaller than 10 micrometers

Comparison of Alternatives

Option	Advantages	Disadvantages	Limitations	Expectations	Cost	Sustainability
1 – LTM	• Current strategy • No capital cost • Plumes are attenuating	• Time to achieve CAOs is uncertain and primarily driven by matrix diffusion, which is difficult to model • Does not actively reduce mass flux to shorten time to achieve CAOs	• Annual costs are high and the time to achieve CAOs is likely long (20 to 30 years)	• 20 to 30 years to achieve CAOs • Time to achieve CAOs could be shorter or longer	$7.5 to $13.4M	• Greatest GHG emissions, total energy use, water impacts, and electricity use
2 – ISCR PRB	• Actively treats and reduces lateral mass flux towards biosparge barrier • PRB design/location can be optimized to shorten time to operate biosparge barrier • Achieves CAOs faster than LTM only	• Does not actively mitigate vertical mass flux from clayey sand; thus, time to achieve CAOs in former HS2 area is uncertain • Time to achieve GCTLs at biosparge barrier uncertain	• May cause changes in groundwater flow • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Strategically located PRB can achieve GCTLs at biosparge barrier in <5 years • Time to achieve CAOs in former HS2 area is likely less than LTM	$2.8M	• Lower GHG emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar
3 – ISCR Grid	• Actively treats and reduces lateral mass flux towards biosparge barrier • Actively treats and reduces vertical mass flux from clayey sand • Achieves CAOs faster than other options	• Highest capital cost • Temporary disruption to property use	• Subsurface utilities may limit treatment area • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Time to achieve GCTLs at biosparge barrier <5 years (like PRB) • Rapid treatment and CAOs in former HS2 area (2 years) • LTM outside current NADC plume (~5 years)	$2.7M	• Lower GHG emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar

Data Needs

Primary evaluation factors that determined advantages of options

- Timeframe of annual recurring costs for groundwater monitoring and operation of the biosparge system
- Additional data collection can support various methods to model time to achieve the CAOs
  - Matrix diffusion rate of cDCE and VC from clayey sand (below 45 ft bls) to sand (above 45 ft bls)
  - Attenuation rate of cDCE and VC in clayey sand
  - Model fate and transport of VC that includes matrix diffusion
    - REMChlor-MD (plume centerline) may reduce uncertainty in timeframe but may provide a range of times instead of a discrete result
    - Spatial heterogeneity in lithology and matrix diffusion may be to complex for plume centerline models (i.e. REMChlor-MD)

Recommendation and Proposed Path Forward

Option 2 – ISCR PRB is the recommended remedial alternative based on

- PRB locations and designs can be optimized to treat spatial and vertical variability in mass flux
- Significantly decreases operation time from ~20 years to 5 years for the biosparge system and associated costs
- Less interruption to current property use
- No maintenance of active equipment (groundwater monitoring only)
- Expected to have better implementability than ISCR Grid (Option 3) because of potential underground utilities/obstruction within the former HS2 NADC footprint

Path Forward

- Develop scope of work to collect data that supports modeling fate and transport with matrix diffusion
- Develop model to evaluate ISCR PRB alternative and effect of matrix diffusion on time to achieve CAOs
- Continue to monitor and evaluate natural attenuation in the sand (above 45 ft bls)

Test Consensus

1. Option 2 ISCR PRB is the recommended remedial alternative to achieve CAOs
2. Model the fate and transport of VC at the site
   - to develop optimal design for the ISCR remedy to manage matrix diffusion
   - to support cost evaluation and confirm shorter remediation timeframe for ISCR alternatives

Response to Comments

- Tetra Tech Comment #6: Slide #54 (new slide #59) – The consensus statements appear conflicting as currently written. Statement 1 recommends the selection of Option 2. However, statement 2 states the fate and transport model will support selection and optimal design of an ISCR remedy, which suggests the best ISCR remedy option is not yet determined. It is understood that Option 2 is more desirable for several reasons as stated on slide #53 (new slide #58). Will the selected alternative be reevaluated following the fate and transport modeling and prior to IM Work Plan preparation? If not, consider revising the first sub-bullet of Statement 2.
- *Response: The first sub-bullet of Statement 2 was revised to state that the modeling will be performed "to develop optimal design for the ISCR remedy to manage matrix diffusion." This revision is made to clarify that the modeling effort will be used to optimize the design of Option 2.*

Attachments

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Common Cost Elements for Remedial Alternative Options

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Biosparge Area Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 63,000	$ 315,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 73,000	$ 365,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 85,000	$ 425,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 99,000	$ 495,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 114,000	$ 570,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 133,000	$ 665,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,835,000	
Former Hot Spot 2 Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 65,000	$ 325,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 75,000	$ 375,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 87,000	$ 435,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 101,000	$ 505,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 118,000	$ 590,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 136,000	$ 680,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,910,000	
Biosparge System Operation & Maintenance						
	Average Annual Cost Years 1-5	5	YEAR	$ 169,000	$ 845,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 196,000	$ 980,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 227,000	$ 1,135,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 264,000	$ 1,320,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 306,000	$ 1,530,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 355,000	$ 1,775,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 7,585,000	

Remedial Alternative Option #1 - Monitored Natural Attenuation by Long-term Monitoring (LTM)

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Low-End of Cost Range (20 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,640,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 20				$ 4,280,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,600,000	See above average annual common cost elements
				Subtotal	$ 7,547,000	
High-End of Cost Range (30 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,910,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 30				$ 7,585,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,835,000	See above average annual common cost elements
				Subtotal	$ 13,357,000	

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Remedial Alternative Option #2 - In Situ Chemical Reduction Permeable Reactive Barrier

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	102,000	LB	$ 2.40	$ 244,800	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 8,000	$ 8,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 20 injection points	15	DAY	$ 4,150	$ 62,250	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	16	DAY	$ 650	$ 10,400	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	16	DAY	$ 250	$ 4,000	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	17	DAY	$ 2,000	$ 34,000	Engineering Estimate
				Subtotal	$ 394,950	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	120	HOUR	$ 150	$ 18,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 81,000	
				Total Capital Cost	$ 534,800	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 5 years to achieve NADCs plus 10 years to achieve GCTLs				$ 1,135,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 2,305,000	
				Option #2 Total	$ 2,839,800	

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Remedial Alternative Option #3 - In Situ Chemical Reduction Grid

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	250,000	LB	$ 2.40	$ 600,000	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 60,000	$ 60,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 20,000	$ 20,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 118 injection points	40	DAY	$ 4,150	$ 166,000	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	40	DAY	$ 650	$ 26,000	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	41	DAY	$ 250	$ 10,250	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	42	DAY	$ 2,000	$ 84,000	Engineering Estimate
				Subtotal	$ 967,750	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	200	HOUR	$ 150	$ 30,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 93,000	
				Total Capital Cost	$ 1,119,600	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 2 years to achieve NADCs plus 5 years to achieve GCTLs				$ 475,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 1,645,000	
				Option #2 Total	$ 2,764,600	

Remedial Technology Screening for Hot Spot 2
Mobile Launch Platform Rehabilitation Sites and the Vehicle Assembly Building Area (MLP/VAB) – SWMU 056
NASA Kennedy Space Center

General Response Action	Remedial Technology	Process Option	Technology Description	Effectiveness (Achieve/Maintain GCTLs and Reliability) Poor, Moderate, or Good	Implementability (Technical and Administrative) Poor, Moderate, or Good	Relative Cost Low, Moderate, or High	Screening Comments Retained or Not Retained
No Action	No Further Action	No Further Action	No actions	**Poor**. Relies on natural attenuation to achieve groundwater cleanup target levels (GCTLs).	**Poor**. Action is required for administrative approval.	**None**.	**Not Retained**. Not protective and does not provide for monitoring of effectiveness.
Limited Actions	Institutional Controls (ICs)	Groundwater Use Restrictions	Groundwater exposure pathway controlled with administrative measures.	**Moderate**. Relies on administrative measures to limit exposure to contaminated groundwater. ICs expected to be effective short-term but must be maintained to provide long-term effectiveness.	**Good**. Land Use Control Implementation Plan (LUCIP) is already in place prohibiting groundwater use including limitations on groundwater development and reuse for the area.	**Low**.	**Retained**. LUCIP required until area achieves cleanup and closure.
	Monitored Natural Attenuation	Long-term Groundwater Monitoring /Analysis to Monitor Naturally Occurring Processes	Contaminants in groundwater attenuate over time through natural physical, chemical, and biological processes.	**Moderate**. Although concentrations of cDCE and VC are greater than NADCs, the VC plume is generally decreasing. The time to achieve GCTLs is uncertain and will require continued operation of the biosparge barrier.	**Good**. Current groundwater monitoring program is evaluating natural attenuation.	**Low**. Long attenuation timeframe will require extended monitoring and reporting duration.	**Retained**. Natural attenuation is occurring. The time to achieve GCTLs is uncertain. Natural attenuation can be combined with other technologies to achieve GCTLs.
Containment	Hydraulic Containment	Groundwater Extraction and Treatment	Extract groundwater near downgradient edge of plume to mitigate groundwater and mass flux to biosparge barrier. Requires ex situ treatment of groundwater.	**Poor**. Could effectively mitigate mass flux of plume and eliminate need for biosparge barrier over time. However, long timeframe needed for natural attenuation to achieve natural attenuation default criteria (NADCs) / GCTLs in area.	**Moderate**. Required extraction rates and number of wells is uncertain to capture/contain chlorinated volatile organic compounds (CVOCs) plume in soil matrix between 45 and 50 ft bls.	**High**. Capital costs for extraction wells, treatment system, and injection wells/trench. Long-term operation and maintenance (O&M) costs.	**Not Retained**. Biosparge barrier is currently containing plume with less capital and long-term costs.
	Physical	Impermeable Barrier	Construct hydraulic barrier from groundwater table to about 45 ft bls near edge of plume to mitigate groundwater and mass flux to biosparge barrier.	**Poor**. Although a barrier could effectively mitigate groundwater and mass flux in sand, matrix diffusion to sand would continue. Long timeframe needed for natural attenuation to achieve NADCs/GCTLs in low permeability layer.	**Poor**. Barrier could be installed via in situ soil stabilization using LDAs or one-pass trenching technology. Length of barrier may be large and cause changes to groundwater flow directions and potentially cause different plume migration.	**High**. Capital costs for barrier installation.	**Not Retained**. Biosparge barrier is currently containing plume with less costs.
		Air Sparging Barrier	Inject air to promote partitioning of CVOCs to air along a treatment transect to mitigate downgradient mass flux.	**Moderate**. Air sparge transect could stop mass flux and shorten operation time for biosparge barrier. Air sparge transect would have to operate for long time until NADCs/GCTLs are achieved upgradient.	**Moderate**. Lots of experience with air sparge wells in the area to 45 ft bls.	**Moderate**. Capital costs for air sparge wells and system. Long-term O&M costs.	**Not Retained.** Biosparge barrier is currently containing plume using similar technology.
Removal	Physical Removal	Groundwater Extraction and Treatment	Extract groundwater plume with series of wells along centerline of NADC plume. Requires ex situ treatment of groundwater.	**Moderate**. Could effectively shrink NADC plume primarily located in sand (above 45 ft bls), but timeframe may be long. Matrix diffusion and discharge from clayey sand below 45 ft bls could increase remediation timeframe.	**Moderate**. Required extraction rates and number of wells is uncertain to shrink CVOCs plume.	**High**. Capital costs for extraction wells, treatment system, and injection wells/trench. Long-term O&M costs.	**Not Retained**. High costs and uncertainty with implementability.

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		Soil Vapor Extraction (SVE)	Not applicable as standalone technology but could be combined with air sparging to capture CVOCs removed from low permeability unit.	**Poor**. Not effective as standalone technology. **Good** if combined with air sparging to limit CVOCs discharge to atmosphere.	**Poor**. Groundwater elevation is typically within 5 feet of ground surface which limits vacuum, reduces well spacing, and increases water recovery. Not likely needed because CVOCs discharge is expected to be less than limits for emissions of hazardous air pollutants.	**Moderate**. Capital and O&M costs until criteria are met.	**Not Retained**. Not expected to be needed in combination with air sparging.
		Traditional Excavation	Excavate clayey sand from 45 to 50 ft bls where groundwater NADCs are exceeded. Dewatering would be required. Typically a source removal technology.	**Good**. Removes CVOCs mass and source of CVOCs mass.	**Poor**. Not feasible to excavate soil at this depth using traditional methods. Dewatering 40 feet of groundwater is not practical in sand.	**High**. Dewatering and soil disposal costs would be very high.	**Not Retained**. Not feasible for dissolved plumes and costs are high.
		Large diameter auger (LDA) Excavation	Targeted excavation of soil down to 50 ft bls. Dewatering not needed. Typically a source removal technology.	**Good**. Removes CVOCs mass and source of CVOCs mass.	**Poor**. Would need to excavate and manage large volume of sand column above 45 ft bls, which is clean to reach targeted soil interval of 45 to 50 ft bls.	**High**. Soil excavation and disposal costs would be very high.	**Not Retained**. Not feasible for dissolved plumes and costs are high.
Ex-situ Treatment	Physical Treatment	Air Stripping	Treat extracted groundwater by transferring CVOCs to air in tray strippers.	**Good**. Common and well understood performance for ex situ treatment of groundwater.	**Good**. Mobile or package system are readily available and implementable for several potential treatment rates.	**Moderate**. Capital and O&M costs would be added to groundwater extraction system costs.	**Not Retained.** Not needed since groundwater extraction was not retained.
		Adsorption	Treat extracted groundwater by CVOCs adsorption to activated carbon.	**Good**. Common and well understood performance for ex situ treatment of groundwater.	**Good**. Mobile or package system are readily available and implementable for several potential treatment rates.	**Moderate**. Capital and O&M costs would be added to groundwater extraction system costs.	**Not Retained.** Not needed since groundwater extraction was not retained.
In-Situ Treatment	Biological	Anaerobic Enhanced Bioremediation	Typically includes injection of an electron donor to enhance reductive dechlorination (ERD) of CVOCs.	**Moderate**. Proven performance at this and other KSC sites. However, effectiveness is typically limited by the length of electron donor supply after injection.	**Good**. Readily implementable in an area to treat CVOCs from 40 to 50 ft bls. Treatment area needs to be sufficient to limit diffusion and downgradient migration to biosparge barrier.	**Moderate**. Costs are primarily capital for the electron donor and one injection event via direct-push technology.	**Not Retained.** ERD only will not be retained because of electron donor longevity, but will be part of an ISCR alternative.
		Aerobic Enhanced Bioremediation	Inject air or oxygen to increase the concentration of dissolved oxygen and promote the aerobic biooxidation of contaminant.	**Good**. Proven performance at the existing biosparge barrier for VC. May be less effective for cDCE. Not effective for TCE.	**Moderate**. Lots of experience with air sparge wells in the area. Would only be able to implement in sand above 45 ft bls and rely on matrix diffusion to treat clayey sand below 45 ft bls.	**Moderate**. Capital costs for biosparge wells and system. Long-term O&M costs.	**Not Retained.** Air sparging for mass removal is expected to be more effective for similar cost.
		Bioaugmentation	Microbial consortia that target anaerobic degradation of CVOCs can be included in an ERD remedy.	**Good**. Proven performance and included in most ERD remedies at KSC.	**Good**. Readily implementable by injecting along with electron donor for ERD.	**Low**. Low add-on cost to ERD remedy.	**Retained.** ERD only is not retained, but bioaugmentation will be evaluated with ISCR.

Remedial Technology Screening for Hot Spot 2
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	Chemical/Physical	Air Sparging (AS)	Inject air into the plume to promote partitioning of CVOCs to air and transfer to atmosphere. Previously implemented to about 45 ft bls within former Hot Spot 2 (HS2) plume.	**Good**. Proven performance at the site in sandy lithology to 45 ft bls. Effectiveness in clayey sand below 45 ft bls is uncertain and would depend on ability to inject and distribute air.	**Moderate**. Implemented previously in the former HS2 plume. Geotechnical testing of clayey sand below 45 ft bls indicates hydraulic conductivity is several orders of magnitude less than practical limits for air sparging.	**Moderate**. Capital costs for air sparge wells and system. Long-term O&M costs.	**Not Retained.** Previous use at the site was effective in sand above 45 ft bls. Hydraulic conductivity of clayey sand (source of VC) is too low for air sparging.
		Large Diameter Augur (LDA) Mixing	In situ soil mixing combined with different technologies to remove or treat CVOCs. Technologies include in situ soil stabilization, steam enhanced extraction, and ISCR.	**Good**. Proven effectiveness at removing CVOCs mass or limiting mass flux of CVOCs to groundwater in CVOC source areas.	**Moderate**. Target treatment zone is deep (about 45 to 50 ft bls) and limited to narrow depth interval.	**High**. High cost to operate LDA equipment. High costs for complimentary technologies (steam, stabilization, and ISCR)	**Not Retained.** High-cost technology typically implemented in CVOC source areas, not plumes.
		In Situ Chemical Oxidation (ISCO)	Inject chemical oxidants in plume to oxidize CVOCs.	**Moderate**. Typical oxidants are expected to permanently remove CVOCs. Natural or background oxidant demand may limit effectiveness.	**Moderate**. Readily implementable via direct-push methods to treat plume area. Ability to treat plume with one injection is unlikely because of background oxidant demand.	**Moderate**. Costs are primarily capital for oxidant injection event via direct-push technology.	**Not Retained.** Although CVOC mass would be destroyed, effectiveness may be limited by background oxidant demand and need for multiple injections.
		In Situ Chemical Reduction (ISCR)	Typically includes injection of zero-valent iron for abiotic reduction of CVOCs and often includes electron donors to support ERD.	**Good**. Permanently degrades CVOCs, which dependent on ability to achieve very low redox conditions.	**Good**. Readily implementable in to treat CVOCs from 40 to 45 ft bls. Treatment area needs to be sufficient to limit diffusion and downgradient migration to biosparge barrier.	**Moderate.** Typically requires one injection since product provides treatment up to 5 years. Capital cost for product and injection.	**Retained.** ISCR is evaluated for targeted treatment of NADC plumes. ISCR along with natural attenuation can be readily implemented to achieve GCTLs. Typically combined with anaerobic enhanced bioremediation.
		Powdered Activated Carbon (PAC)	Powdered activated carbon is injected into the groundwater to adsorb CVOCs and remove mass from groundwater.	**Good**. Effectively decreases concentrations of CVOCs in groundwater.	**Moderate**. Typically implemented as a permeable reactive barrier to intercept dissolved CVOC in a plume. May require additional treatment with an electron donor to regenerate sorption capacity.	**High**. Capital costs can be high for product and direct-push installation in barriers.	**Not Retained.** Although mass is removed, long-term destruction is uncertain.
		Permeable Reactive Barrier (PRB)	A permeable treatment barrier is installed to intercept the plume to destroy CVOCs via ISCR.	**Moderate**. Mass flux is mitigated via removal of CVOCs from groundwater flow. Relies on groundwater flow through barrier for treatment.	**Moderate**. Multiple barriers may be required to achieve GCTLs in reasonable time. Could also be implemented to remove the need for the biosparge barrier.	**Moderate**. Capital costs can be high for product and direct-push installation in multiple barriers.	**Retained.** ISCR PRBs will be evaluated/compared to an ISCR grid approach to achieve GCTLs. A single PRB to mitigate the need of the biosparge barrier will be evaluated.
	Thermal	Electrical Resistance Heating	Heat the subsurface using electrical resistive heating to enhance removal of CVOCs via volatilization.	**Moderate**. Can effectively remove CVOCs in combination with multiphase extraction. Less effective in sandy soil where groundwater flux may slow subsurface heating.	**Moderate to Poor**. Would require heating entire saturated zone to 50 ft bls to treat small depth interval of 45 to 50 ft bls.	**High**. Infrastructure and energy cost are high.	**Not Retained.** Technology is better for CVOC source area and high concentrations, not NADC plumes.

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Disposal	On-Site	Re-Injection Wells	Used in combination with groundwater extraction and ex situ groundwater treatment to inject treated groundwater. Groundwater injection can enhance performance of groundwater extraction.	**Moderate**. Can be used to control groundwater flow, contain the plume and increase the pore volume flush rate for plume removal.	**Moderate**. Would require development of a groundwater flow model to design appropriate injection locations. Requires significant monitoring of treated groundwater to ensure meeting criteria for injection.	**Moderate**. Requires capital cost for injection wells or trenches. Requires O&M along with treatment system.	**Not Retained.** Not retained when groundwater extraction is not retained.

Remedial Alternatives	GHG Emissions	Total energy Used	Water Consumption	Electricity Usage	Onsite NO_x Emissions	Onsite SO_x Emissions	Onsite PM_{10} Emissions	Total NO_x Emissions	Total SO_x Emissions	Total PM_{10} Emissions	Accident Risk Fatality	Accident Risk Injury
	metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
Option 1 LTM	1759.01	2.99E+04	1.31E+06	2.56E+03	0.00E+00	0.00E+00	0.00E+00	2.07E+00	3.18E+00	1.48E+00	1.96E-03	2.91E-01
Option 2 ISCR PRB	643.69	9.09E+03	3.49E+05	6.41E+02	6.40E-04	4.00E-05	4.00E-05	9.57E-01	1.56E+00	5.18E-01	6.64E-04	9.16E-02
Option 3 ISCR Grid	600.26	8.70E+03	4.48E+05	6.41E+02	1.92E-03	1.20E-04	1.20E-04	8.27E-01	1.38E+00	4.88E-01	6.05E-04	8.61E-02

Additional Sustainability Metrics

Remedial Alternatives	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent Electricity from Renewable Sources	Final Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	$
Option 1 LTM	0.00	0.00E+00	0.00E+00	7.55E+06	2.33E+00	1.7%	7.55E+06
Option 2 ISCR PRB	0.00	0.00E+00	0.00E+00	3.24E+06	7.33E-01	1.7%	3.24E+06
Option 3 ISCR Grid	0.00	0.00E+00	0.00E+00	3.16E+06	7.08E-01	1.7%	3.14E+06

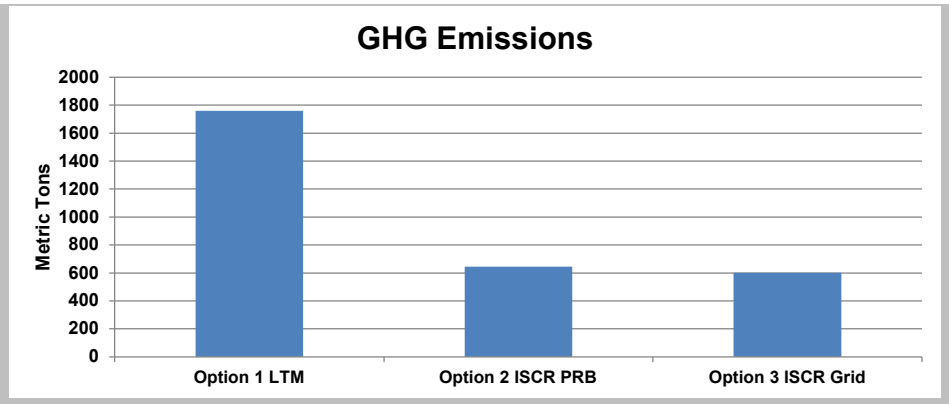
Relative Impact

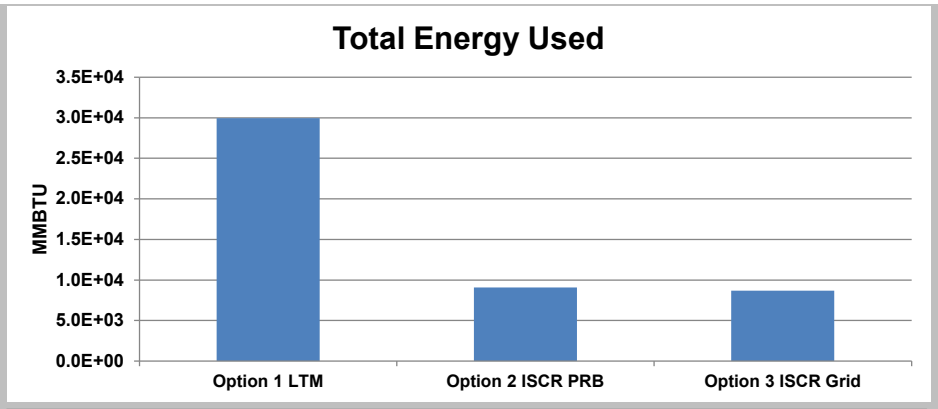
Remedial Alternatives	GHG Emissions	Energy Usage	Water Usage	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx emissions	Total SOx Emissions	Total PM10 Emissions	*Accident Risk Fatality	*Accident Risk Injury	Community Impacts	Resources Lost
Option 1 LTM	High	High	High	High	Low	Low	Low	High	High	High	Low	Low	user select	user select
Option 2 ISCR PRB	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	user select	user select
Option 3 ISCR Grid	Medium	Low	Medium	Low	High	High	High	Medium	Medium	Medium	Low	Low	user select	user select

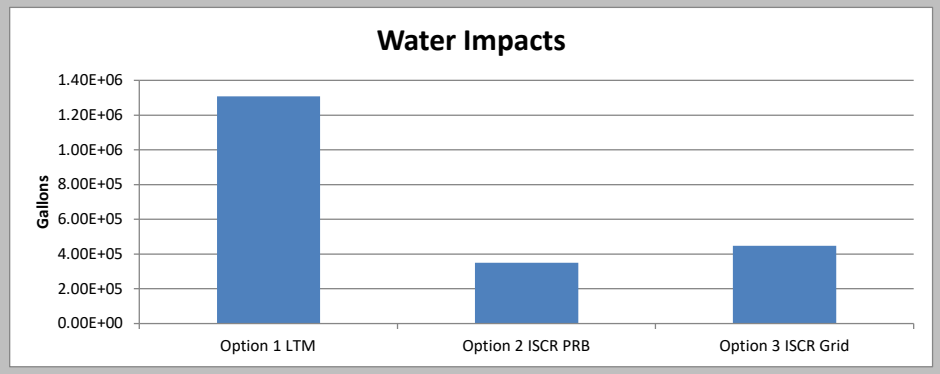
Relative Impact (User Override)

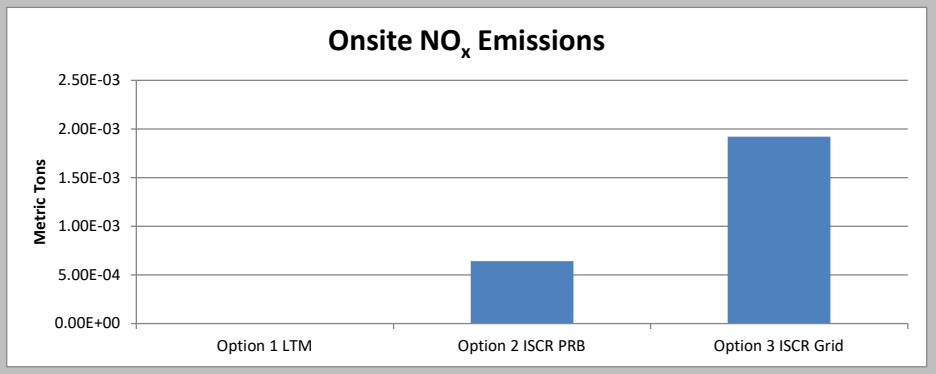
Remedial Alternatives	GHG Emissions	Energy Usage	Water Usage	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	*Accident Risk Fatality	*Accident Risk Injury	Community Impacts	Resources Lost
Option 1 LTM	High	High	High	High	Low	Low	Low	High	High	High	Low	Low	user select	user select
Option 2 ISCR PRB	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	user select	user select
Option 3 ISCR Grid	Medium	Low	Medium	Low	High	High	High	Medium	Medium	Medium	Low	Low	user select	user select

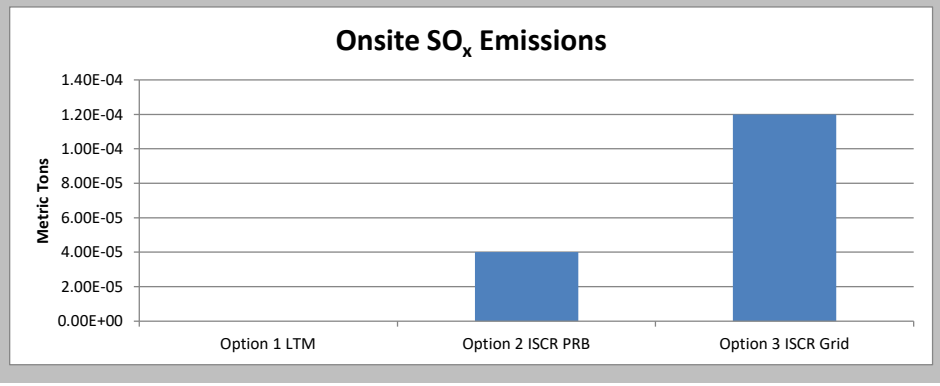
*Accident Risk is an estimate of how many accidents may occur. This risk is not the same as Cancer Risk, which is the probablity (for a single person) of getting cancer. Accident risk is not comparable to Cancer Risk due to inherent fundamental differences.

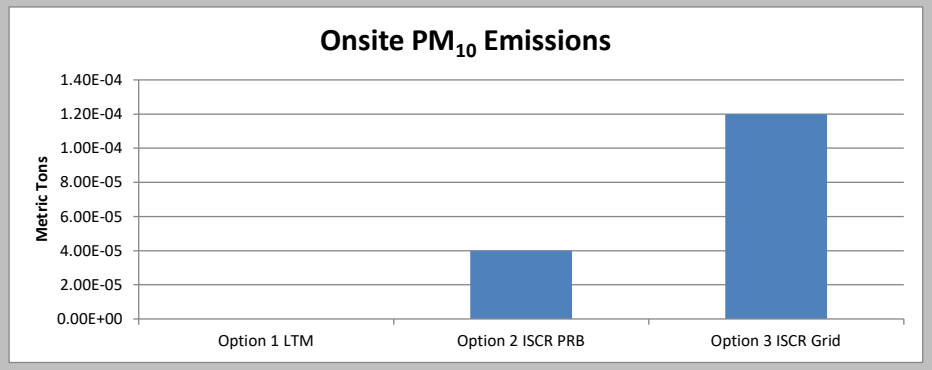

GHG Emissions
Metric Tons
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

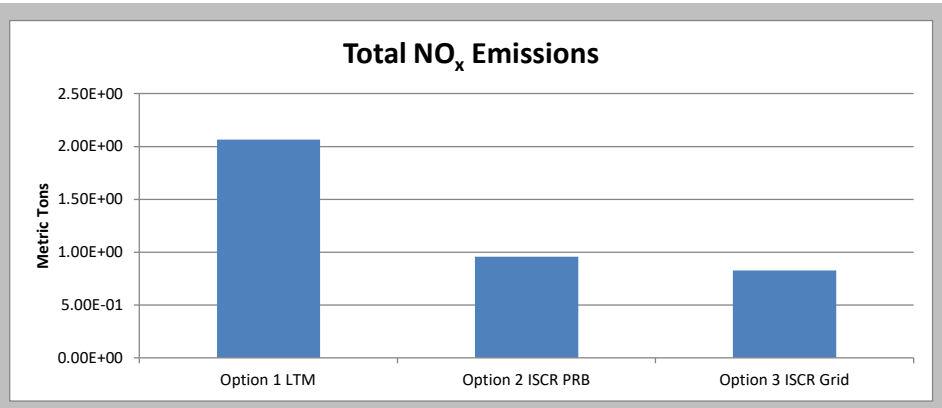

Total Energy Used
MMBTU
3.5E+04
3.0E+04
2.5E+04
2.0E+04
1.5E+04
1.0E+04
5.0E+03
0.0E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

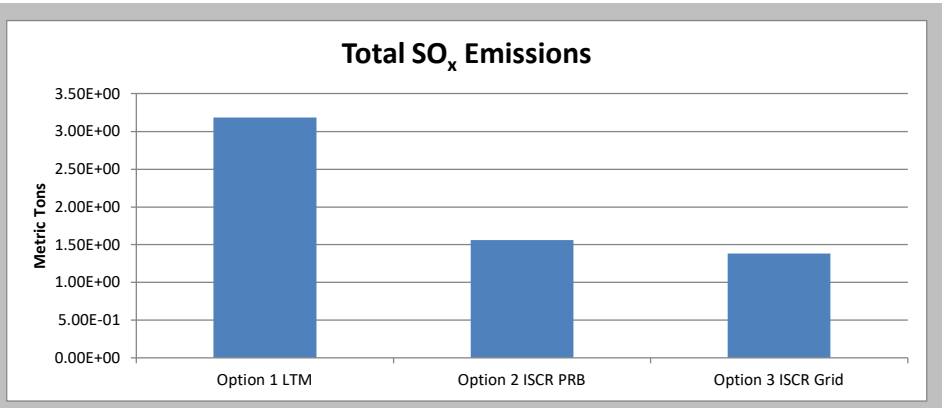

Water Impacts
Gallons
1.40E+06
1.20E+06
1.00E+06
8.00E+05
6.00E+05
4.00E+05
2.00E+05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

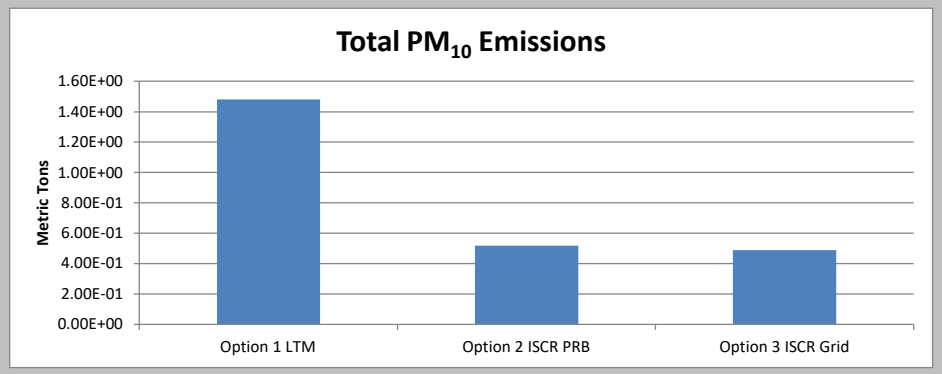

Onsite NOx Emissions
Metric Tons
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

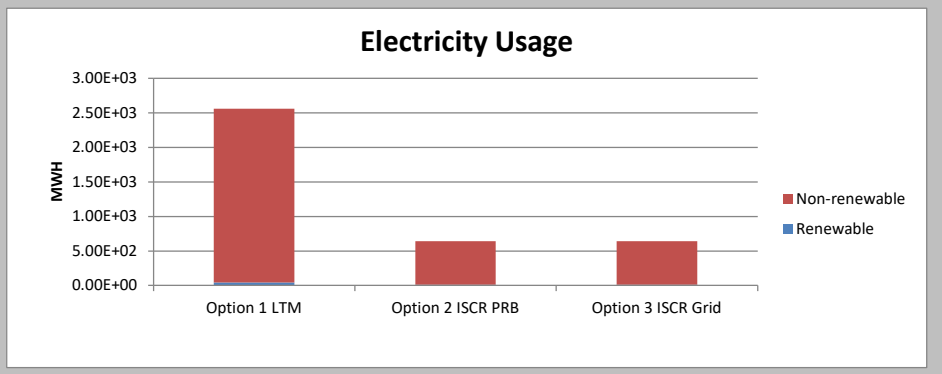

Onsite SOx Emissions
Metric Tons
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

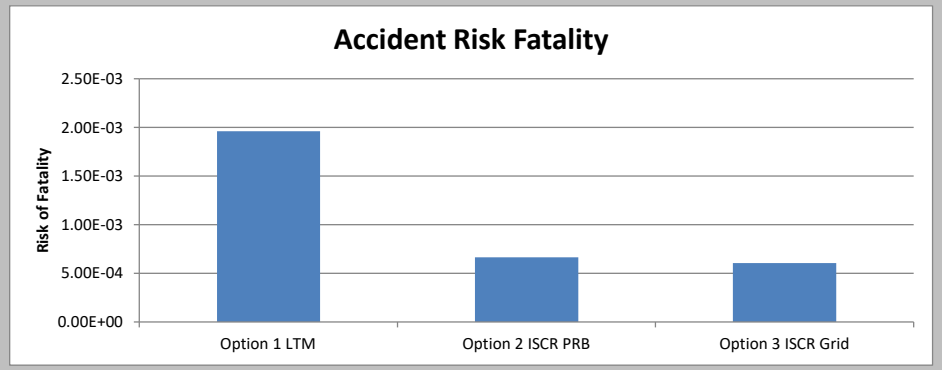

Onsite PM10 Emissions
Metric Tons
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

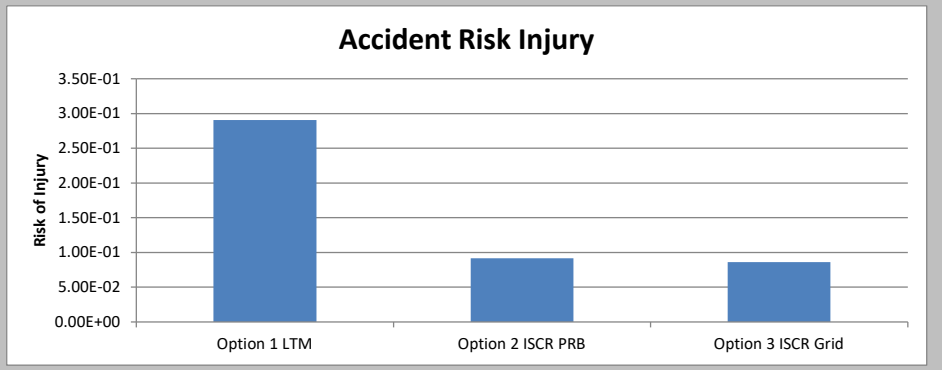

Total NOx Emissions
Metric Tons
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Total SOx Emissions
Metric Tons
3.50E+00
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

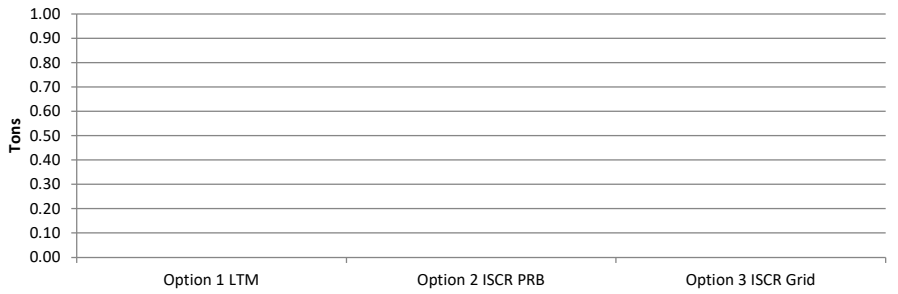

Total PM10 Emissions
Metric Tons
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Electricity Usage
MWH
3.00E+03
2.50E+03
2.00E+03
1.50E+03
1.00E+03
5.00E+02
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid
Non-renewable
Renewable

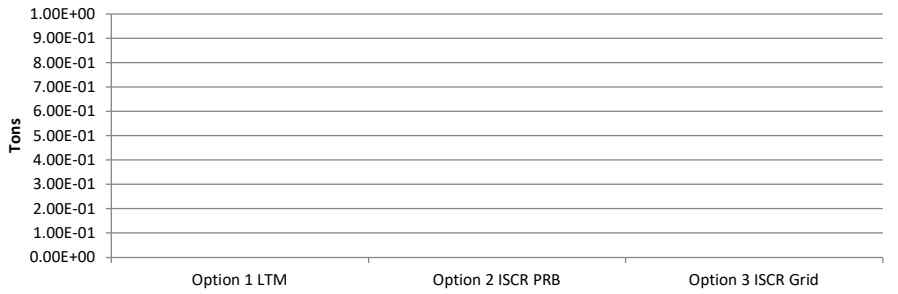

Accident Risk Fatality
Risk of Fatality
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Accident Risk Injury
Risk of Injury
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

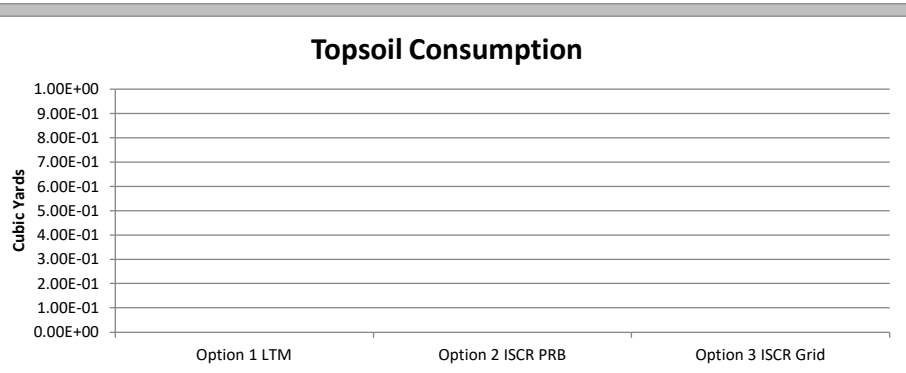
Non-Hazardous Waste Landfill Space



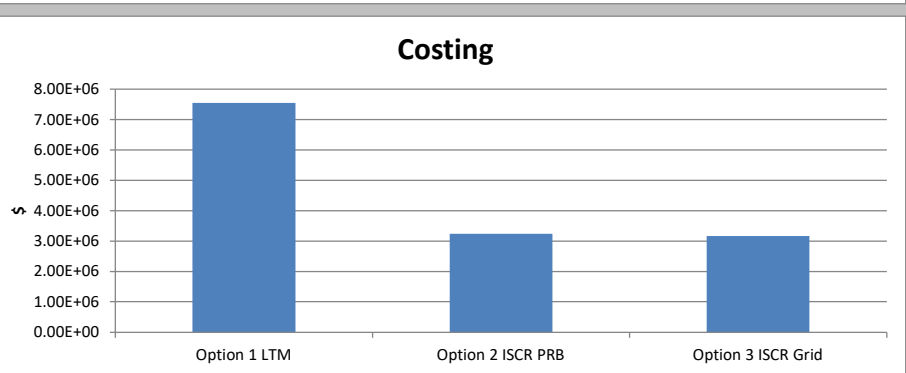
Hazardous Waste Landfill Space



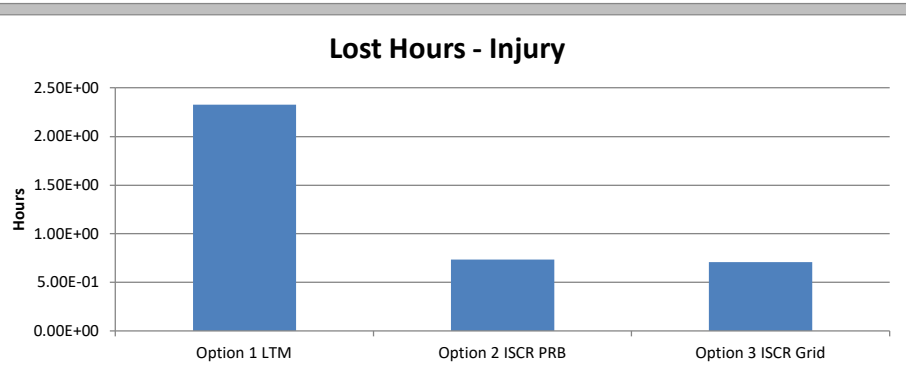
Topsoil Consumption



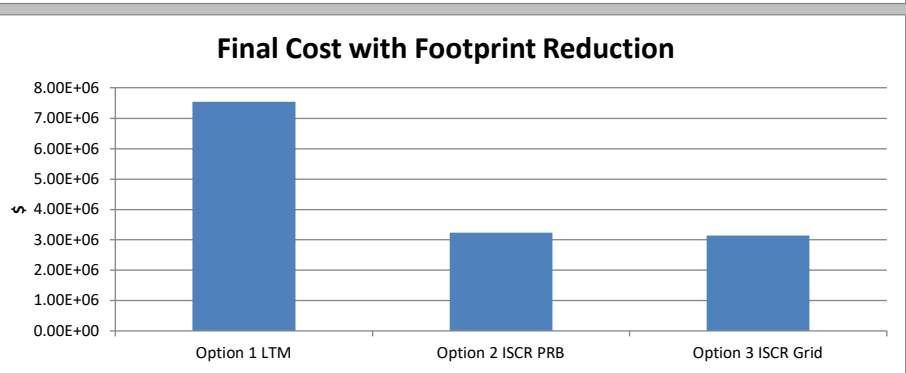
Costing

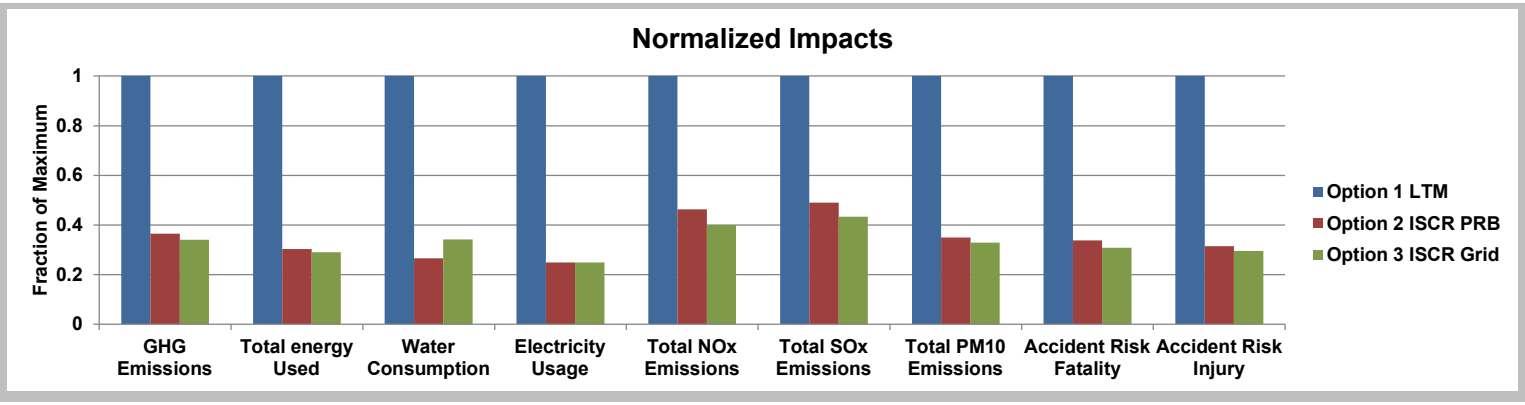


Lost Hours - Injury



Final Cost with Footprint Reduction

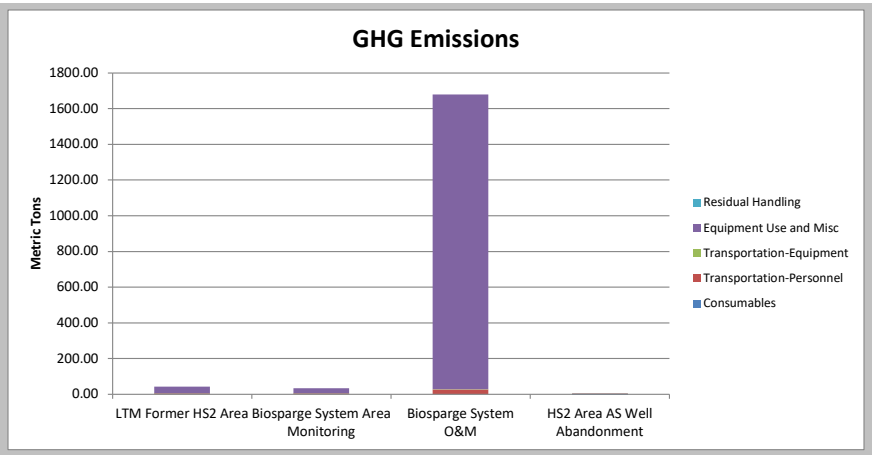


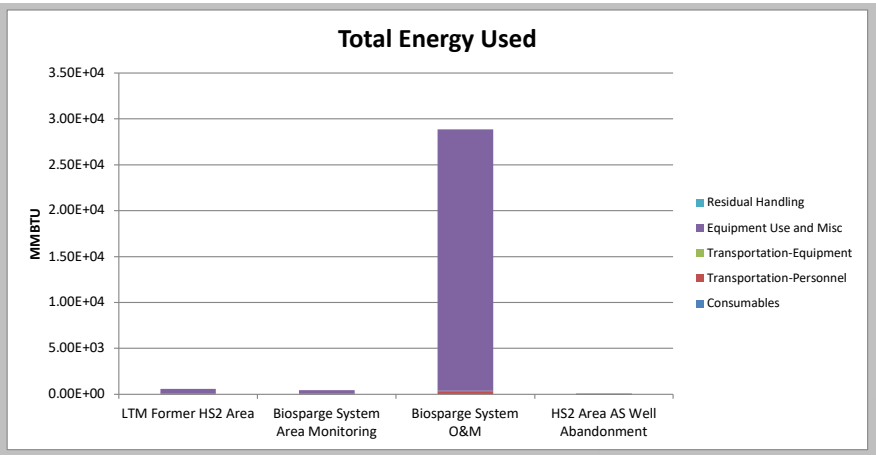

Normalized Impacts
Fraction of Maximum
1
0.8
0.6
0.4
0.2
0
GHG Emissions
Total energy Used
Water Consumption
Electricity Usage
Total NOx Emissions
Total SOx Emissions
Total PM10 Emissions
Accident Risk Fatality
Accident Risk Injury
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

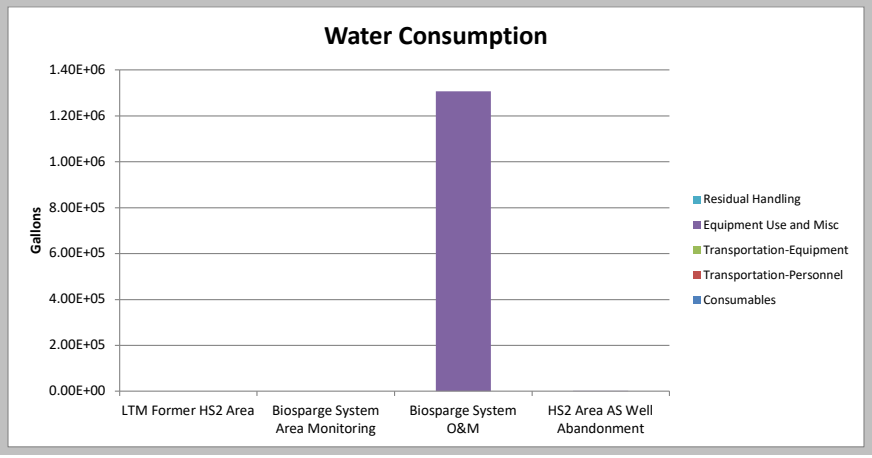
Sustainable Remediation - Environmental Footprint Summary
Option 1 LTM 2

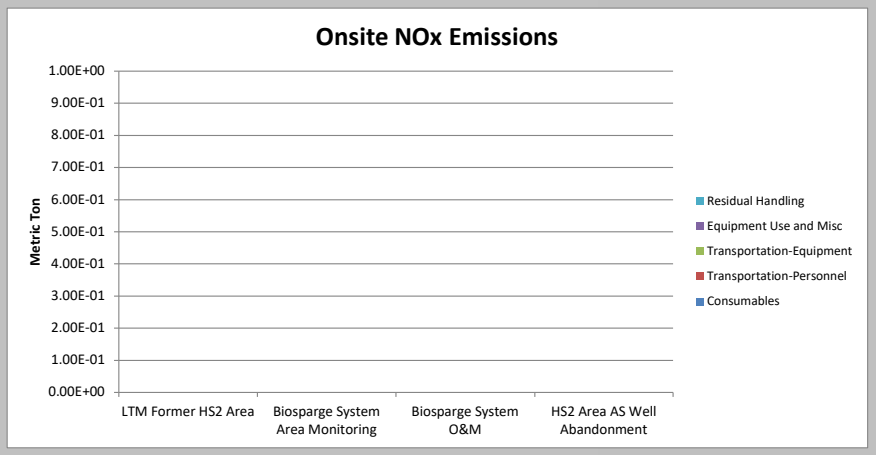
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	5.42	6.8E+01	NA	NA	NA	NA	NA	2.3E-03	7.1E-05	3.2E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.49	6.4E+00	NA	NA	NA	NA	NA	1.5E-04	2.7E-06	1.4E-05	7.8E-05	6.3E-03
	Equipment Use and Misc	36.29	5.2E+02	1.5E-01	3.0E-04	0.0E+00	0.0E+00	0.0E+00	1.7E-01	1.3E-01	1.5E-02	5.8E-06	7.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	42.20	5.94E+02	1.51E-01	2.96E-04	0.00E+00	0.00E+00	0.00E+00	1.77E-01	1.31E-01	1.49E-02	2.37E-04	2.57E-02
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	5.42	6.8E+01	NA	NA	NA	NA	NA	2.3E-03	7.1E-05	3.2E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.49	6.4E+00	NA	NA	NA	NA	NA	1.5E-04	2.7E-06	1.4E-05	7.8E-05	6.3E-03
	Equipment Use and Misc	27.22	3.9E+02	1.5E-01	3.0E-04	0.0E+00	0.0E+00	0.0E+00	1.3E-01	9.8E-02	1.1E-02	5.4E-06	6.6E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	33.13	4.64E+02	1.51E-01	2.96E-04	0.00E+00	0.00E+00	0.00E+00	1.33E-01	9.80E-02	1.12E-02	2.37E-04	2.52E-02
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	26.44	3.3E+02	NA	NA	NA	NA	NA	1.1E-02	3.5E-04	1.6E-03	7.5E-04	6.0E-02
	Transportation-Equipment	2.35	3.1E+01	NA	NA	NA	NA	NA	7.4E-04	1.3E-05	6.6E-05	3.7E-04	3.0E-02
	Equipment Use and Misc	1,651.07	2.8E+04	1.3E+06	2.6E+03	0.0E+00	0.0E+00	0.0E+00	1.7E+00	2.9E+00	1.5E+00	3.4E-04	1.5E-01
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	1,679.86	2.89E+04	1.31E+06	2.56E+03	0.00E+00	0.00E+00	0.00E+00	1.75E+00	2.95E+00	1.45E+00	1.47E-03	2.38E-01
HS2 Area AS Well Abandonment	Consumables	1.60	8.4E+00	NA	NA	NA	NA	NA	3.2E-03	6.4E-03	1.3E-03	NA	NA
	Transportation-Personnel	1.41	1.8E+01	NA	NA	NA	NA	NA	4.4E-04	7.8E-06	3.9E-05	1.6E-05	1.3E-03
	Transportation-Equipment	0.82	1.1E+01	NA	NA	NA	NA	NA	2.6E-04	9.8E-06	2.2E-05	5.9E-06	4.7E-04
	Equipment Use and Misc	0.00	9.2E-03	1.0E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E-06	2.7E-06	7.3E-06	5.4E-07	6.6E-04
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	3.83	3.79E+01	1.00E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.91E-03	6.41E-03	1.35E-03	2.20E-05	2.39E-03
Total		**1.8E+03**	**3.0E+04**	**1.3E+06**	**2.6E+03**	**0.0E+00**	**0.0E+00**	**0.0E+00**	**2.1E+00**	**3.2E+00**	**1.5E+00**	**2.0E-03**	**2.9E-01**

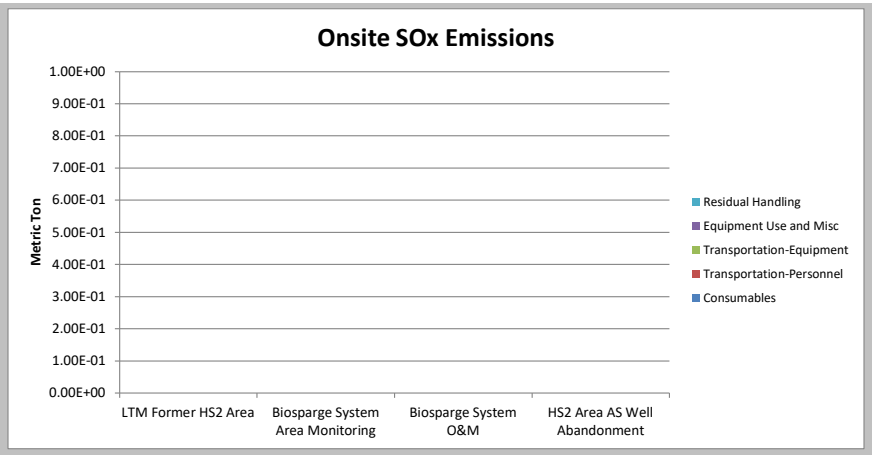
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	1,640,000	2.1E-01	2.3%	$7,547,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	1,600,000	2.0E-01	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	4,280,000	1.9E+00	2.3%	
HS2 Area AS Well Abandonment	0.0E+00	0.0E+00	0.0E+00	27,000	1.9E-02	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$7,547,000**	**2.3E+00**	**1.7%**	

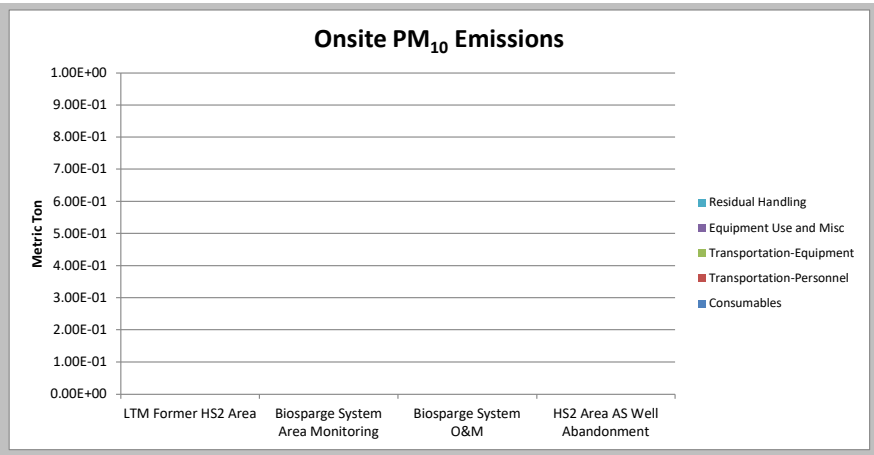

GHG Emissions
Metric Tons
1800.00
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

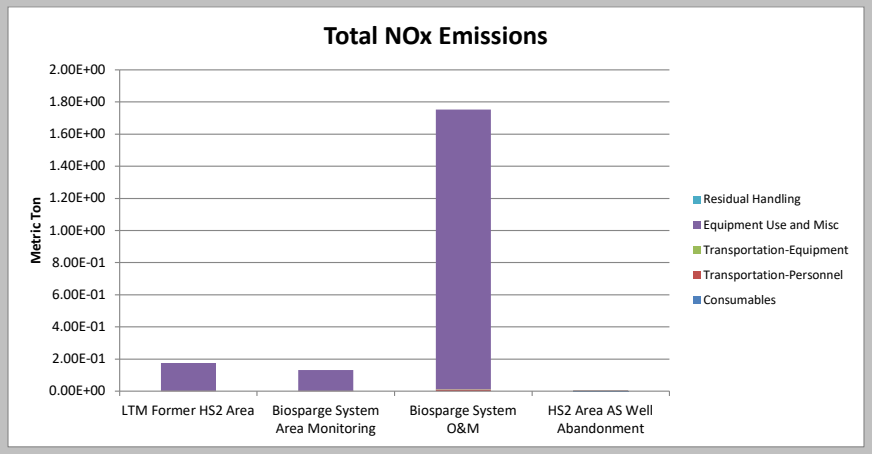

Total Energy Used
MMBTU
3.50E+04
3.00E+04
2.50E+04
2.00E+04
1.50E+04
1.00E+04
5.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

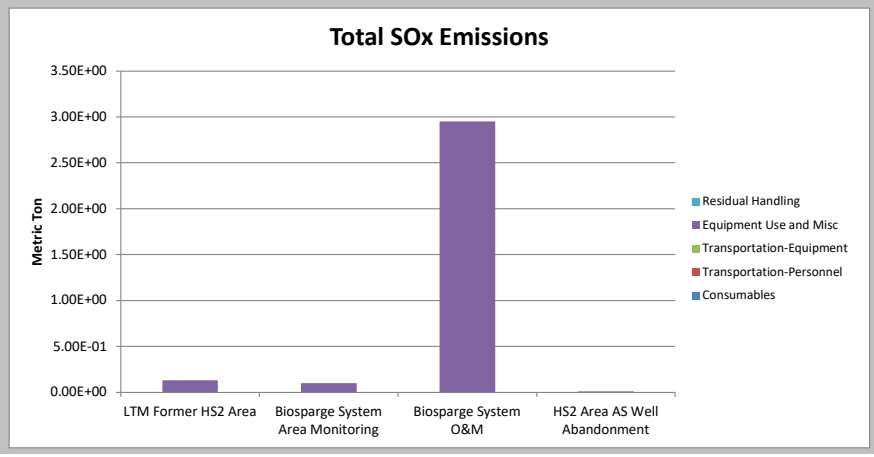

Water Consumption
Gallons
1.40E+06
1.20E+06
1.00E+06
8.00E+05
6.00E+05
4.00E+05
2.00E+05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

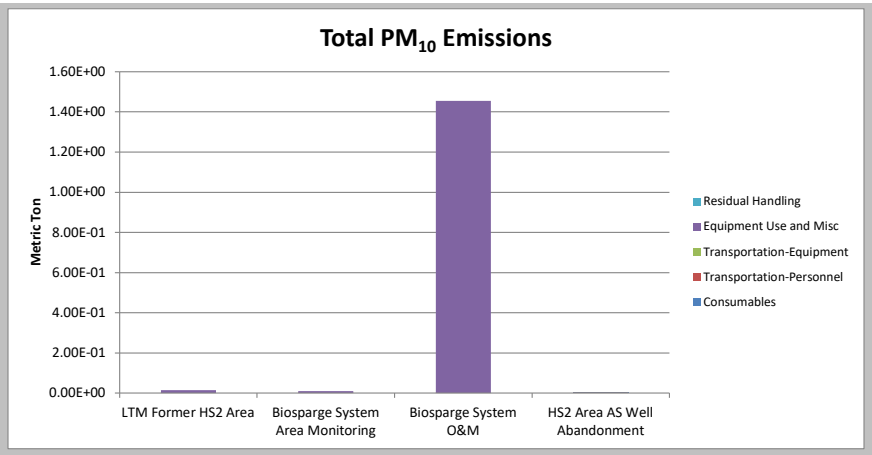

Onsite NOx Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

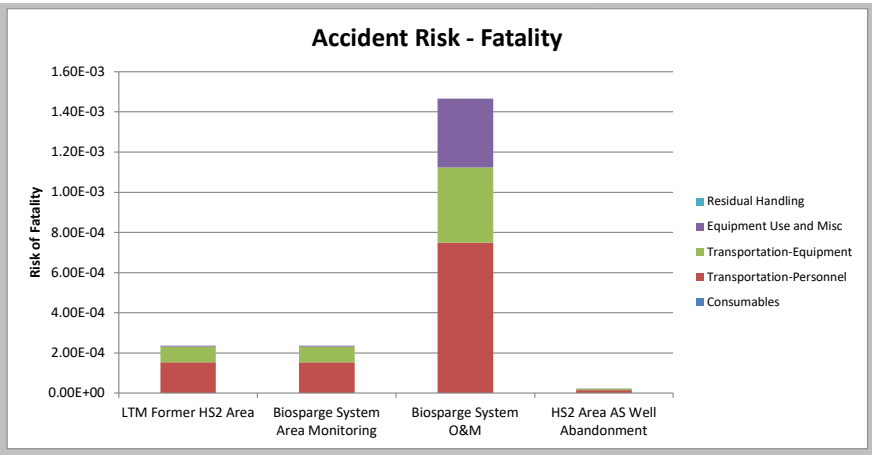

Onsite SOx Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

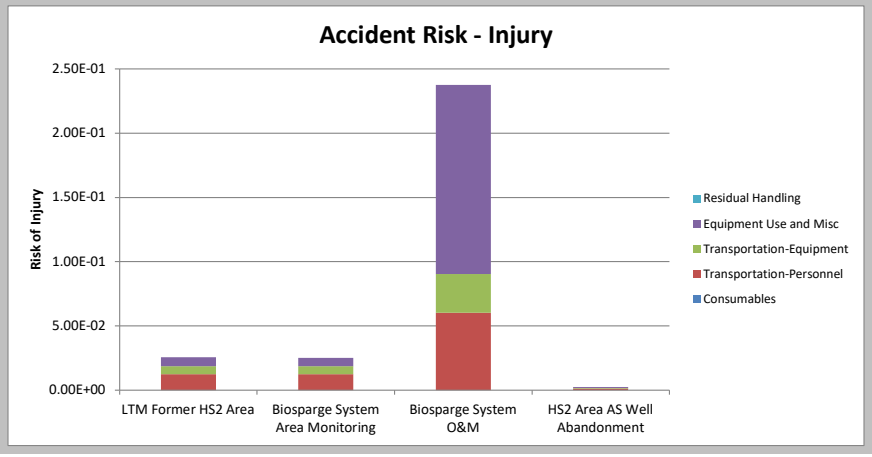

Onsite PM10 Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

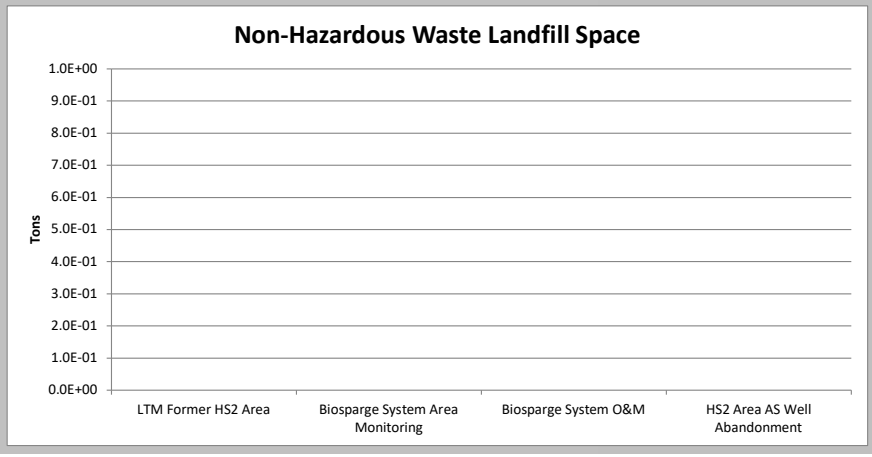

Total NOx Emissions
Metric Ton
2.00E+00
1.80E+00
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

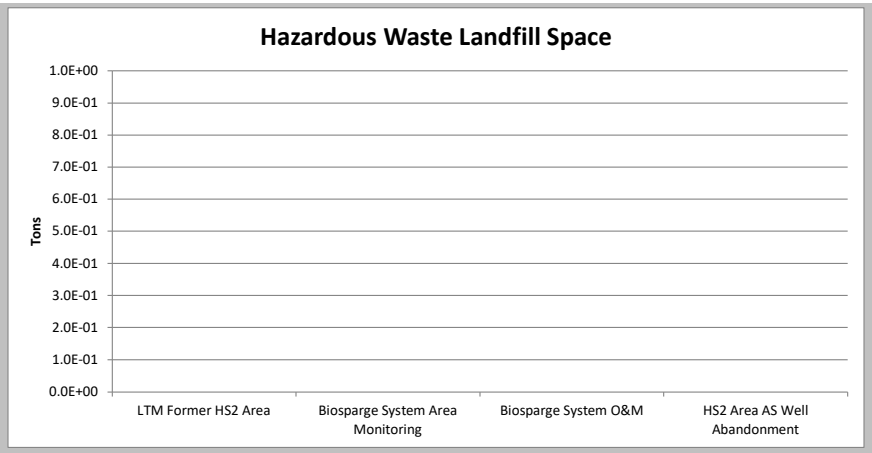

Total SOx Emissions
Metric Ton
3.50E+00
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

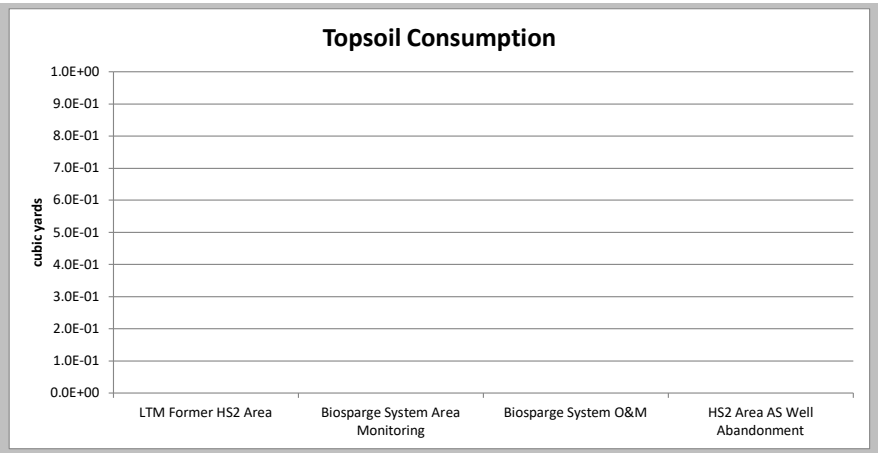

Total PM10 Emissions
Metric Ton
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

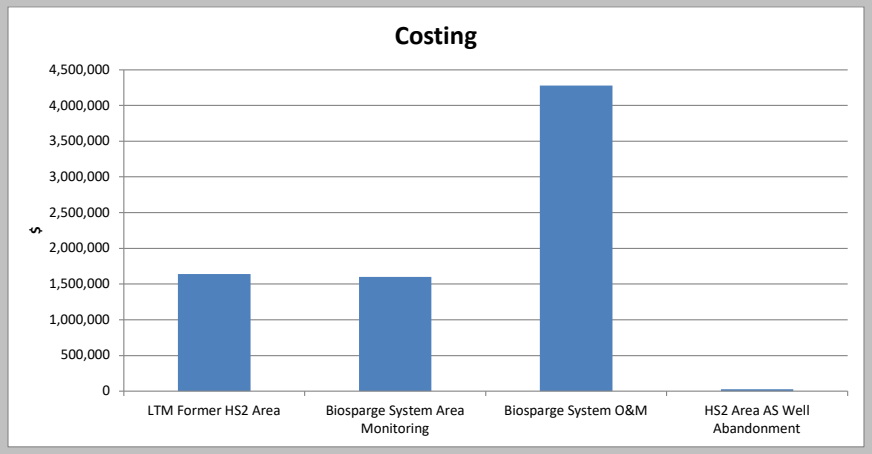

Accident Risk - Fatality
Risk of Fatality
1.60E-03
1.40E-03
1.20E-03
1.00E-03
8.00E-04
6.00E-04
4.00E-04
2.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

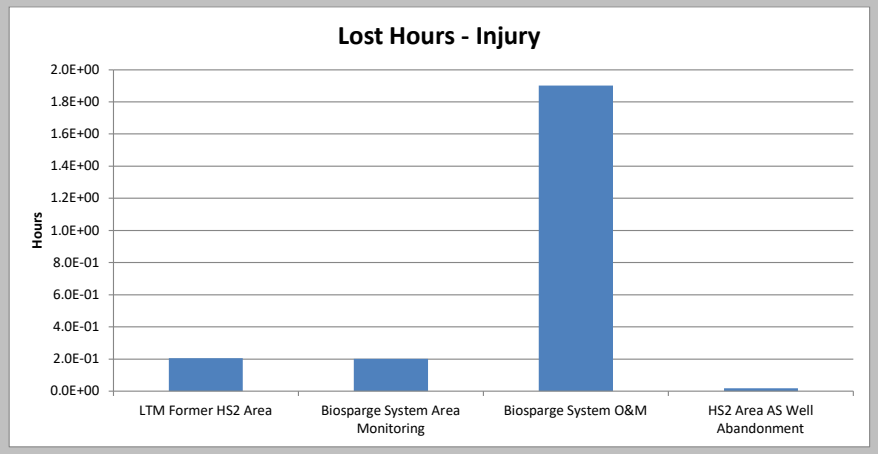

Accident Risk - Injury
Risk of Injury
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

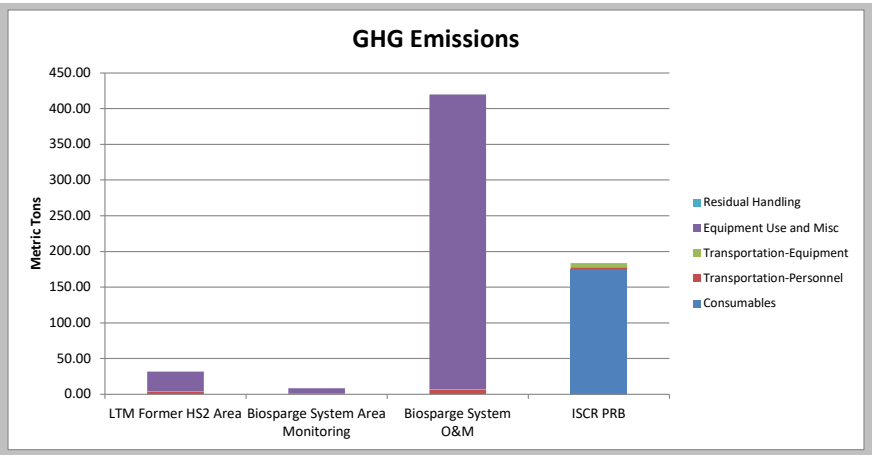

Costing
$
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

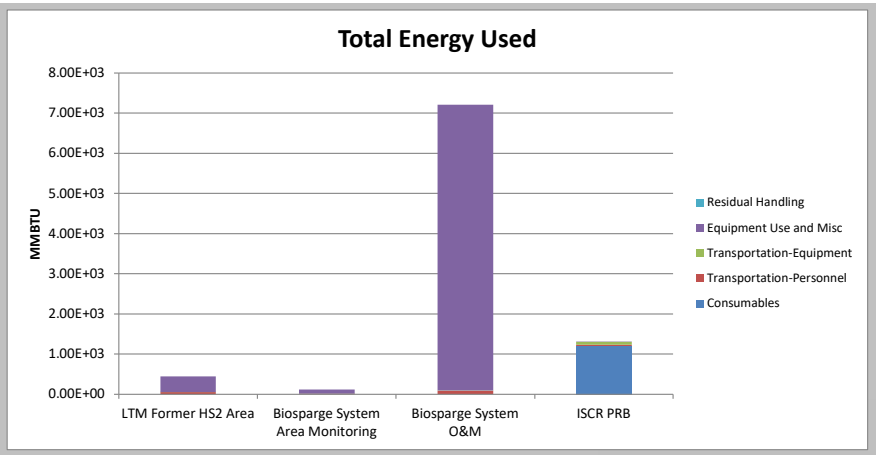

Lost Hours - Injury
Hours
2.0E+00
1.8E+00
1.6E+00
1.4E+00
1.2E+00
1.0E+00
8.0E-01
6.0E-01
4.0E-01
2.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

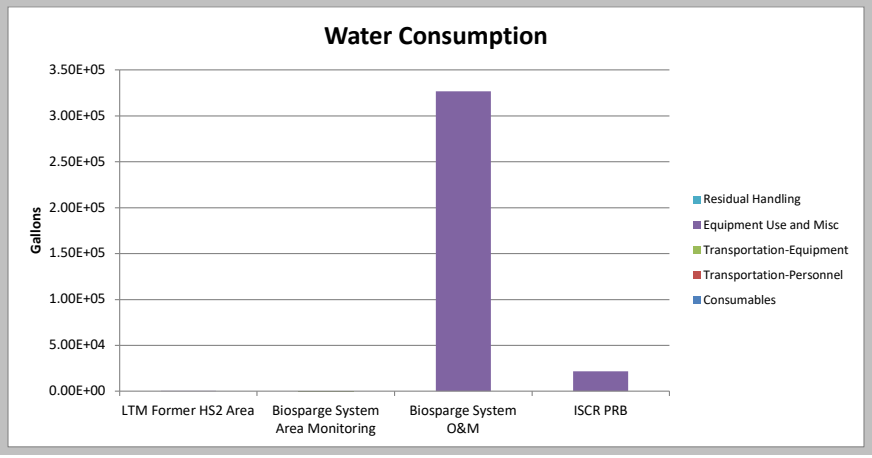
Sustainable Remediation - Environmental Footprint Summary
Option 2 ISCR PRB 2

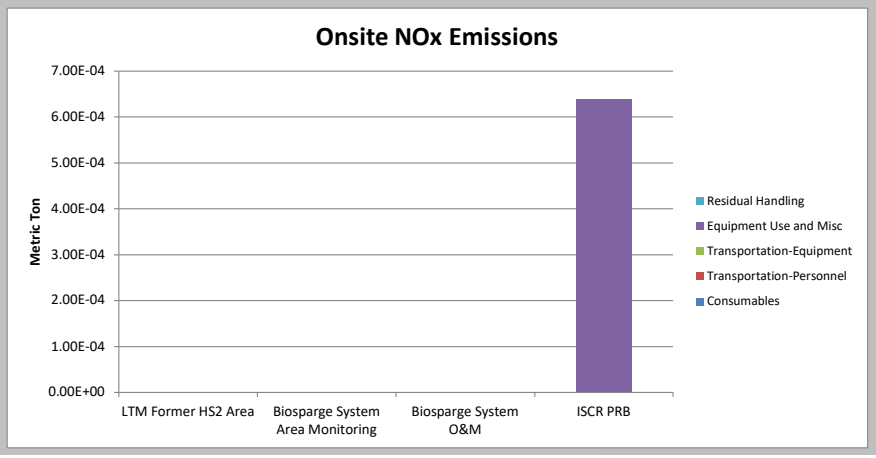
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	4.07	5.1E+01	NA	NA	NA	NA	NA	1.7E-03	5.3E-05	2.4E-04	1.2E-04	9.3E-03
	Transportation-Equipment	0.37	4.8E+00	NA	NA	NA	NA	NA	1.2E-04	2.0E-06	1.0E-05	5.9E-05	4.7E-03
	Equipment Use and Misc	27.22	3.9E+02	1.1E-01	2.2E-04	0.0E+00	0.0E+00	0.0E+00	1.3E-01	9.8E-02	1.1E-02	4.3E-06	5.3E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	31.65	4.45E+02	1.13E-01	2.22E-04	0.00E+00	0.00E+00	0.00E+00	1.32E-01	9.80E-02	1.11E-02	1.78E-04	1.93E-02
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	-	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.36	1.7E+01	1.5E+01	NA	NA	NA	NA	5.6E-04	1.8E-05	8.0E-05	3.8E-05	3.1E-03
	Transportation-Equipment	0.12	1.6E+00	1.4E+00	NA	NA	NA	NA	3.9E-05	6.8E-07	3.4E-06	2.0E-05	1.6E-03
	Equipment Use and Misc	6.80	9.7E+01	8.4E+01	7.4E-05	0.0E+00	0.0E+00	0.0E+00	3.3E-02	2.4E-02	2.7E-03	1.4E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	-	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	8.28	1.16E+02	1.00E+02	7.39E-05	0.00E+00	0.00E+00	0.00E+00	3.33E-02	2.45E-02	2.81E-03	5.92E-05	6.31E-03
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	6.61	8.3E+01	NA	NA	NA	NA	NA	2.7E-03	8.6E-05	3.9E-04	1.9E-04	1.5E-02
	Transportation-Equipment	0.59	7.7E+00	NA	NA	NA	NA	NA	1.8E-04	3.3E-06	1.6E-05	9.4E-05	7.5E-03
	Equipment Use and Misc	412.77	7.1E+03	3.3E+05	6.4E+02	0.0E+00	0.0E+00	0.0E+00	4.4E-01	7.4E-01	3.6E-01	8.6E-05	3.7E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	419.97	7.21E+03	3.27E+05	6.41E+02	0.00E+00	0.00E+00	0.00E+00	4.38E-01	7.37E-01	3.64E-01	3.66E-04	5.94E-02
ISCR PRB	Consumables	175.10	1.2E+03	NA	NA	NA	NA	NA	3.5E-01	7.0E-01	1.4E-01	NA	NA
	Transportation-Personnel	2.95	3.8E+01	NA	NA	NA	NA	NA	9.4E-04	1.7E-05	8.6E-05	3.3E-05	2.7E-03
	Transportation-Equipment	5.41	7.1E+01	NA	NA	NA	NA	NA	1.7E-03	3.0E-05	1.5E-04	2.5E-05	2.0E-03
	Equipment Use and Misc	0.34	4.0E+00	2.2E+04	0.0E+00	6.4E-04	4.0E-05	4.0E-05	9.2E-04	1.9E-04	2.3E-04	1.6E-06	2.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	183.79	1.31E+03	2.20E+04	0.00E+00	6.40E-04	4.00E-05	4.00E-05	3.54E-01	7.01E-01	1.41E-01	6.00E-05	6.68E-03
Total		**6.4E+02**	**9.1E+03**	**3.5E+05**	**6.4E+02**	**6.4E-04**	**4.0E-05**	**4.0E-05**	**9.6E-01**	**1.6E+00**	**5.2E-01**	**6.6E-04**	**9.2E-02**

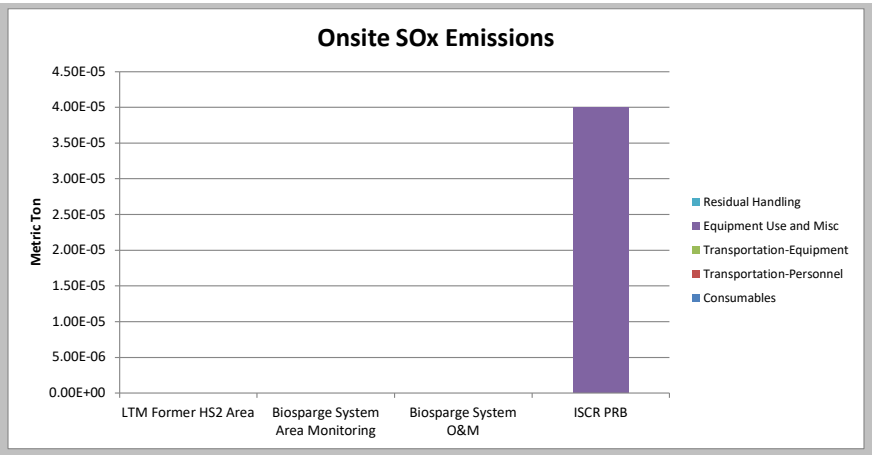
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	1,230,000	1.5E-01	2.3%	$3,235,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	400,000	5.0E-02	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	1,070,000	4.8E-01	2.3%	
ISCR PRB	0.0E+00	0.0E+00	0.0E+00	535,000	5.3E-02	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$3,235,000**	**7.3E-01**	**1.7%**	

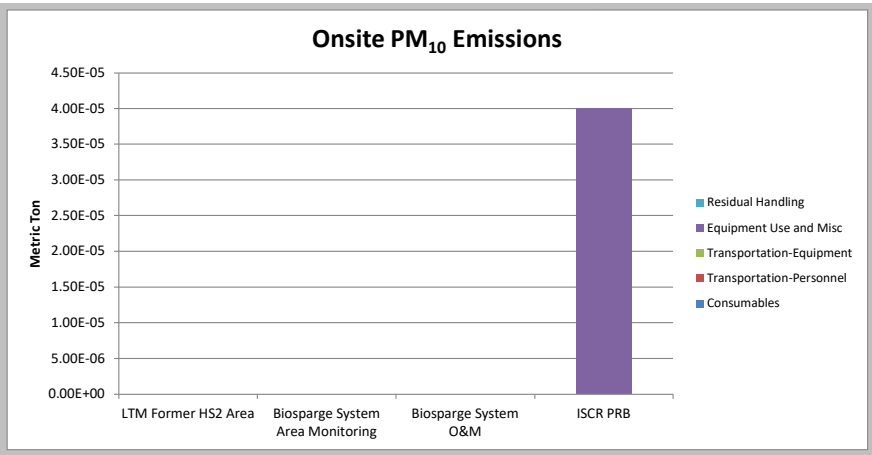

GHG Emissions
Metric Tons
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

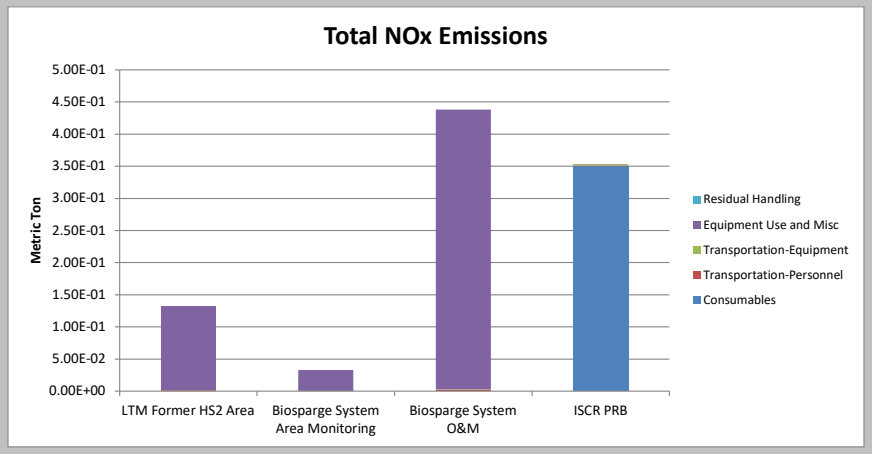

Total Energy Used
MMBTU
8.00E+03
7.00E+03
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

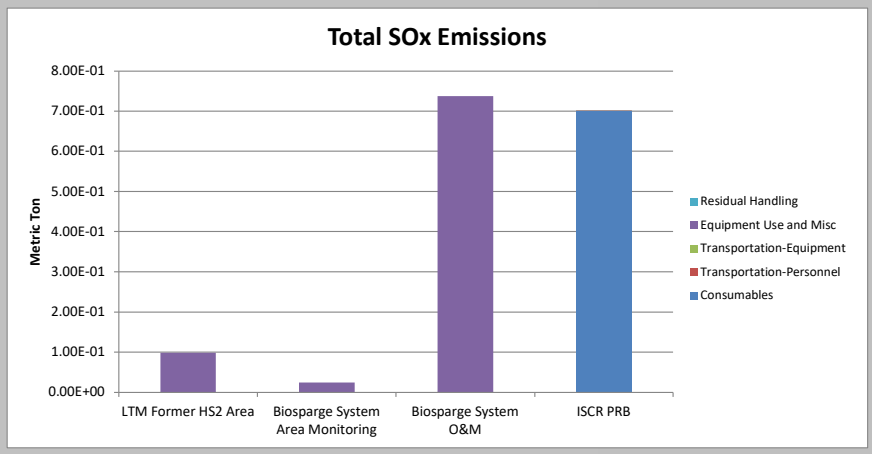

Water Consumption
Gallons
3.50E+05
3.00E+05
2.50E+05
2.00E+05
1.50E+05
1.00E+05
5.00E+04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

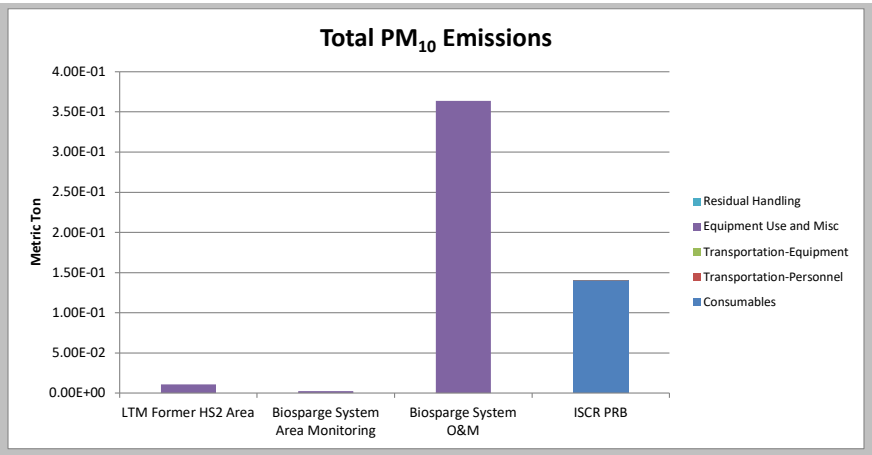

Onsite NOx Emissions
Metric Ton
7.00E-04
6.00E-04
5.00E-04
4.00E-04
3.00E-04
2.00E-04
1.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

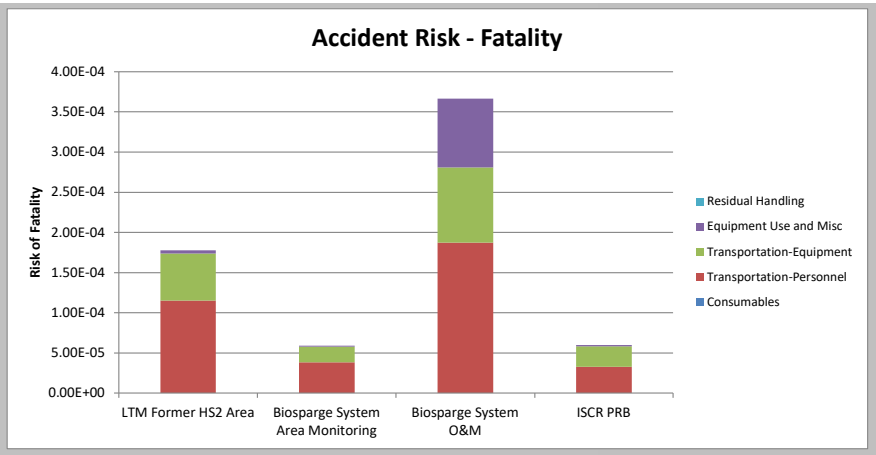

Onsite SOx Emissions
Metric Ton
4.50E-05
4.00E-05
3.50E-05
3.00E-05
2.50E-05
2.00E-05
1.50E-05
1.00E-05
5.00E-06
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

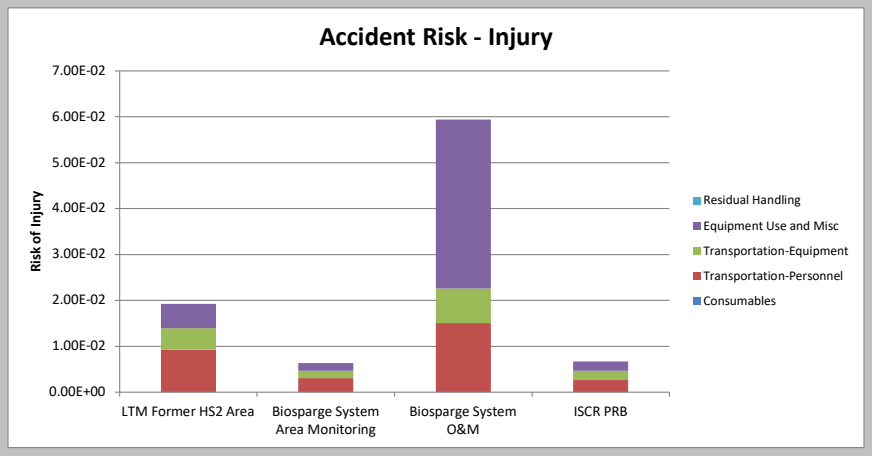

Onsite PM10 Emissions
Metric Ton
4.50E-05
4.00E-05
3.50E-05
3.00E-05
2.50E-05
2.00E-05
1.50E-05
1.00E-05
5.00E-06
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

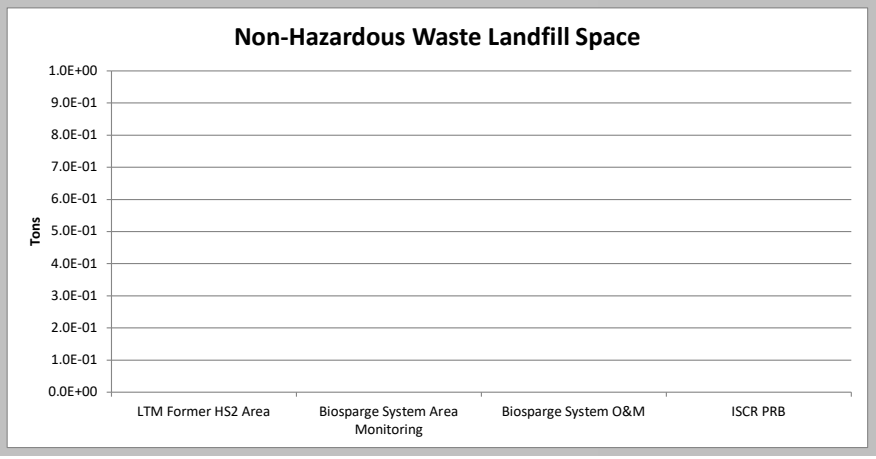

Total NOx Emissions
Metric Ton
5.00E-01
4.50E-01
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

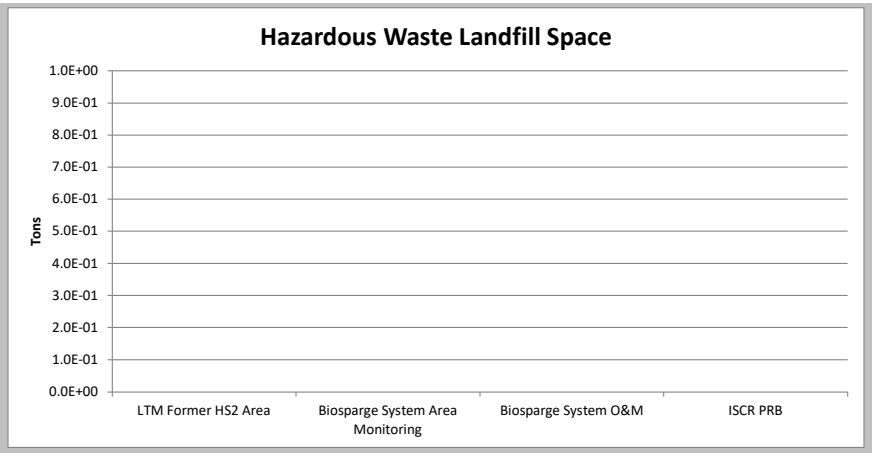

Total SOx Emissions
Metric Ton
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

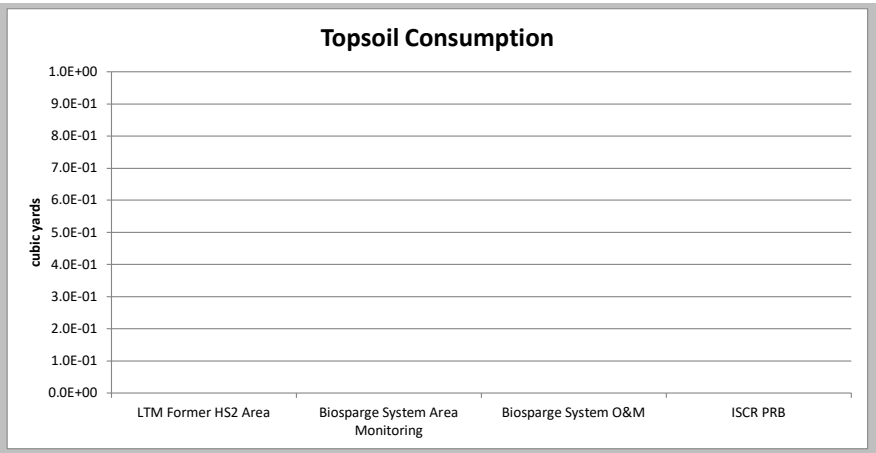

Total PM10 Emissions
Metric Ton
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

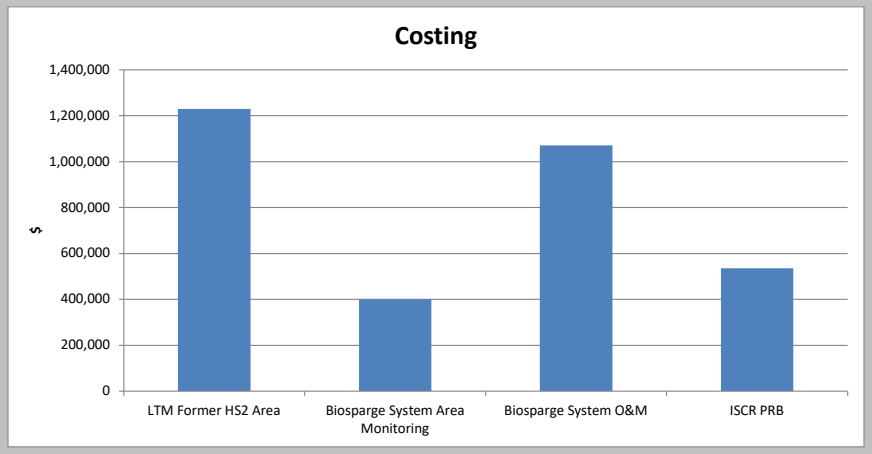

Accident Risk - Fatality
Risk of Fatality
4.00E-04
3.50E-04
3.00E-04
2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

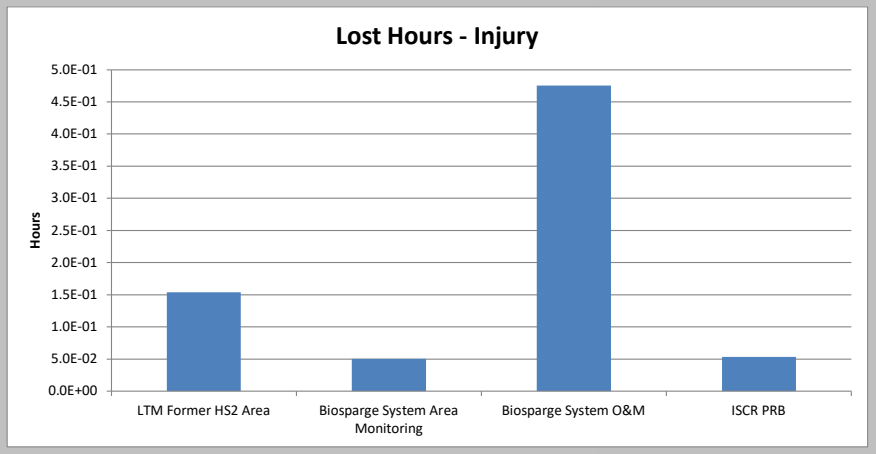

Accident Risk - Injury
Risk of Injury
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

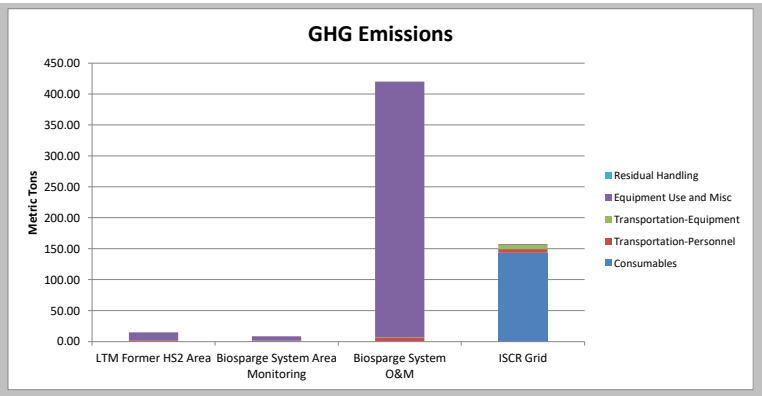

Costing
$
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

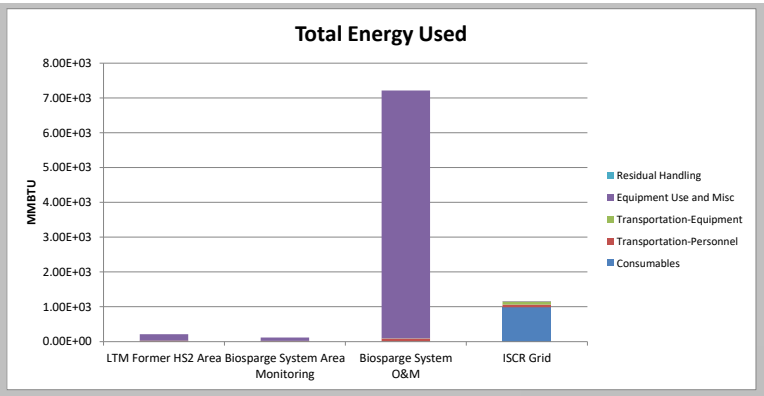

Lost Hours - Injury
Hours
5.0E-01
4.5E-01
4.0E-01
3.5E-01
3.0E-01
2.5E-01
2.0E-01
1.5E-01
1.0E-01
5.0E-02
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

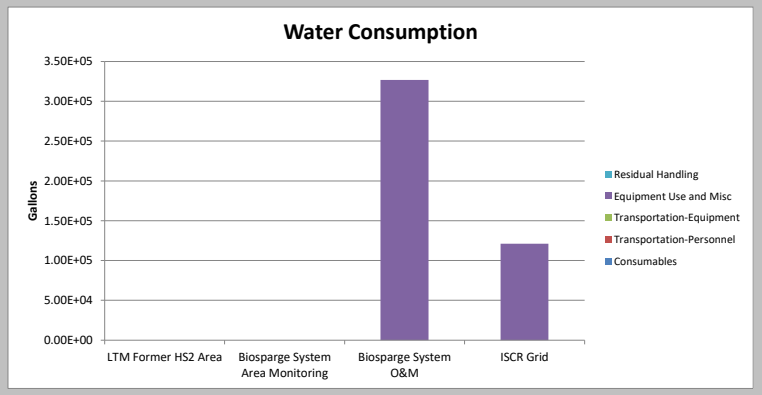
Sustainable Remediation - Environmental Footprint Summary
Option 3 ISCR Grid

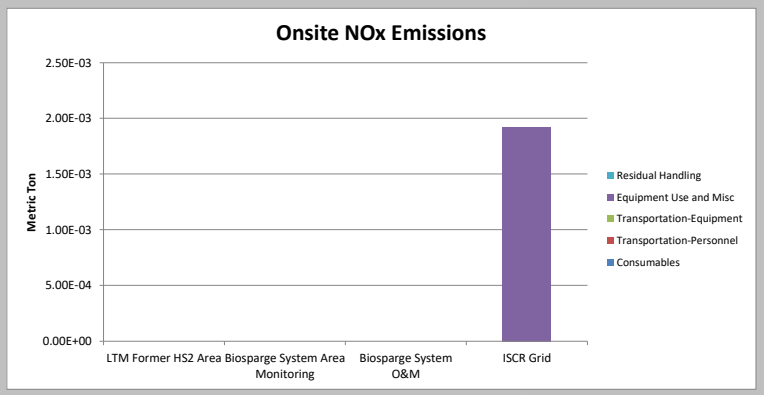
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.90	2.4E+01	NA	NA	NA	NA	NA	7.9E-04	2.5E-05	1.1E-04	5.4E-05	4.3E-03
	Transportation-Equipment	0.17	2.2E+00	NA	NA	NA	NA	NA	5.4E-05	9.5E-07	4.8E-06	2.7E-05	2.2E-03
	Equipment Use and Misc	12.70	1.8E+02	5.3E-02	1.0E-04	0.0E+00	0.0E+00	0.0E+00	6.1E-02	4.6E-02	5.1E-03	2.0E-06	2.5E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	14.77	2.08E+02	5.27E-02	1.03E-04	0.00E+00	0.00E+00	0.00E+00	6.18E-02	4.57E-02	5.20E-03	8.30E-05	8.99E-03
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.36	1.7E+01	NA	NA	NA	NA	NA	5.6E-04	1.8E-05	8.0E-05	3.8E-05	3.1E-03
	Transportation-Equipment	0.12	1.6E+00	NA	NA	NA	NA	NA	3.9E-05	6.8E-07	3.4E-06	2.0E-05	1.6E-03
	Equipment Use and Misc	6.80	9.7E+01	3.8E-02	7.4E-05	0.0E+00	0.0E+00	0.0E+00	3.3E-02	2.4E-02	2.7E-03	1.4E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	8.28	1.16E+02	3.77E-02	7.39E-05	0.00E+00	0.00E+00	0.00E+00	3.33E-02	2.45E-02	2.81E-03	5.92E-05	6.31E-03
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	6.61	8.3E+01	NA	NA	NA	NA	NA	2.7E-03	8.6E-05	3.9E-04	1.9E-04	1.5E-02
	Transportation-Equipment	0.59	7.7E+00	NA	NA	NA	NA	NA	1.8E-04	3.3E-06	1.6E-05	9.4E-05	7.5E-03
	Equipment Use and Misc	412.77	7.1E+03	3.3E+05	6.4E+02	0.0E+00	0.0E+00	0.0E+00	4.4E-01	7.4E-01	3.6E-01	8.6E-05	3.7E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	419.97	7.21E+03	3.27E+05	6.41E+02	0.00E+00	0.00E+00	0.00E+00	4.38E-01	7.37E-01	3.64E-01	3.66E-04	5.94E-02
ISCR Grid	Consumables	143.44	9.8E+02	NA	NA	NA	NA	NA	2.9E-01	5.7E-01	1.1E-01	NA	NA
	Transportation-Personnel	6.02	7.8E+01	NA	NA	NA	NA	NA	1.9E-03	3.6E-05	1.8E-04	5.2E-05	4.2E-03
	Transportation-Equipment	6.63	8.7E+01	NA	NA	NA	NA	NA	2.1E-03	3.7E-05	1.9E-04	4.1E-05	3.3E-03
	Equipment Use and Misc	1.15	1.3E+01	1.2E+05	0.0E+00	1.9E-03	1.2E-04	1.2E-04	3.0E-03	7.3E-04	1.1E-03	3.2E-06	4.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	157.25	1.16E+03	1.21E+05	0.00E+00	1.92E-03	1.20E-04	1.20E-04	2.94E-01	5.75E-01	1.16E-01	9.64E-05	1.15E-02
Total		**6.0E+02**	**8.7E+03**	**4.5E+05**	**6.4E+02**	**1.9E-03**	**1.2E-04**	**1.2E-04**	**8.3E-01**	**1.4E+00**	**4.9E-01**	**6.1E-04**	**8.6E-02**

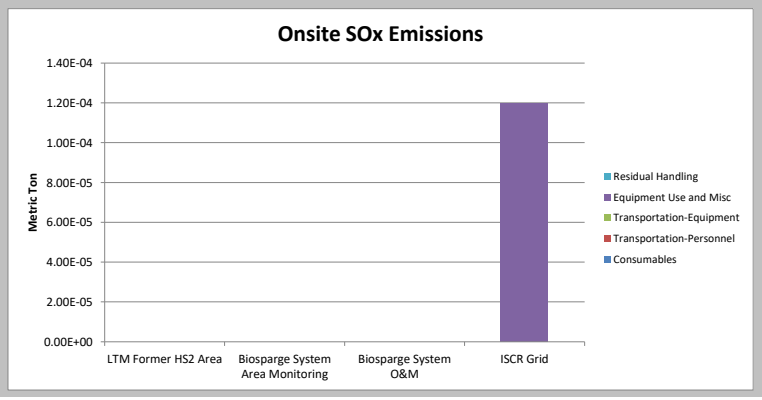
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	574,000	7.2E-02	2.3%	$3,137,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	400,000	5.0E-02	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	1,070,000	4.8E-01	2.3%	
ISCR Grid	0.0E+00	0.0E+00	0.0E+00	1,120,000	1.1E-01	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$3,164,000**	**7.1E-01**	**1.7%**	

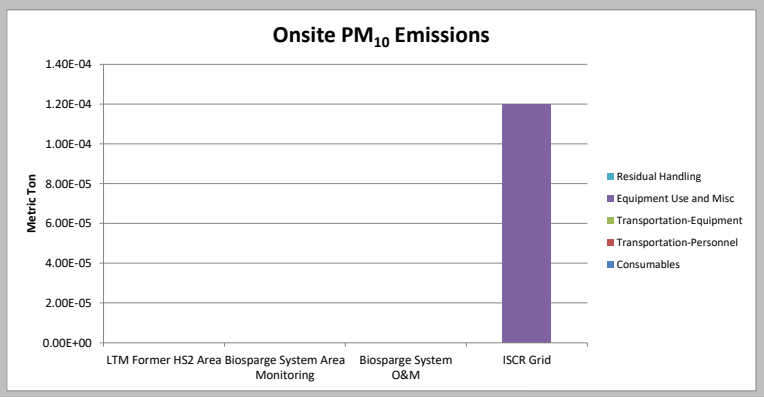

GHG Emissions
Metric Tons
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

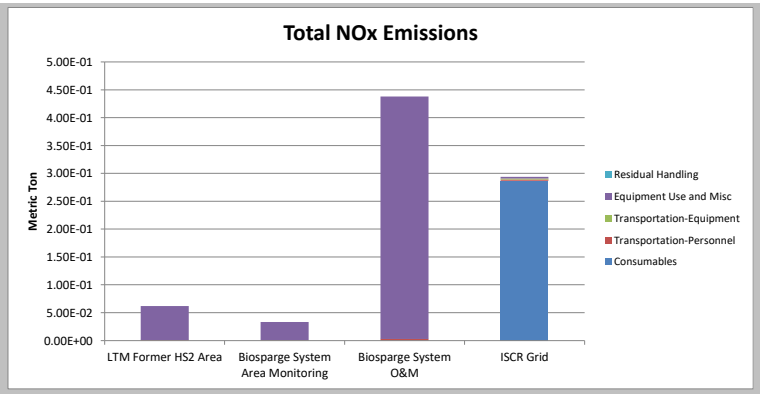

Total Energy Used
MMBTU
8.00E+03
7.00E+03
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

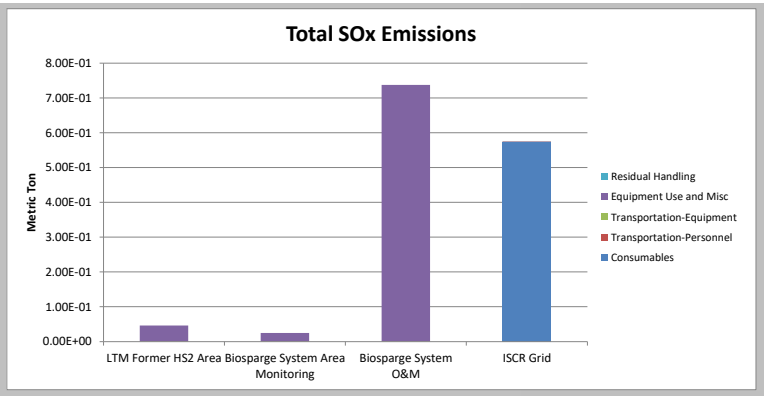

Water Consumption
Gallons
3.50E+05
3.00E+05
2.50E+05
2.00E+05
1.50E+05
1.00E+05
5.00E+04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

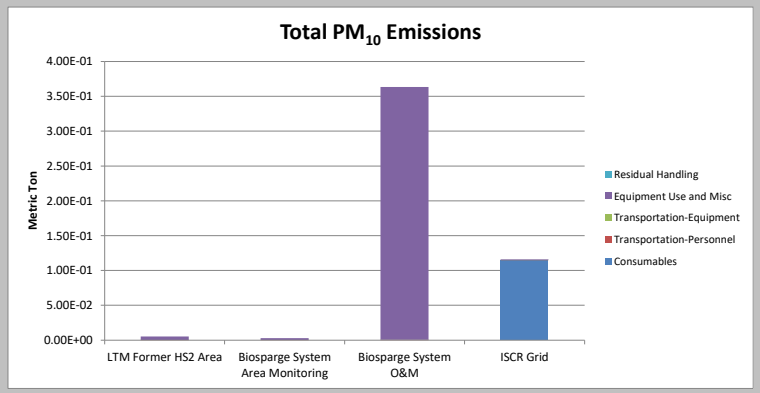

Onsite NOx Emissions
Metric Ton
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

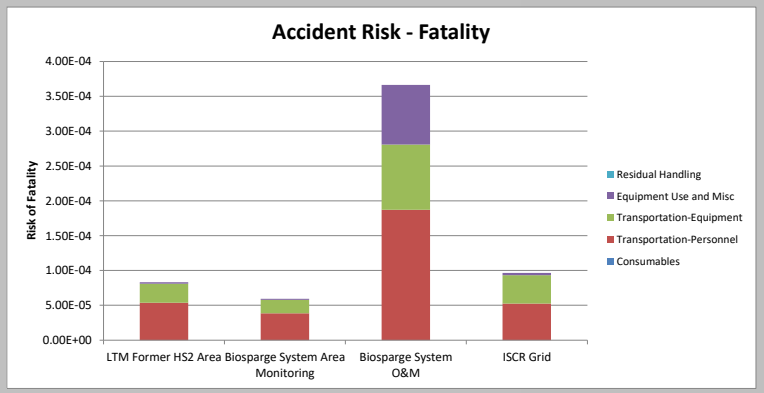

Onsite SOx Emissions
Metric Ton
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

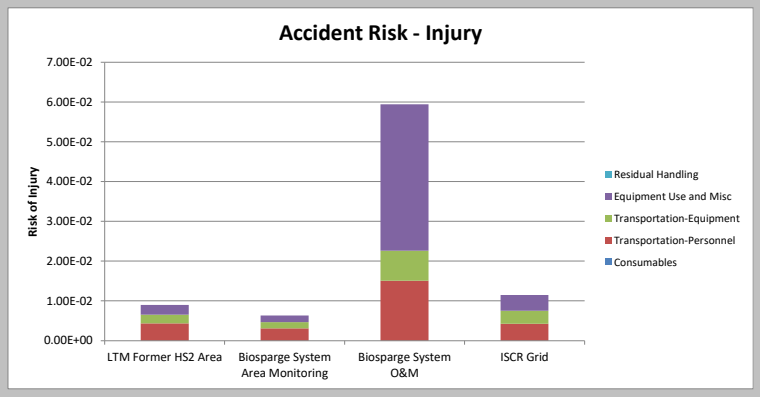

Onsite PM10 Emissions
Metric Ton
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

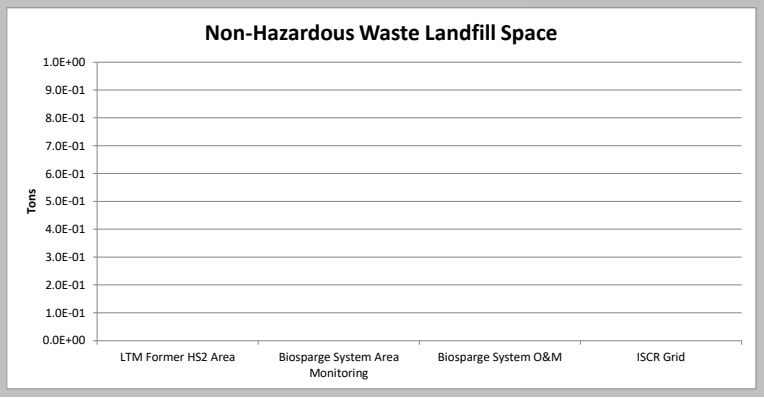

Total NOx Emissions
Metric Ton
5.00E-01
4.50E-01
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

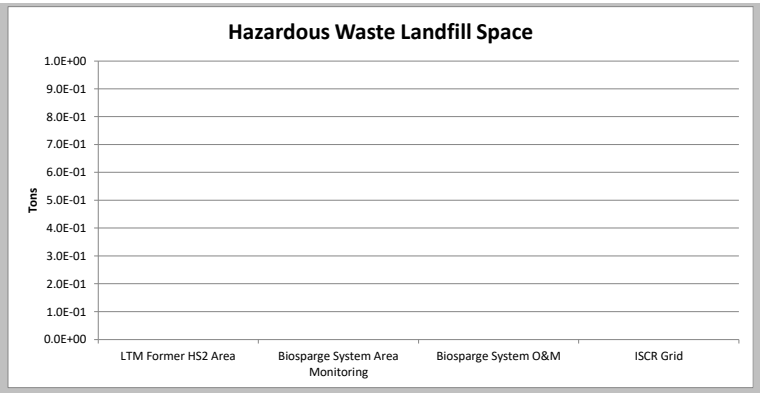

Total SOx Emissions
Metric Ton
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

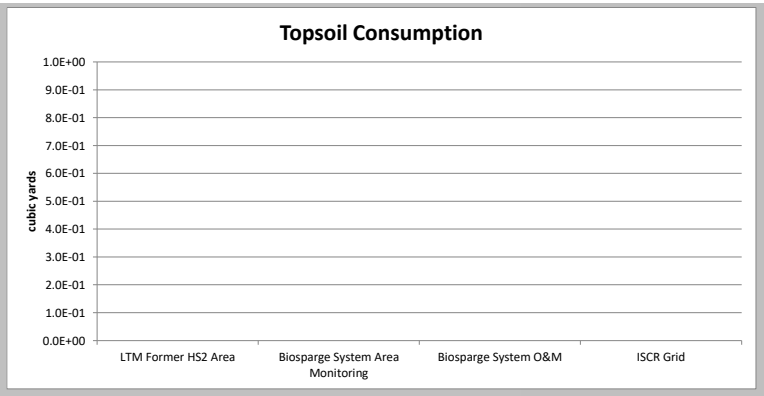

Total PM10 Emissions
Metric Ton
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

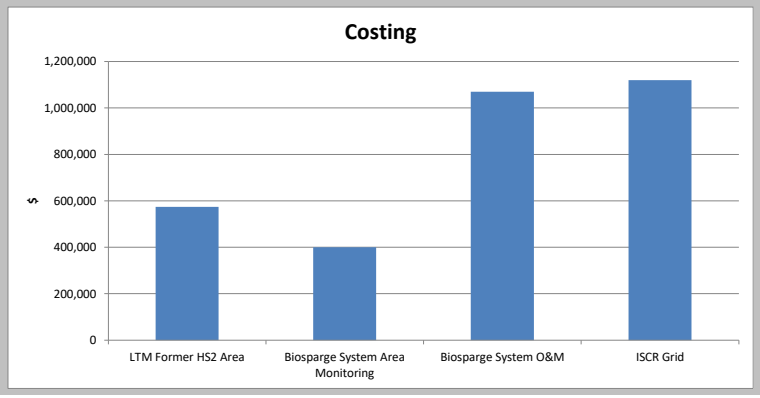

Accident Risk - Fatality
Risk of Fatality
4.00E-04
3.50E-04
3.00E-04
2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

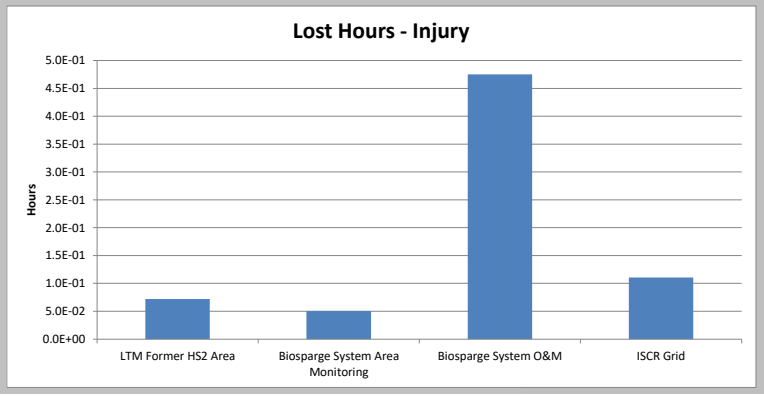

Accident Risk - Injury
Risk of Injury
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Costing
$
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Lost Hours - Injury
Hours
5.0E-01
4.5E-01
4.0E-01
3.5E-01
3.0E-01
2.5E-01
2.0E-01
1.5E-01
1.0E-01
5.0E-02
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid

AECOM
150 North Orange Avenue
Orlando, FL 32801
aecom.com

Project name:
MLP/VAB

Project ref:
MLP/VAB Former HS2 RAE ADP

To:
Ryan O'Meara
Kennedy Space Center, Florida

From:
Randy Sillan, PhD, PE
Linnea King Clark

Date:
September 26, 2023

Memo

Subject: Response to Comments on Former Hot Spot 2 Remedial Alternatives Evaluation; Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB), SWMU 056

AECOM's responses to comments provided by HydroGeoLogic and Tetra Tech from their review of the MLP/VAB, SWMU 056, Former Hot Spot 2 Remedial Alternatives Evaluation are provided here.

Responses to HydroGeoLogic Comments

1. Comment: Slide 2 – Please note that the second goal, obtain team consensus on the treatment area, does not appear to align with the second consensus statement in the cover letter. The second consensus statement in the cover letter is to conduct fate and transport modeling to support the remedial design.

   Response: The goals were revised to be consistent with the consensus statements.

2. Comment: Slide 10 (new slide 11) – It would be helpful to specify the depths associated with the deep groundwater referenced on this slide. How many data points were used in the Mann-Kendall analysis?

   Response: The first bullet was revised to state 5 sampling events were included in the Mann-Kendall trend analysis. At the time of the analysis, 5 groundwater sampling events were available for the analysis since shutdown of the air sparge system in April 2018. The second sub bullet was revised to show that deep groundwater refers to groundwater from 40 to 50 ft bls at the time of the Mann-Kendall trend analysis.

3. Comment: Slide 24 (new slide 26) – There is a typo on sparge well, 1st bullet.

   Response: Corrected.

4. Comment: Slide 45 (new slide 47) – The second bullet refers to cis-1,2-dichloroethane (cDCE) Natural Attenuation Default Concentration (NADC) plume. However, the 2021 data described on prior slides did not show cDCE concentrations greater than NADC.

   Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."

5. Comment: Slide 46 (new slide 49) – This option assumes 15 years of active treatment by the permeable reactive barriers (PRBs). Will the PRBs need to be replenished with amendment during that timeframe?

6. *Response: The expected treatment lifespan of the in-situ chemical reduction (ISCR) PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on*

the slide, the time to achieve the corrective action objective (CAO) of Groundwater Cleanup Target Levels (GCTLs) upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.

7. Comment: Options 2 and 3 – What is the estimated distance between PRB#2 or the downgradient edge of the treatment grid and the current bio barrier?

   Response: The biosparge barrier injection wells are approximately 250 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3. This distance was added to new slides #49 and #52. Note that the monitoring well network upgradient of the biosparge barrier is approximately 150 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3.

8. Comment: Slide 49 (new slide 54) – Parenthesis in first bullet under Option 3 should read "design and install grid."

   Response: Corrected.

Responses to Tetra Tech Comments

1. Comment: Slides 45 and 47 (new slide 47 and 51) – Bioaugmentation was retained as a technology on slide 41. However, there is no mention of this technology being combined with ISCR in Options 2 and 3 or costs associated with it in the attachments. Was bioaugmentation eliminated after further evaluation?

   Response: Bioaugmentation with a microbial consortia including Dhc was not eliminated but is not included in the conceptual designs for Options 2 and 3. Similar to the ISCR design at Hot Spot 3, bioaugmentation is not included because Dhc is likely present and the primary degradation pathway is expected to be abiotic. However, bioaugmentation can be added, if needed, during the remedial design phase with limited effect on remedy costs. A note was added to the slides to indicate that bioaugmentation is not included.

2. Comment: Slide 45 (new slide 47) – Second bullet under ISCR PRB Strategy does not agree with site characterization slides (no cDCE NADC plume shown on site characterization slides).

   Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."

3. Comment: Slide 45 (new slide 47) – There is a typo at the end of the first bullet under implementation; "Host Spot 3" should read "Hot Spot 3".

   Response: Corrected

4. Comment: Slide 46 (new slide 49) – Please specify the expected lifespan of the PRBs on this slide. Costing for Option 2 appears to be one injection event to install PRBs. Are the PRBs expected to last through the estimated treatment timeframe (~15 years)?

   Response: The expected treatment lifespan of the ISCR PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on the slide, the time to achieve the CAO of GCTLs upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.

5. Comment: Slides 47 and 48 (new slides 51 and 52) – Third bullet under ISCR Grid Strategy is misleading ("NADC plumes"). Figure on slide 48 shows treatment area extent is the vinyl chloride (VC) NADC plume with overlap of the cDCE GCTL plume.

   Response: The third bullet was revised on slide #51 to read "VC NADC plume." The text in the 1st sub-bullet on slide #52 was revised from "PRB #2" to "ISCR grid."

6. Comment: Slide 54 (new slide 59) – The consensus statements appear conflicting as currently written. Statement 1 recommends the selection of Option 2. However, statement 2 states the fate and transport model will support selection and optimal design of an ISCR remedy, which suggests the best ISCR remedy option is not yet determined. It is understood that Option 2 is more desirable for several reasons as stated on slide 53 (new slide 58). Will the selected alternative be reevaluated following the fate and transport modeling and prior to IM Work Plan preparation? If not, consider revising the first sub-bullet of Statement 2.

   Response: The first sub-bullet of Statement 2 was revised to state that the modeling will be performed "to develop optimal design for the ISCR remedy to manage matrix diffusion." This revision is made to clarify that the modeling effort will be used to optimize the design of Option 2.

APPENDIX B

SOIL BORING LOG

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BORING NUMBER MLPV-SB0300

AECOM

TOTAL DEPTH 60 FT BGS
PAGE 1 OF 1

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/02/2022 **COMPLETED** 11/03/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
ON **Ground Elevation** N/A
DRILLING EQUIPMENT Geoprobe 8140DT
EASTING N/A **NORTHING** N/A
DRILLING METHOD Sonic
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE N/A

DEPTH (ft)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0			GP		0.00	Poorly graded gravel (GP), very coarse, angular [TOPSOIL]
			SP		0.50	- 10R 8/1 (white), dry - no odor, no staining - non-cohesive, very loose
5			SP		5.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE]
			SP		6.50	- 2.5Y 5/4 (light olive brown), dry - no odor, no staining - non-cohesive, very loose
			SP		8.00	
10			SP		8.50	Poorly graded sand (SP), medium, subangular [NATIVE]
			SP		10.00	- 10YR 3/1 (very dark gray), moist - no odor, no staining - non-cohesive, very loose
15			NR		15.00	Poorly graded sand (SP), medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), moist - no odor, no staining - non-cohesive, very loose
			SP		18.00	Poorly graded sand (SP), medium, subangular [NATIVE] - 10YR 2/1 (black), moist - no odor, no staining - non-cohesive, very loose
20						
25			SP		25.00	Poorly graded sand (SP), subangular [NATIVE] - 10YR 2/2 (very dark brown / dusky yellowish brown), moist - no odor, no staining - non-cohesive, to very loose
30	SN	42				Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/6 (brownish yellow / dark yellowish orange), moist - no odor, no staining - non-cohesive, very loose
35						No Recovery
						Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/2 (light brownish gray / pale yellowish brown), wet - no odor, no staining - non-cohesive, very loose
40						Poorly graded sand (SP), coarse, subangular, 35-45% shell, Almost all shell fragments [NATIVE] - 2.5Y 5/1 (gray), moist - no odor, no staining - non-cohesive, very loose
45			SC		45.00	Clayey sand (SC), fine, poorly graded, subangular, 15-25% clay[NATIVE] - N 6/0 (grey), moist - no odor, no staining - cohesive, medium dense
50						
55			CL		55.00	Lean clay with sand (CL), 15-25% fine sand, few shell fragments <5% (native) - 10BG 7/1 (light greenish gray), moist - no odor, no staining - cohesive, medium dense
60						Bottom of borehole at 60 feet.

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 10:06 - C:\USERS\CHASTAIN\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV SB300-304.GPJ

BORING NUMBER MLPV-SB0301

AECOM

TOTAL DEPTH 60 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/03/2022 **COMPLETED** 11/03/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
ON
Ground Elevation N/A
DRILLING EQUIPMENT Geoprobe 8140DT
EASTING N/A
NORTHING N/A
DRILLING METHOD Sonic
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE N/A

DEPTH (ft)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0						
			SP		0.50	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), dry - no odor, no staining - non-cohesive, very loose
5			SP		5.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 3/3 (dark brown), wet - no odor, no staining - non-cohesive, very loose
			SP		7.00	
10						Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 2.5Y 6/4 (light yellowish brown), moist - no odor, no staining - non-cohesive, very loose
			SP		11.50	
15			NR		15.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 2/1 (black), moist - no odor, no staining - non-cohesive, very loose
20						No Recovery
			SM		21.00	Silty sand (SM), fine, poorly graded, subangular, 10-20% silt [NATIVE] - 10YR 8/2 (very pale brown / very pale orange), wet - no odor, no staining - non-cohesive, very loose
25			SP		24.00	
			SP		25.00	Poorly graded sand (SP), fine, subangular [NATIVE] - 10YR 3/1 (very dark gray), moist - no odor, no staining - non-cohesive, very loose
30	SN	82				Poorly graded sand (SP), medium to coarse, subangular, 15-25% shell, Mostly a shell hash with some fine to medium grained sand [NATIVE] - 10YR 7/1 (light gray), wet - no odor, no staining - non-cohesive, very loose
35						
			SM		38.00	Silty sand (SM), fine, poorly graded, subangular, 15-25% silt [NATIVE] - 5Y 5/1 (gray), moist - no odor, no staining - non-cohesive, loose
40						
45			SM		45.00	Silty sand (SM), fine, poorly graded, subangular, 20-30% silt [NATIVE] - 5Y 5/1 (gray), wet - no odor, no staining - non-cohesive, loose
50						
55			CL		54.50	Lean clay with sand (CL), 15-25% fine sand, few shell fragments <5% (native) - 10BG 7/1 (light greenish gray), moist - no odor, no staining - cohesive, medium dense
60						

Bottom of borehole at 60 feet.

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 10:07 - C:\USERS\CHASTAIN\JDOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV SB300-304.GPJ

BORING NUMBER MLPV-SB0302

AECOM

TOTAL DEPTH 60 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/16/2022 **COMPLETED** 11/16/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
ON **Ground Elevation** N/A
DRILLING EQUIPMENT Geoprobe 8140DT
EASTING N/A **NORTHING** N/A
DRILLING METHOD Sonic
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE N/A

DEPTH (ft)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			SP		0.00 Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), dry - no odor, no staining - non-cohesive, very loose
10			SP		8.00 Poorly graded sand (SP), fine to medium, subangular, 5-15% roots [NATIVE] - 10YR 2/1 (black), wet - no odor, no staining - non-cohesive, loose
			SP		8.50
			SP		11.00 Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/2 (light brownish gray / pale yellowish brown), moist - no odor, no staining - non-cohesive, loose to loose
20					Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), moist - no odor, no staining - non-cohesive, loose
30	SN	58	SP		25.00 Poorly graded sand (SP), fine to medium, subangular, 25-35% shell, Slight petro odor [NATIVE] - 5Y 5/1 (gray), moist - hydrocarbon odor, no staining - non-cohesive, very loose
40					
45			SP		42.00 Poorly graded sand (SP), fine to medium, subangular, 5-15% shell, Similar Lithology to previous depth but less shell [NATIVE] - 5Y 5/1 (gray), moist - no odor, no staining - non-cohesive, loose
			SC		45.00 Clayey sand (SC), fine, poorly graded, subangular, 15-25% clay[NATIVE] - N 6/0 (grey), moist - no odor, no staining - cohesive, medium dense
55			CL		55.00 Lean clay with sand (CL), 15-25% fine sand, few shell fragments <5% (native) - 10BG 7/1 (light greenish gray), moist - no odor, no staining - cohesive, medium dense
60					Bottom of borehole at 60 feet.

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 10:07 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV SB300-304.GPJ

BORING NUMBER MLPV-SB0303

AECOM

TOTAL DEPTH 60 FT BGS
PAGE 1 OF 1

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/16/2022 **COMPLETED** 11/16/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
ON **Ground Elevation** N/A
DRILLING EQUIPMENT Geoprobe 8140DT
EASTING N/A **NORTHING** N/A
DRILLING METHOD Sonic
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE N/A

DEPTH (ft)	SAMPLE TYPE	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0					
		SP		0.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/2 (light brownish gray / pale yellowish brown), dry - no odor, no staining - non-cohesive, very loose
5		SP		5.00	Poorly graded sand (SP), fine to medium, subangular, 5-15% roots, 2 inches (6.8 to 8) of gray sand [NATIVE] - 10YR 2/1 (black), moist - organics odor, trace black staining
		SP		8.50	- non-cohesive, loose
10		SP		9.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), moist - no odor, no staining - non-cohesive, loose
15					Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/2 (light brownish gray / pale yellowish brown), moist - no odor, no staining
		SP		18.00	- non-cohesive, loose
20					Poorly graded sand (SP), fine to medium, subangular, 15-25% shell [NATIVE] - 10YR 5/1 (gray), moist - no odor, no staining
		SP		21.00	- non-cohesive, very loose
25					Poorly graded sand (SP), subangular, <10% shell [NATIVE] - 10YR 5/1 (gray), moist - no odor, no staining
		SP		25.00	- non-cohesive, loose
30	SN				Poorly graded sand (SP), fine to medium, subangular, 25-35% shell [NATIVE] - 5Y 5/1 (gray), moist - no odor, no staining - non-cohesive, very loose
35					
		SP		38.00	Poorly graded sand (SP), fine, subangular [NATIVE] - 5Y 5/1 (gray), moist - no odor, no staining - non-cohesive, loose
40					
45		SC		45.00	Clayey sand (SC), fine, poorly graded, subangular, 15-25% clay[NATIVE] - 5Y 6/1 (grey), moist - no odor, no staining - cohesive, medium dense
50					
55		SP		55.00	Grey clayey fine sand with shell -5Y 6/1 (grey / light olive grey), moist -cohesive, soft
60					
					Bottom of borehole at 60 feet.

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 10:07 - C:\USERS\CHASTAIN\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV SB300-304.GPJ

BORING NUMBER MLPV-SB0304

AECOM

TOTAL DEPTH 60 FT BGS
PAGE 1 OF 1

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/17/2022 **COMPLETED** 11/17/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
ON **Ground Elevation** N/A
DRILLING EQUIPMENT Geoprobe 8140DT
EASTING N/A **NORTHING** N/A
DRILLING METHOD Sonic
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE N/A

DEPTH (ft)	SAMPLE TYPE	RECOVERY %	U.S.C.S.	GRAPHIC LOG		MATERIAL DESCRIPTION
0			SP		0.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 6/2 (light brownish gray / pale yellowish brown), dry - no odor, no staining - non-cohesive, loose
5			SP		4.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), dry - no odor, no staining - non-cohesive, loose
10			SP		8.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 2/1 (black), moist - organics odor, no staining - non-cohesive, loose
15			SP		10.50	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 10YR 5/2 (grayish brown), moist - no odor, no staining - non-cohesive, loose
20			NR		15.00	No Recovery
25			SP		23.00	Poorly graded sand (SP), fine to medium, subangular, Some organics throughout [NATIVE] - 10YR 3/3 (dark brown), wet - no odor, no staining - non-cohesive, loose
30	SN	62	SP		24.00	Poorly graded sand (SP), fine to medium, subangular, 25-35% shell [NATIVE] - 10YR 5/1 (gray), moist - no odor, no staining - non-cohesive, loose
40			SP		39.00	Poorly graded sand (SP), fine to medium, subangular [NATIVE] - 5Y 6/1 (gray / light olive gray), moist - no odor, no staining - non-cohesive, loose
45			SC		45.00	Clayey sand (SC), fine, poorly graded, subangular, 15-25% clay[NATIVE] - 5Y 6/1 (grey), moist - no odor, no staining - cohesive, medium dense
55			CL		55.00	Lean clay with sand (CL), 15-25% fine sand, few shell fragments <5% (native) - 10BG 7/1 (light greenish gray), moist - no odor, no staining - cohesive, medium dense
60						Bottom of borehole at 60 feet.

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 10:07 - C:\USERS\CHASTAIN\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV SB300-304.GPJ

APPENDIX C

SOIL CORE PHOTO LOG

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AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
1	11/2/22

Direction Photo Taken:

Description:

SB0300 recovery not photographed from 0' - 5'

View of SB0300
5' – 10'



Photo No.	**Date:**
2	11/2/22

Direction Photo Taken:

Description:

View of SB0300
5' – 10' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
3	11/2/22

Direction Photo Taken:

Description:

View of SB0300
10’ - 15’



Photo No.	**Date:**
4	11/2/22

Direction Photo Taken:

Description:

View of SB0300
10’ - 15’ close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 5	**Date:** 11/2/22
Direction Photo Taken:	
Description: SB0300 no recovery from 15' – 20' View of SB0300 20' – 25'	



Photo No. 6	**Date:** 11/2/22
Direction Photo Taken:	
Description: View of SB0300 20' – 25' close up	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
7	11/3/22

Direction Photo Taken:

Description:

SB0300 no recovery from 25' – 30'

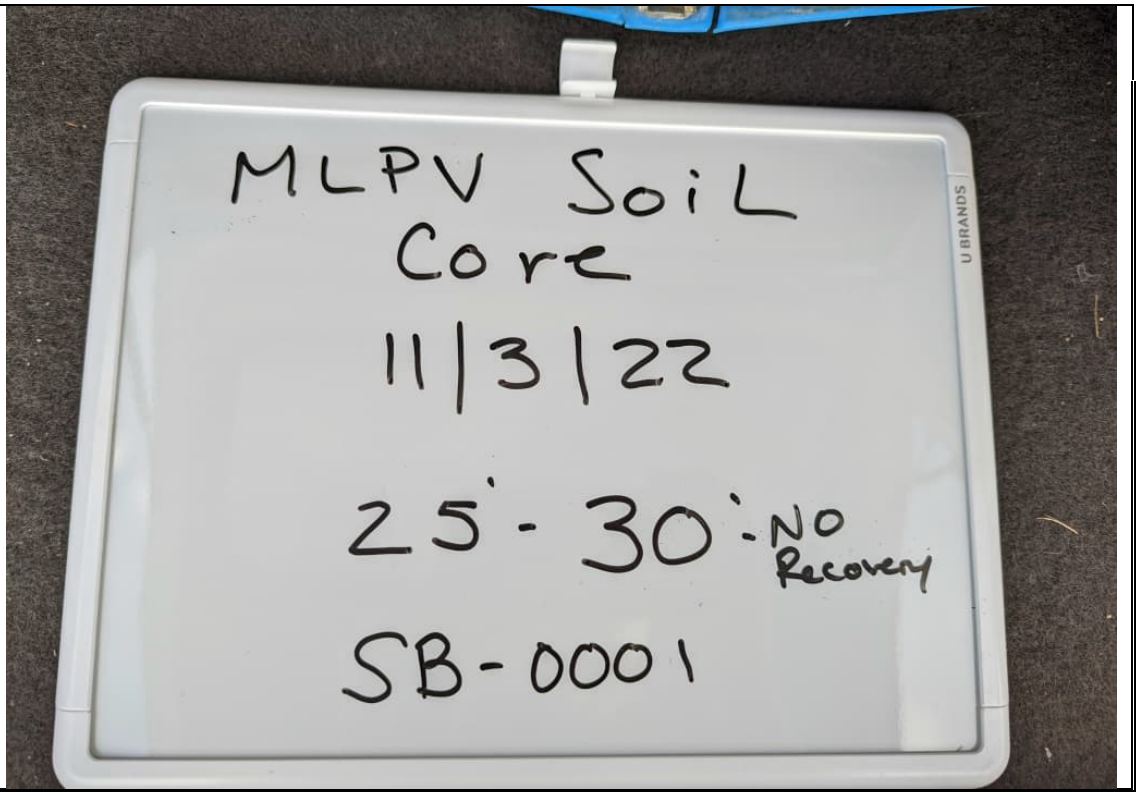
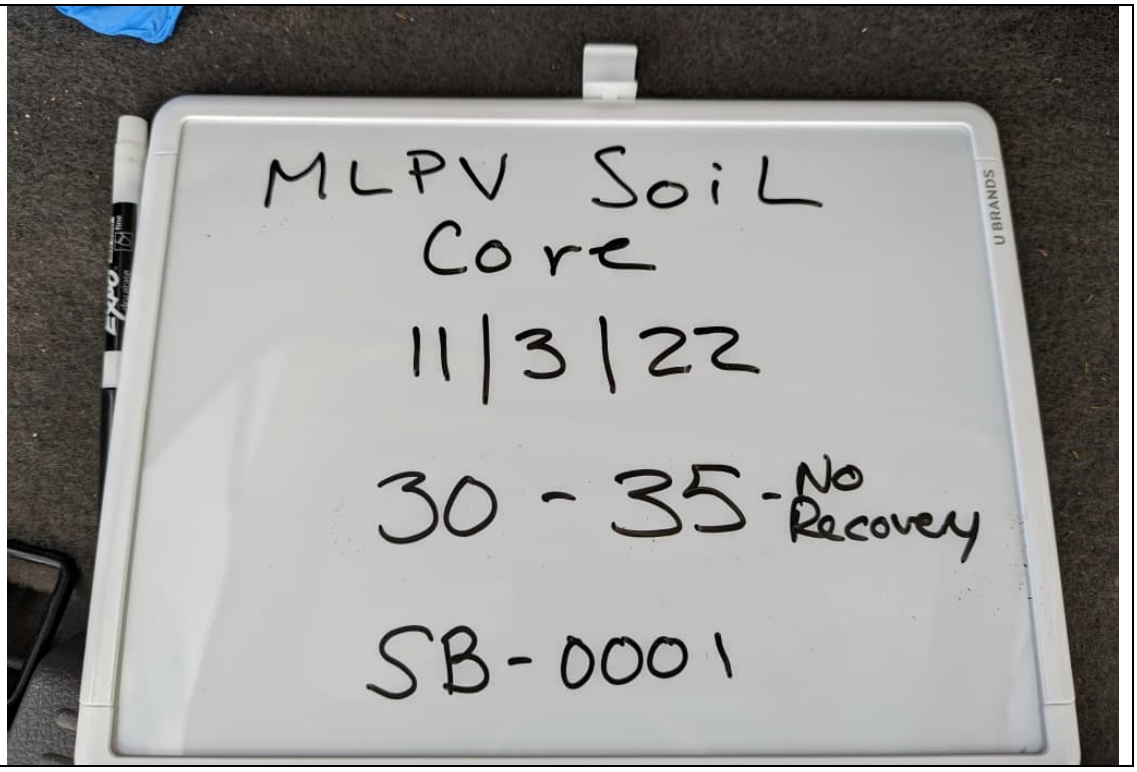


Photo No.	**Date:**
8	11/3/22

Direction Photo Taken:

Description:

SB0300 no recovery from 30' – 35'



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 9	**Date:** 11/3/22
Direction Photo Taken:	
Description: View of SB0300 35' – 45'	



Photo No. 10	**Date:** 11/3/22
Direction Photo Taken:	
Description: View of SB0300 35' – 45' close up SB0300 no recovery from 45' – 55'	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
11	11/3/22

Direction Photo Taken:

Description:

SB0300 no recovery from 55' – 60'

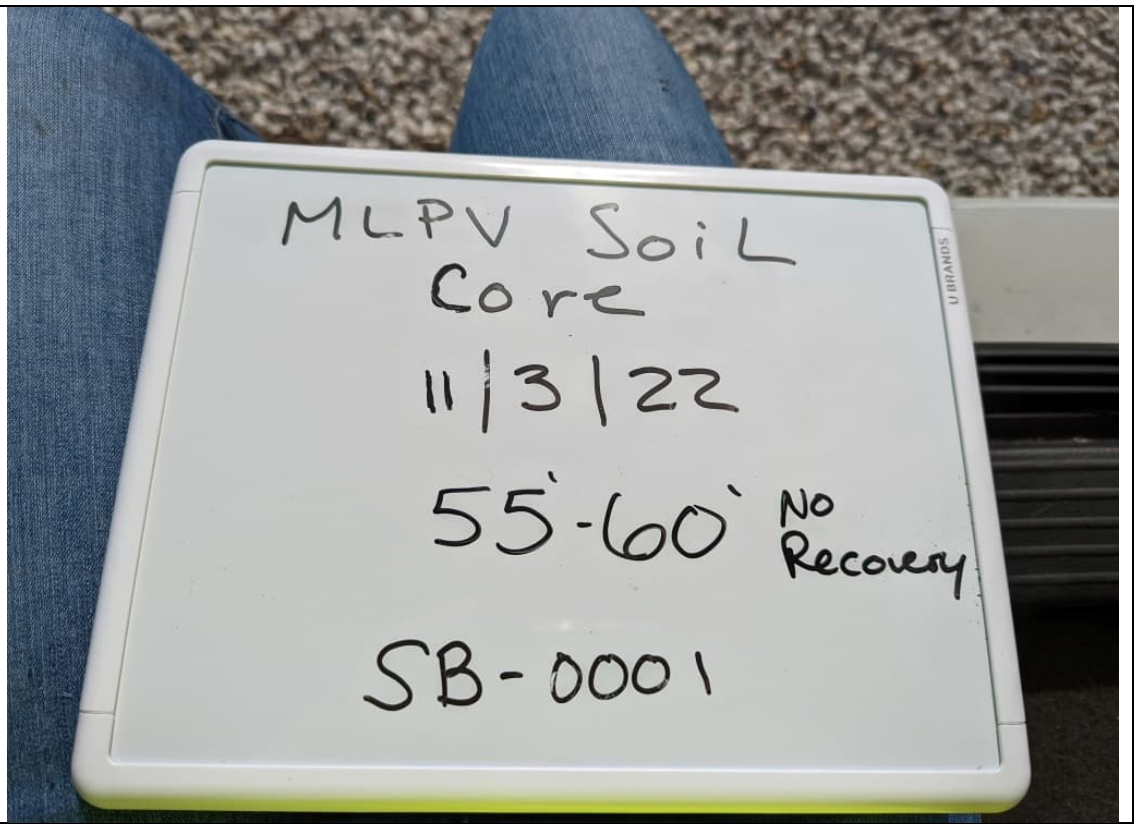


Photo No.	**Date:**
12	11/3/22

Direction Photo Taken:

Description:

View of SB0301
0' – 5'



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
13	11/3/22

Direction Photo Taken:

Description:

View of SB0301
5' – 15'



Photo No.	**Date:**
14	11/3/22

Direction Photo Taken:

Description:

View of SB0301
5' – 15' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 15	**Date:** 11/3/22
Direction Photo Taken:	
Description: View of SB0301 5’ – 15’ close up	



Photo No. 16	**Date:** 11/3/22
Direction Photo Taken:	
Description: View of SB0301 5’ – 15’ close up	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
17	11/3/22

Direction Photo Taken:

Description:

View of SB0301
15' – 25'



Photo No.	**Date:**
18	11/3/22

Direction Photo Taken:

Description:

View of SB0301
15' – 25' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
19	11/3/22

Direction Photo Taken:

Description:

View of SB0301
25’ – 35’

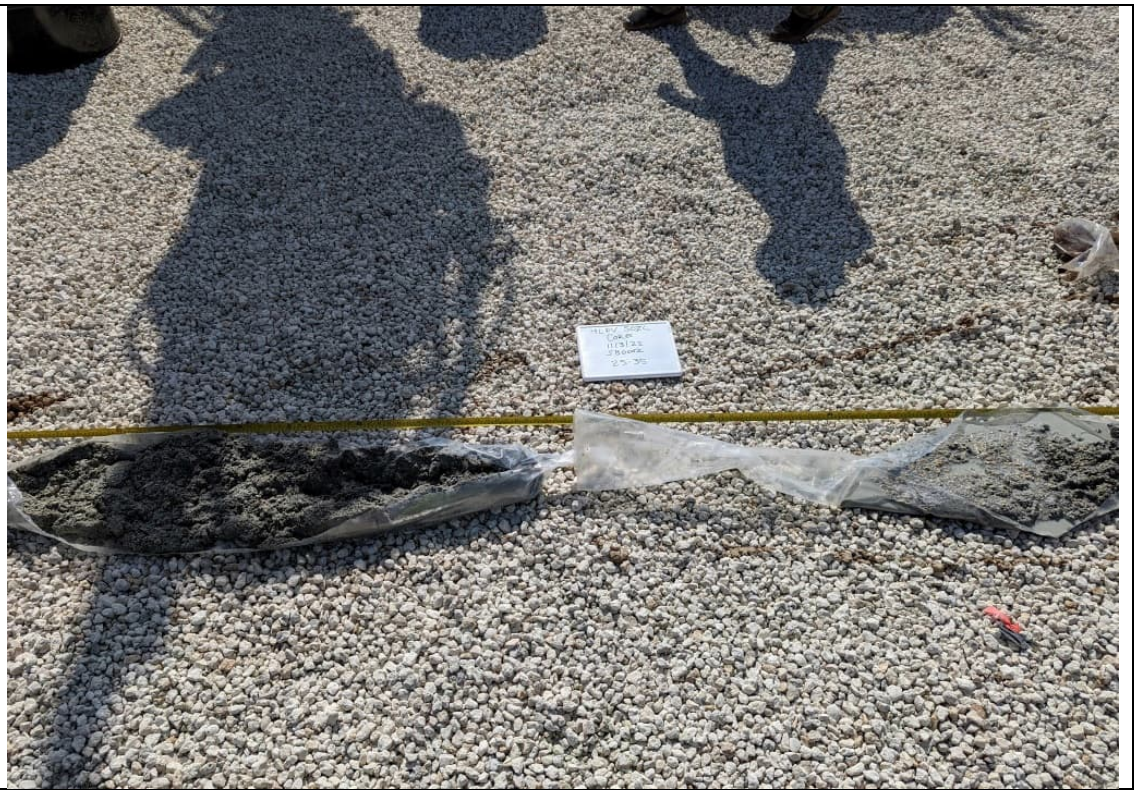


Photo No.	**Date:**
20	11/3/22

Direction Photo Taken:

Description:

View of SB0301
25’ – 35’ close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
21	11/3/22

Direction Photo Taken:

Description:

View of SB0301
35' – 45'

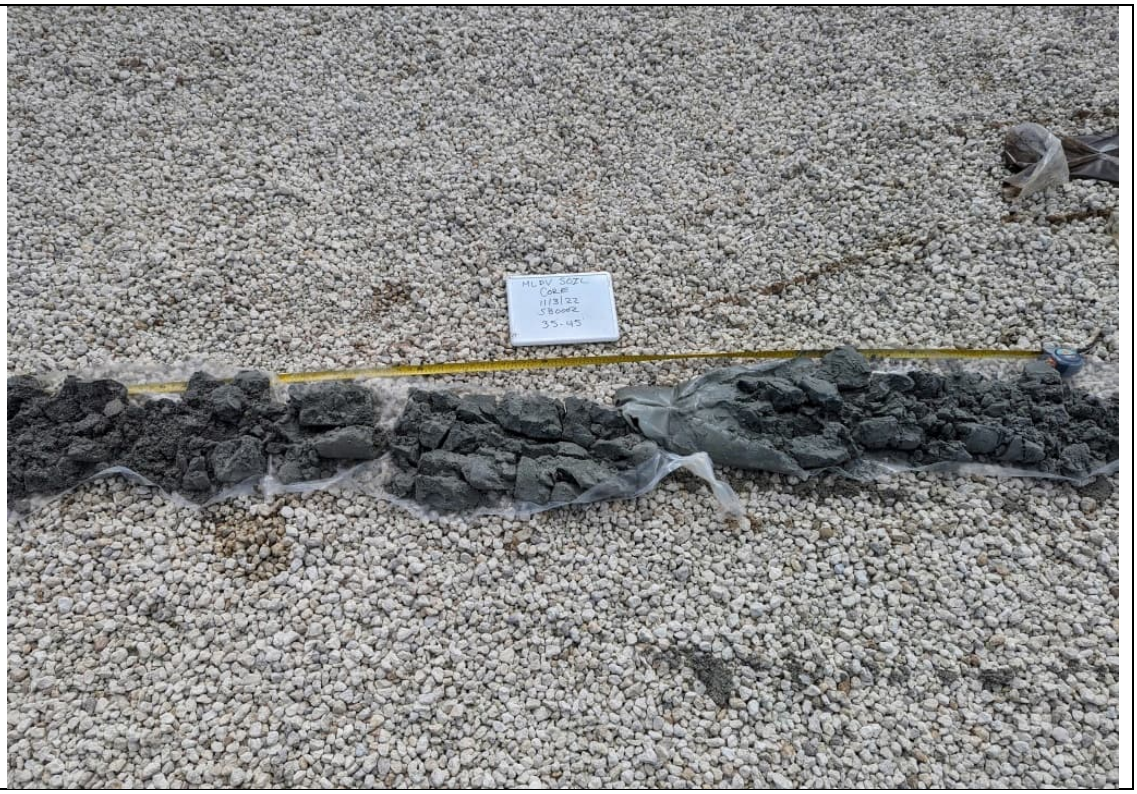


Photo No.	**Date:**
22	11/3/22

Direction Photo Taken:

Description:

View of SB0301
35' – 45' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
23	11/3/22

Direction Photo Taken:

Description:

SB0301 no recovery from 45' – 55'

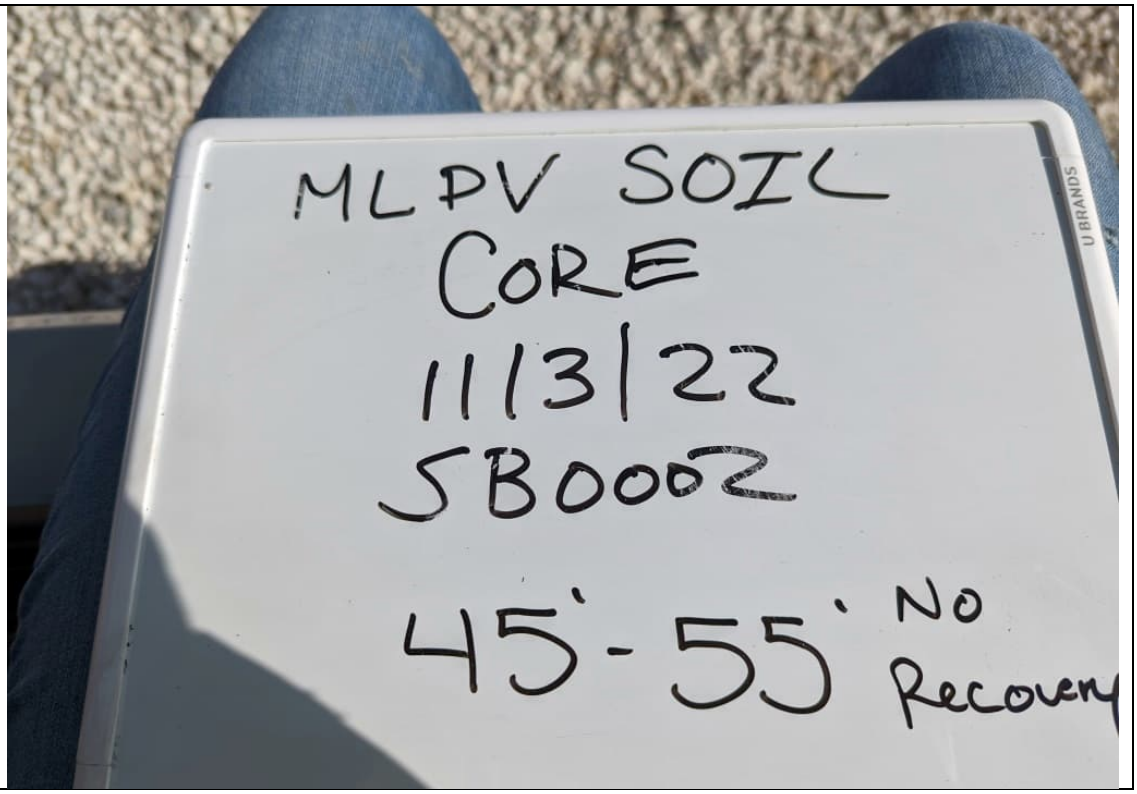
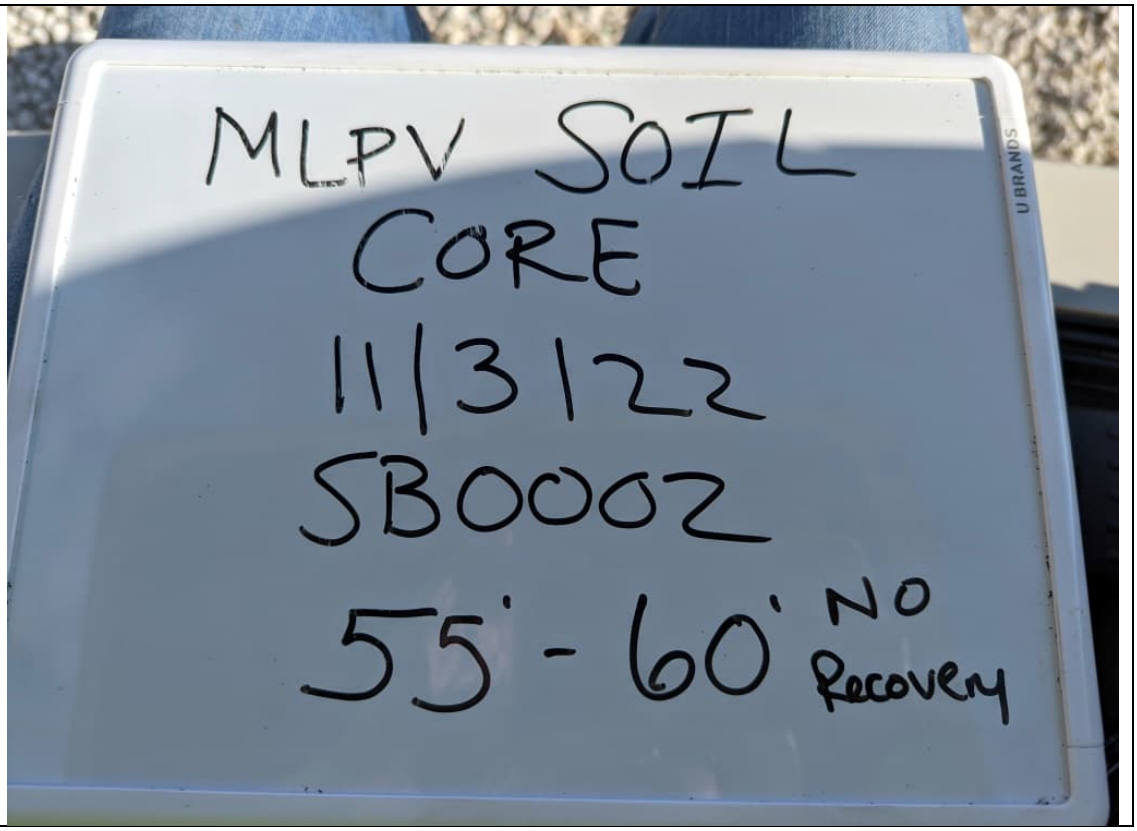


Photo No.	**Date:**
24	11/3/22

Direction Photo Taken:

Description:

SB0301 no recovery from 55' – 60'



AECOM

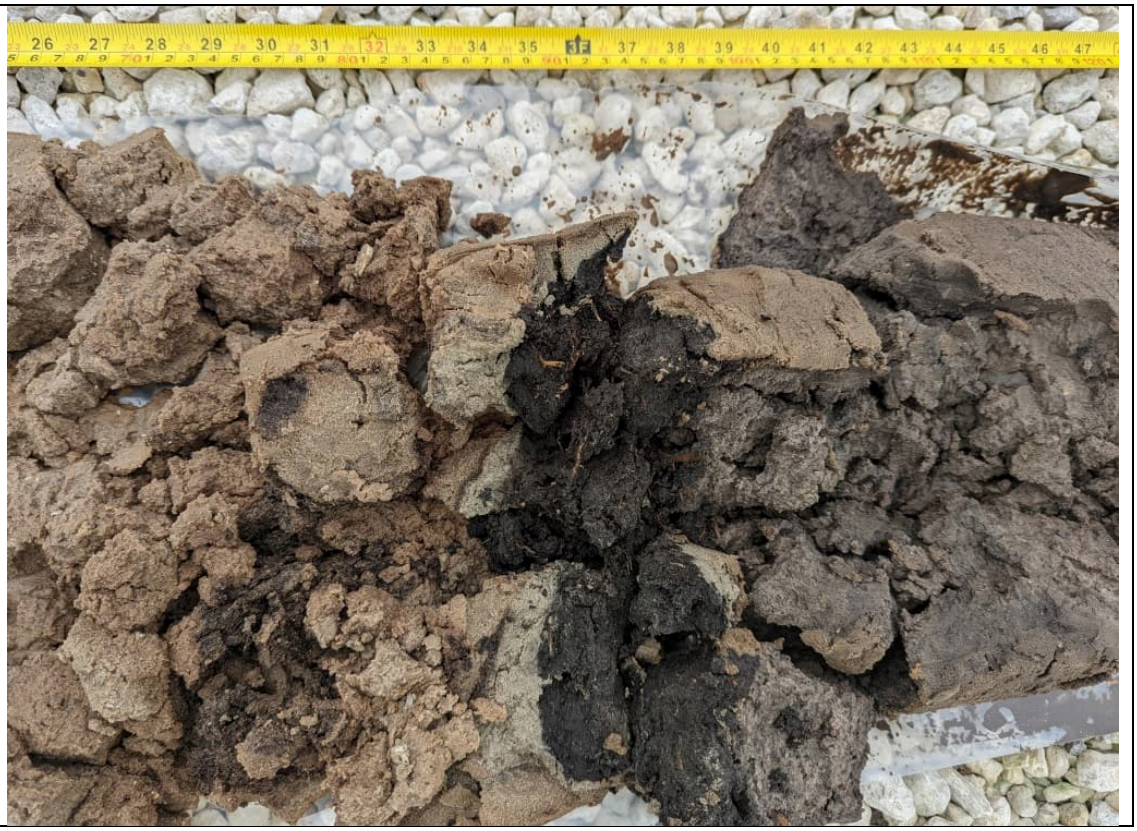
PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 25	**Date:** 11/16/22
Direction Photo Taken:	
Description: SB0302 recovery not photographed from 0' – 5' View of SB0302 5' – 15'	



Photo No. 26	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0302 5' – 15' close up	



AECOM

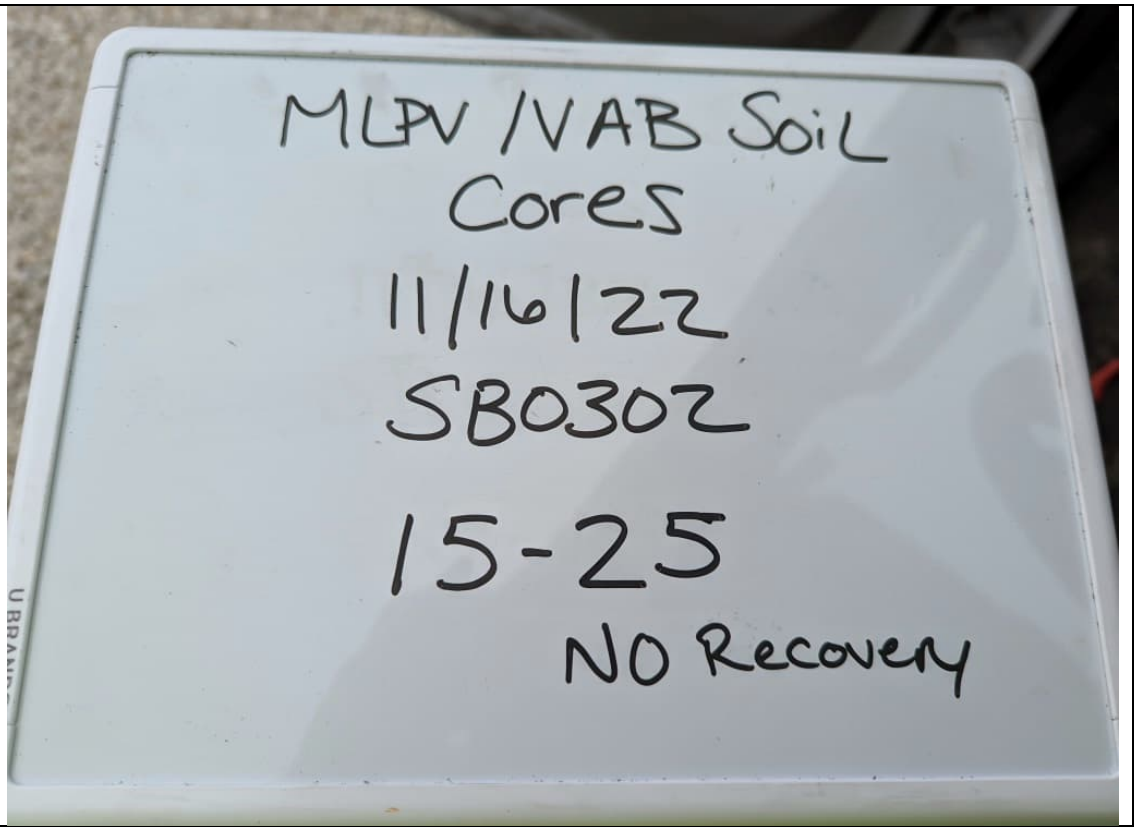
PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 27	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0302 5' – 15' close up	



Photo No. 28	**Date:** 11/16/22
Direction Photo Taken:	
Description: SB0302 no recovery from 15' – 25'	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
29	11/16/22

Direction Photo Taken:

Description:

View of SB0302
25' – 35'

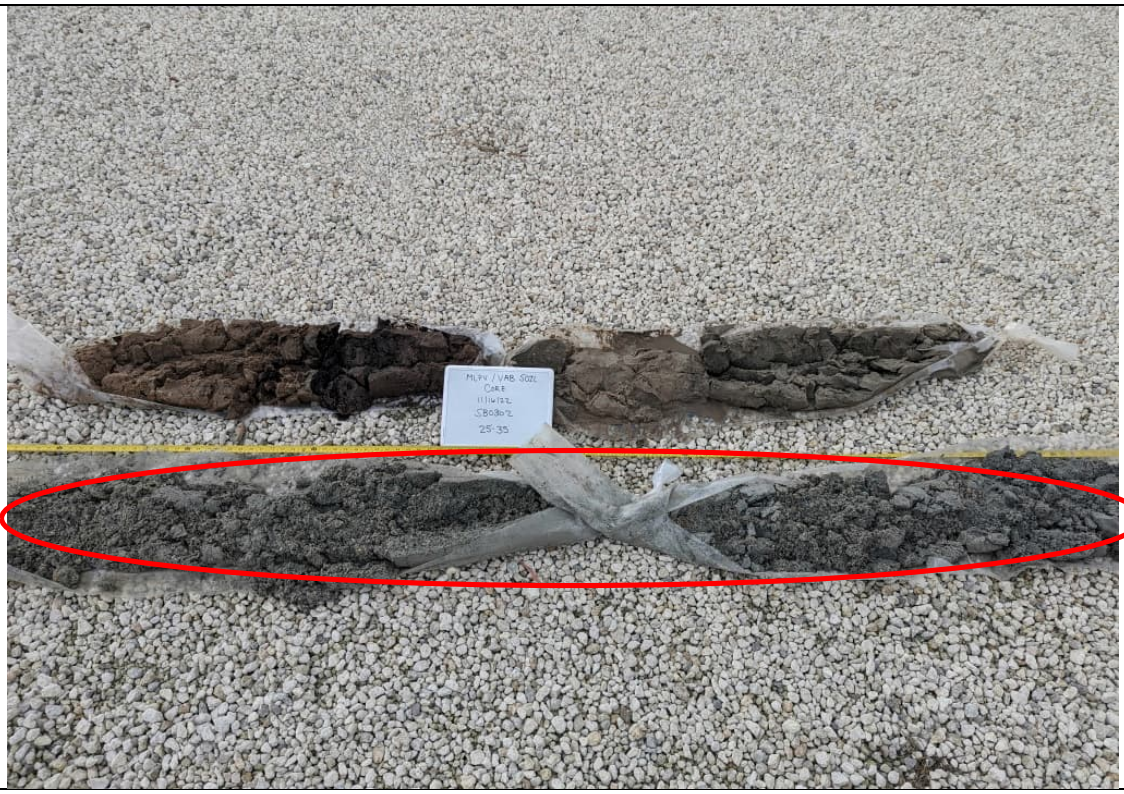
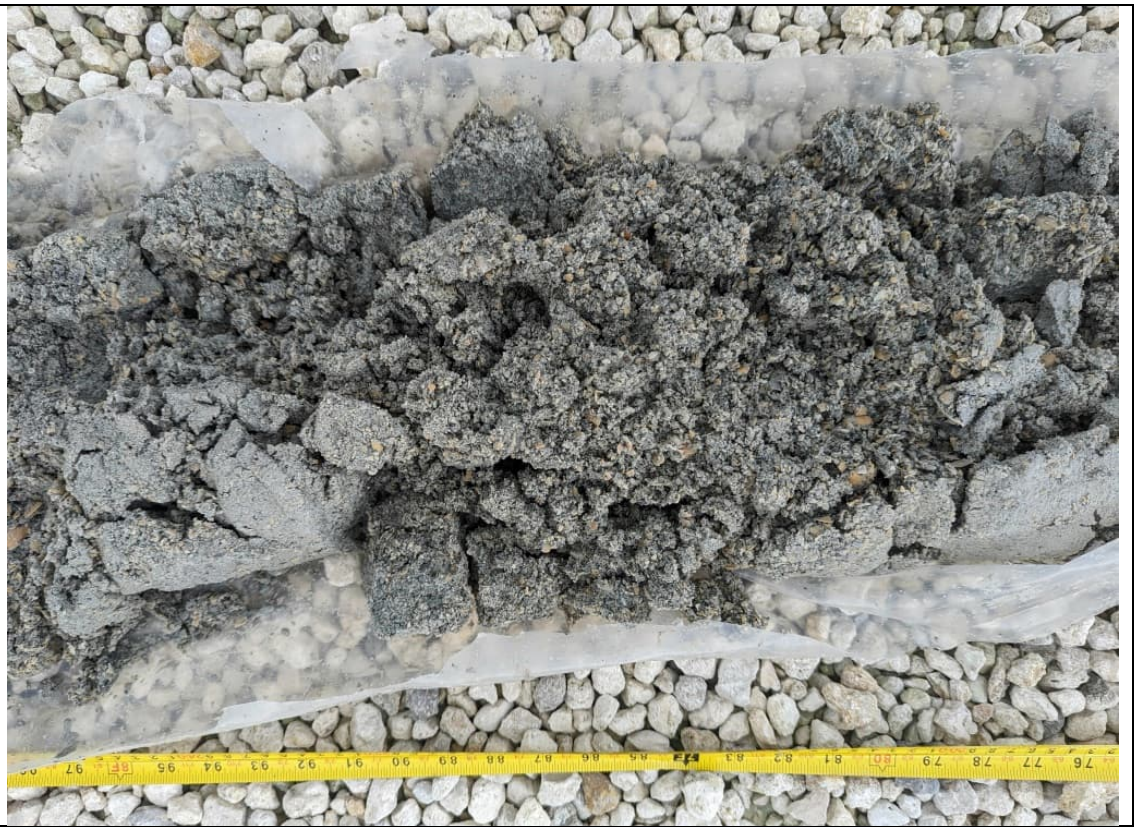


Photo No.	**Date:**
30	11/16/22

Direction Photo Taken:

Description:

View of SB0302
25' – 35' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 31	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0302 35' – 45'	

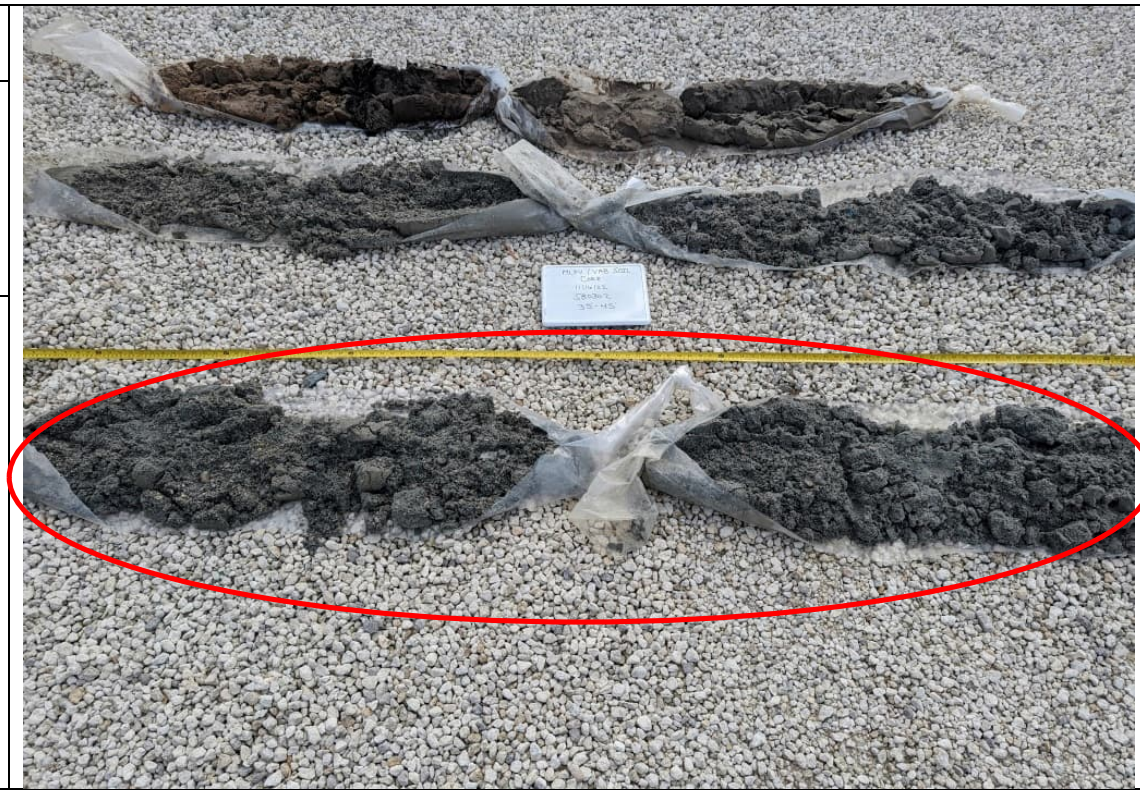


Photo No. 32	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0302 35' – 45' close up	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
33	11/16/22

Direction Photo Taken:

Description:

SB0302 no recovery from 45’ – 55’

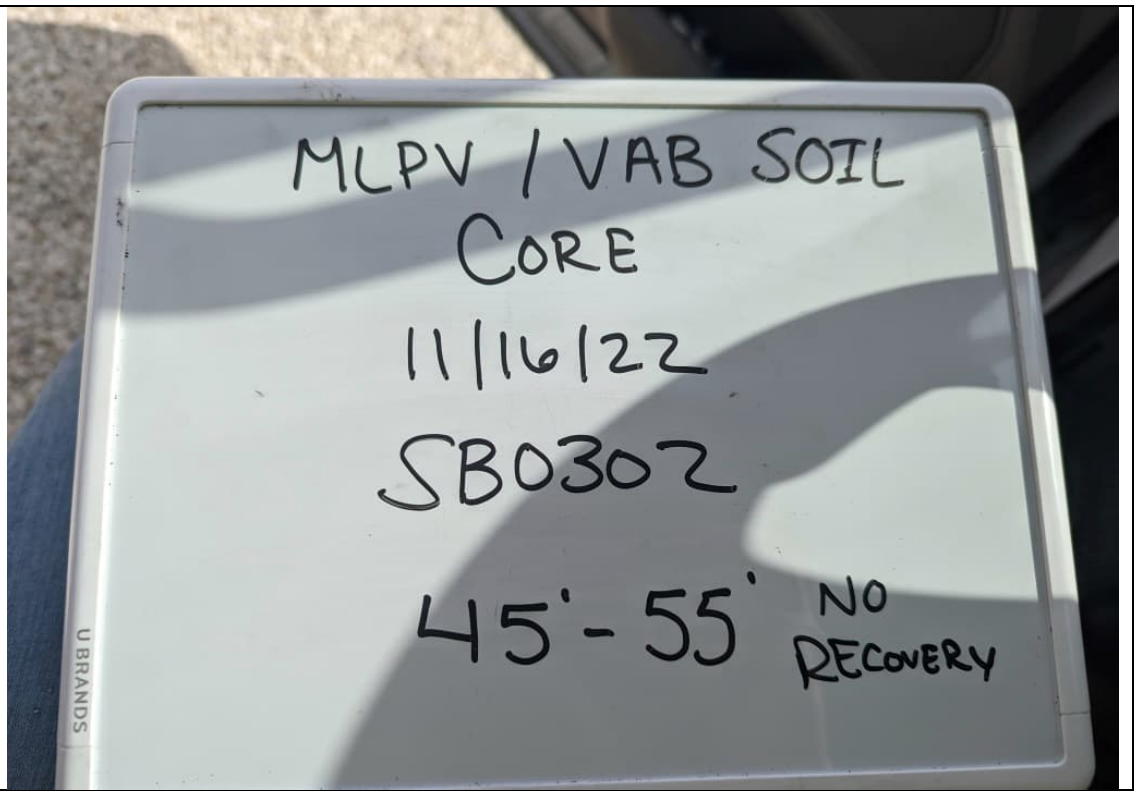
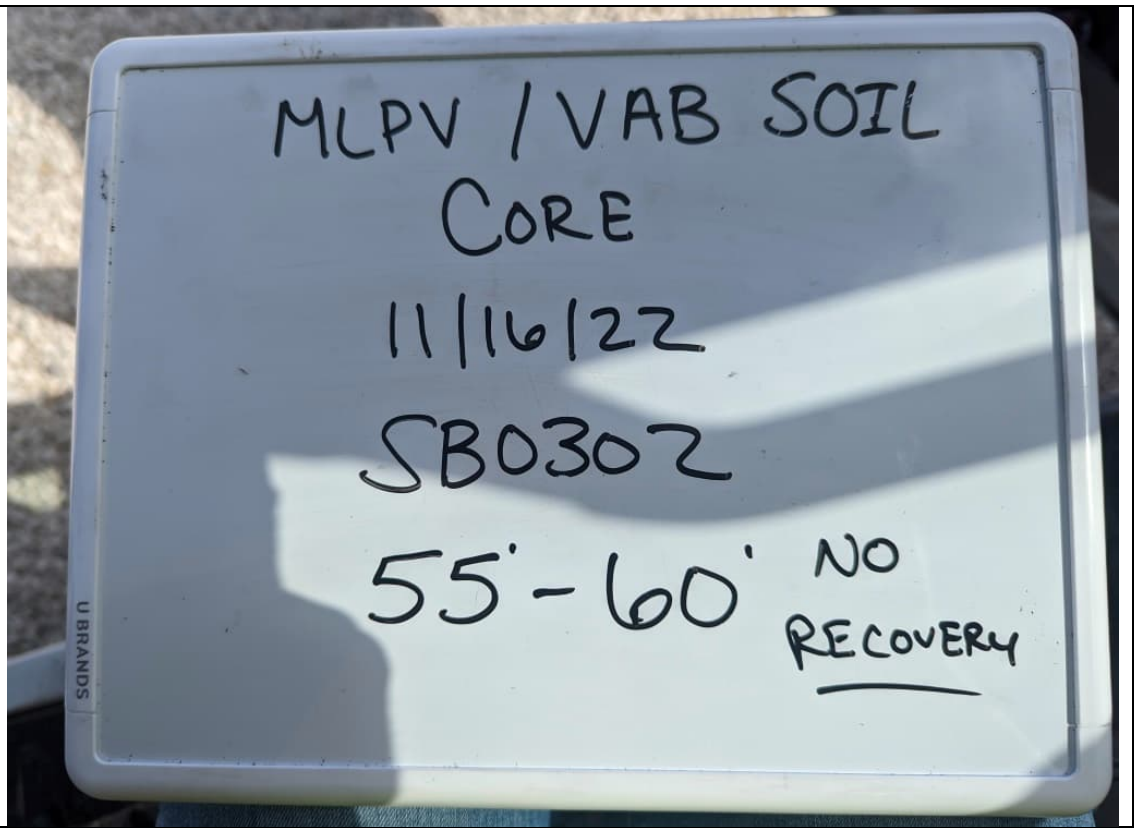


Photo No.	**Date:**
34	11/16/22

Direction Photo Taken:

Description:

SB0302 no recovery from 55’ – 60’



AECOM

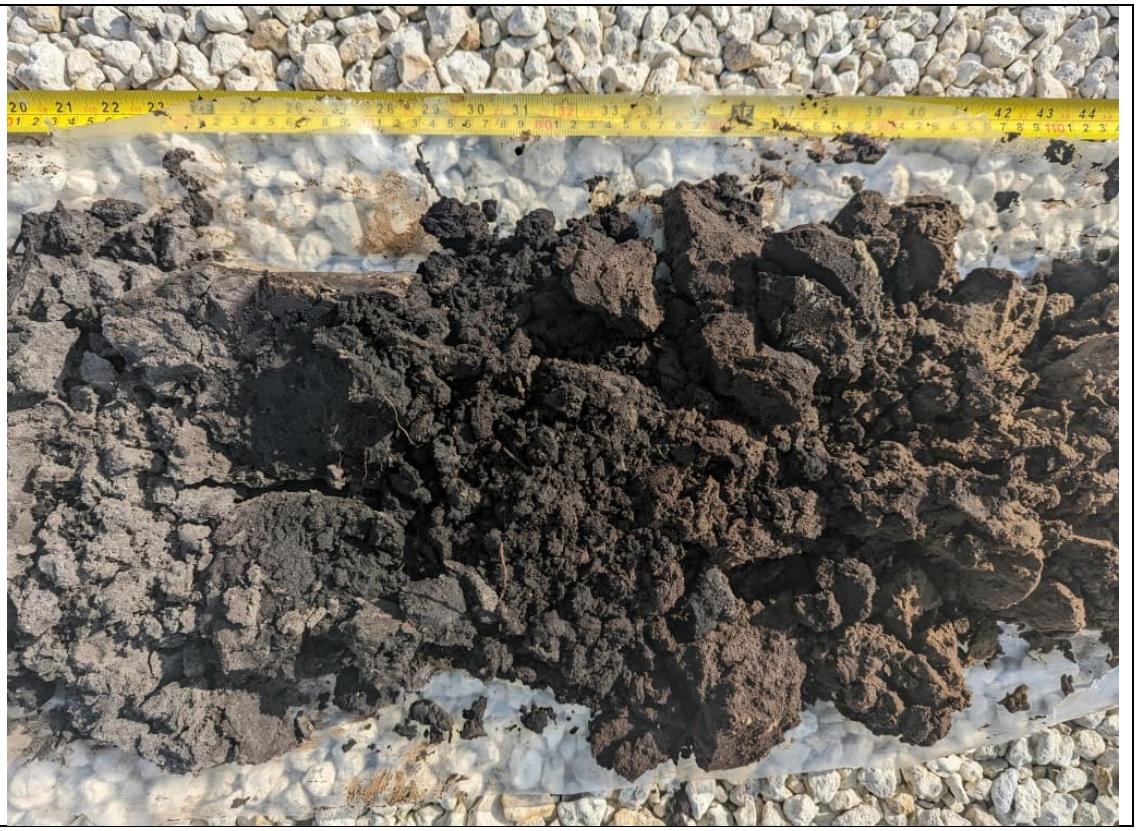
PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 35	**Date:** 11/16/22
Direction Photo Taken:	
Description: SB0303 recovery not photographed from 0' – 5' View of SB0303 5' – 15'	



Photo No. 36	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0303 5' – 15' close up	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
37	11/16/22

Direction Photo Taken:

Description:

View of SB0303
5' – 15' close up

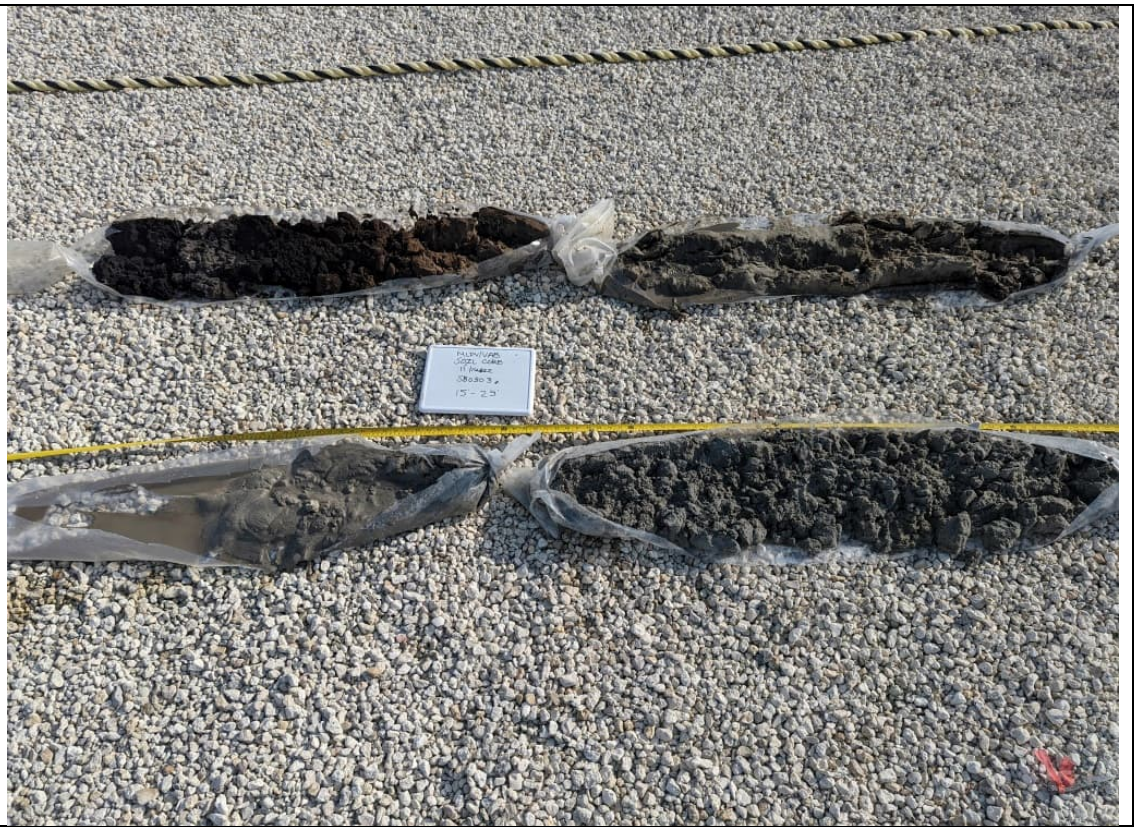


Photo No.	**Date:**
38	11/16/22

Direction Photo Taken:

Description:

View of SB0303
15' – 25'



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
39	11/16/22

Direction Photo Taken:

Description:

View of SB0303
15’ – 25’ close up



Photo No.	**Date:**
40	11/16/22

Direction Photo Taken:

Description:

View of SB0303
25’ – 35’



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
41	11/16/22

Direction Photo Taken:

Description:

View of SB0303
25’ – 35’ close up

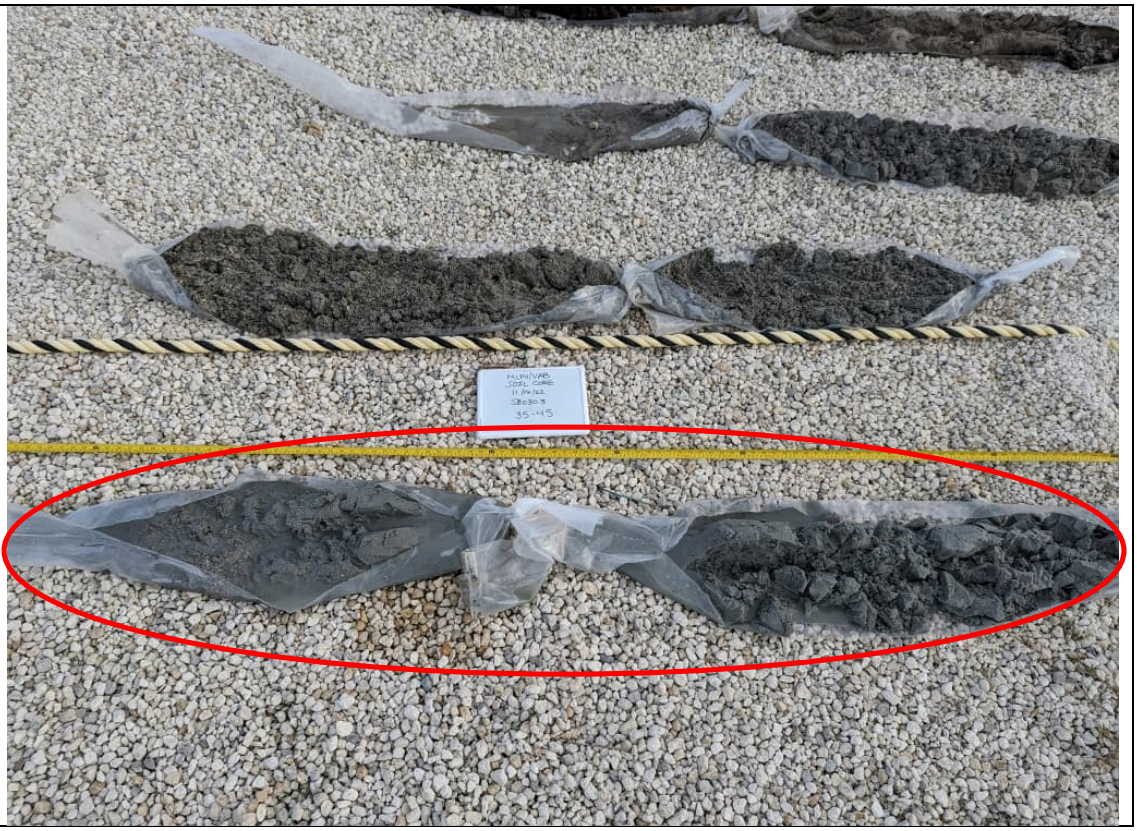


Photo No.	**Date:**
42	11/16/22

Direction Photo Taken:

Description:

View of SB0303
35’ – 45’



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
43	11/16/22

Direction Photo Taken:

Description:

View of SB0303
35' – 45' close up

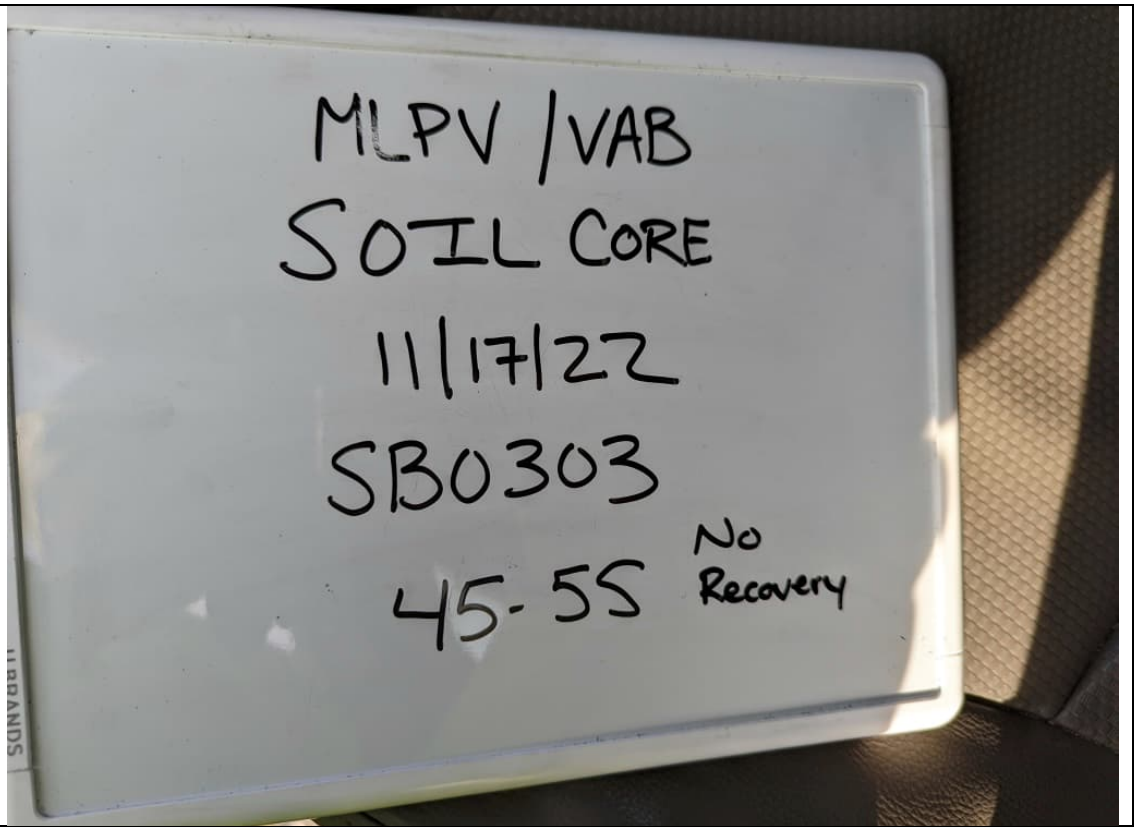


Photo No.	**Date:**
44	11/17/22

Direction Photo Taken:

Description:

SB0303 no recovery from
45' – 55'



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. **45**	**Date:** 11/16/22
Direction Photo Taken:	
Description: View of SB0303 55' – 60'	



Photo No. **46**	**Date:** 11/17/22
Direction Photo Taken:	
Description: View of SB0304 0' – 5'	



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
47	11/17/22

Direction Photo Taken:

Description:

View of SB0304
5' – 15'



Photo No.	**Date:**
48	11/17/22

Direction Photo Taken:

Description:

View of SB0304
5' – 15' close up



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
49	11/17/22

Direction Photo Taken:

Description:

View of SB0304
5' – 15' close up



Photo No.	**Date:**
50	11/17/22

Direction Photo Taken:

Description:

View of SB0304
15' – 25'



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
51	11/17/22

Direction Photo Taken:

Description:

View of SB0304
15' – 25' close up



Photo No.	**Date:**
52	11/17/22

Direction Photo Taken:

Description:

View of SB0304
25' – 35'



AECOM

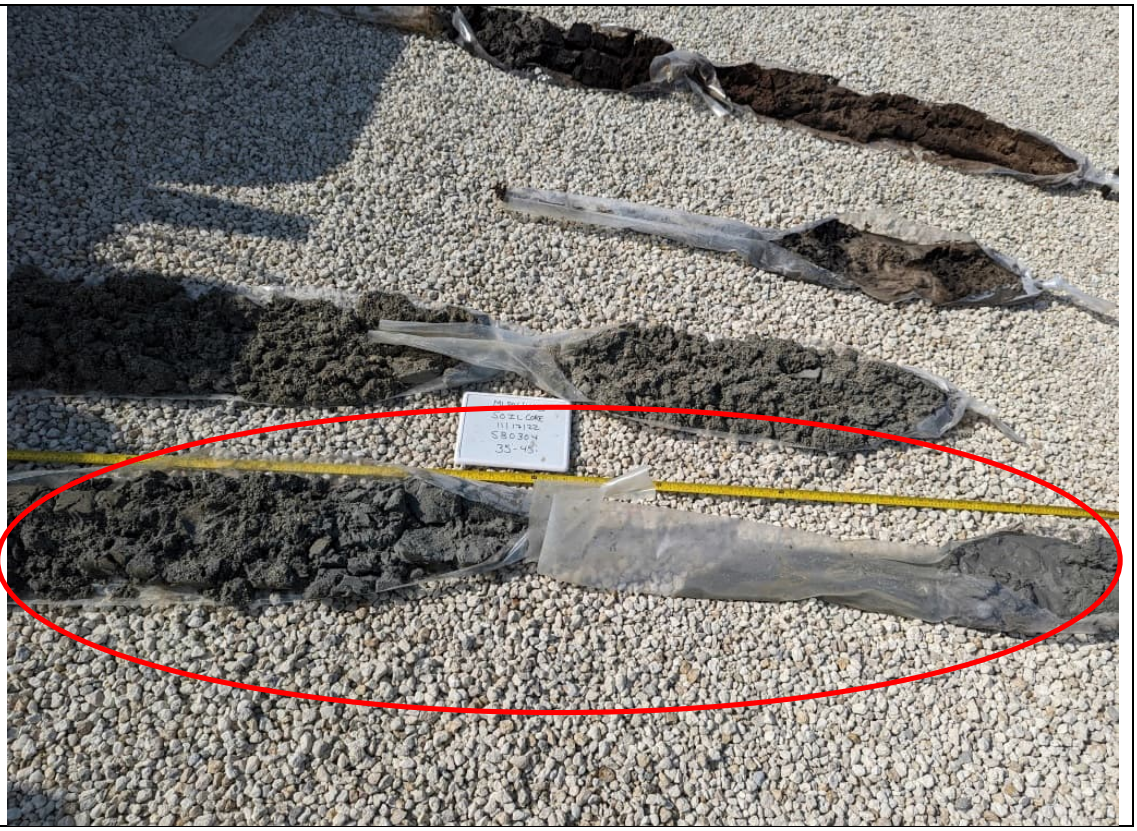
PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 53	**Date:** 11/17/22
Direction Photo Taken:	
Description: View of SB0304 25’ – 35’ close up	



Photo No. 54	**Date:** 11/17/22
Direction Photo Taken:	
Description: View of SB0304 35’ – 45’	



AECOM

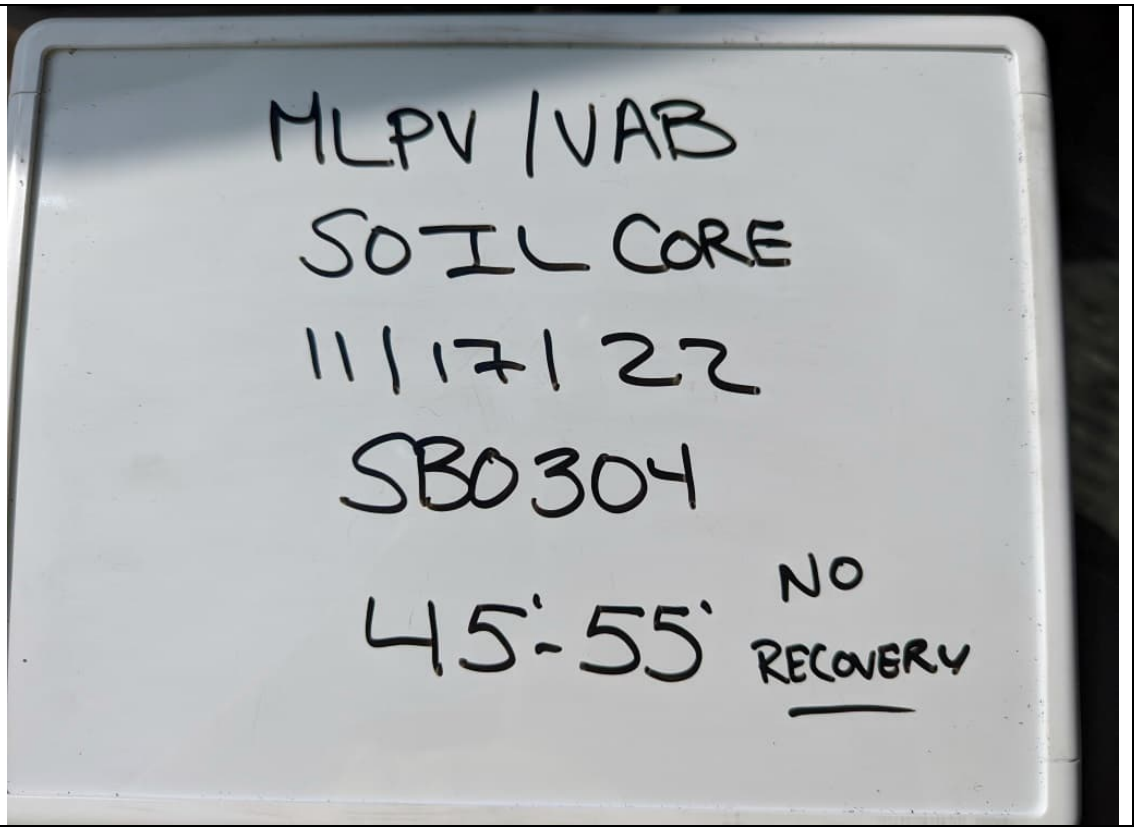
PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No. 55	**Date:** 11/17/22
Direction Photo Taken:	
Description: View of SB0304 35' – 45' close up	



Photo No. 56	**Date:** 11/17/22
Direction Photo Taken:	
Description: SB0304 no recovery from 45' – 55'	



AECOM

PHOTOGRAPH LOG

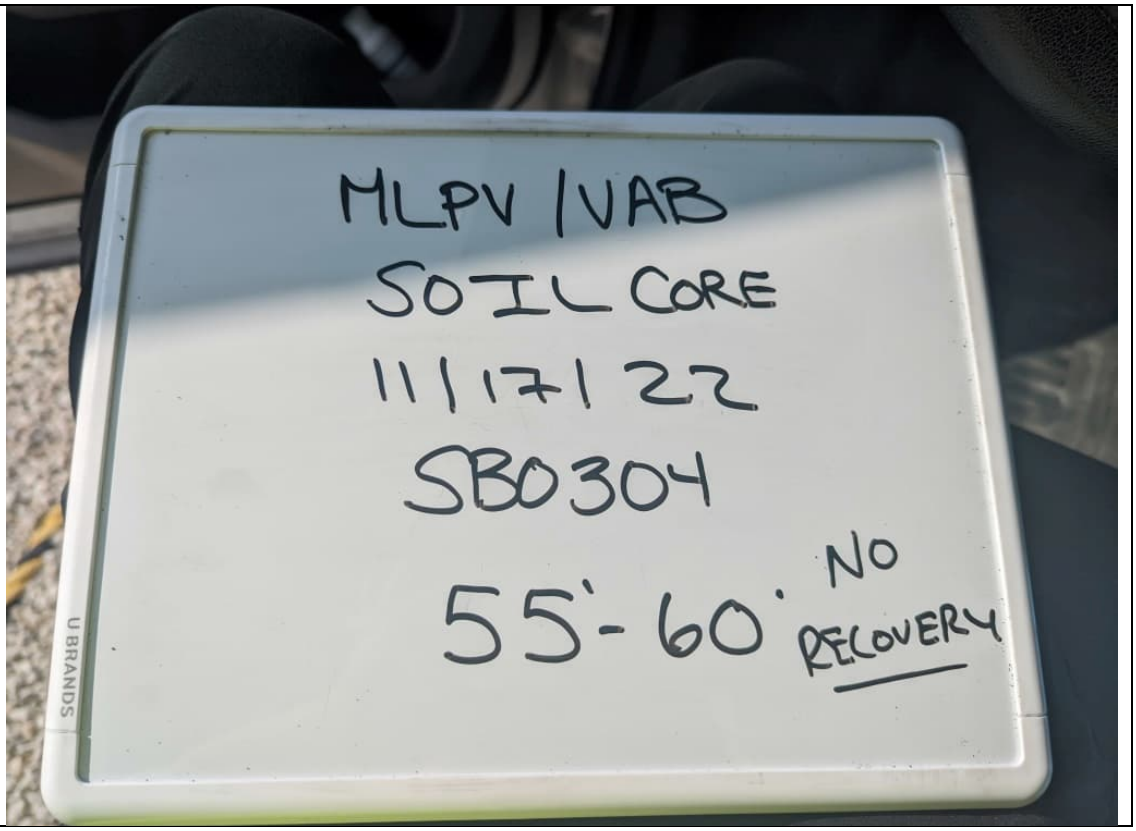
Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Soil Borings

Photo No.	**Date:**
57	11/17/22

Direction Photo Taken:

Description:

SB0304 no recovery from
55' – 60'



APPENDIX D

LABORATORY ANALYTICAL REPORTS – SOIL PERMEABILITY TESTING

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Soil Laboratory Testing
Mobile Launch Platform Rehabilitation Site
Kennedy Space Center, Florida



Ardaman & Associates, Inc.

CORPORATE HEADQUARTERS

8008 S. Orange Avenue, Orlando, FL 32809 - Phone: (407) 855-3860

Branch Office Locations

Florida: Bartow, Cocoa, Fort Myers, Miami, Orlando, Port St. Lucie, Sarasota, Tallahassee, Tampa, West Palm Beach
Louisiana: Baton Rouge, New Orleans, Shreveport

MEMBERS:

ASTM International
American Concrete Institute
Geoprofessional Business Association
Society of American Military Engineers
American Council of Engineering Companies

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

January 13, 2023
Ardaman File No. 22-6474

AECOM
1111 Third Avenue
Suite 1600
Seattle, WA 98101

Attention: Ms. Jordan Thompson

Subject: Soil Laboratory Testing
Mobile Launch Platform Rehabilitation Site
Kennedy Space Center, Florida

Dear Ms. Jordan:

As requested and authorized, we have completed soil laboratory testing for the subject project. The purpose of performing this testing was to provide data for use by others in design of a contamination remediation program. This data report documents our findings.

Eight soil samples were collected from a representative of AECOM at the Kennedy Space Center and were transported to our laboratory for hydraulic conductivity testing. The soil samples were provided to us in 3.5-inch diameter plastic sleeves that were obtained using the Vibrocore soil sampling technique. The samples were extruded from their sleeves and hydraulic conductivity testing was performed on selected sub-samples.

Constant head hydraulic conductivity tests (ASTM 5084) using a Flexible Wall Permeameter were performed on the selected sub-samples of soil. In addition, we conducted Atterberg limits tests (ASTM D4318) on each sample, grain size analyses (ASTM D6913) on seven samples, and a percent fines analysis (ASTM D1140) on one sample.

A summary of the test results are presented on the table below.

Boring	Depth (feet)	Liquid Limit (%)	Plasticity Index	Percent Fines	Measured Hydraulic Conductivity (cm/sec)
SB0-300	50 – 55	42	16	50.1	9.1E-07
SB0-301	50 – 55	43	17	43.5	1.9E-06
	55 – 60	42	25	56.5	4.6E-08
SB0-302	50 – 55	58	37	94.9	3.5E-08
	55 – 60	Not Plastic	Not Plastic	16.8	8.7E-05
SB0-303	50 – 55	46	27	35.3	3.7E-06
SB0-304	50 – 55	71	43	66.6	1.3E-07
	55 – 60	39	20	27.3	6.6E-07

Detailed hydraulic conductivity test results are presented in Table 1 and sieve analysis test results are presented in Appendix I. In addition, a graph depicting the fines content versus hydraulic conductivity is presented in Appendix II for informational purposes. We note that this report does not reflect any variations which may occur adjacent to the sub-samples of soil selected for testing, or possible soil disturbance associated with the Vibrocore drilling technique.

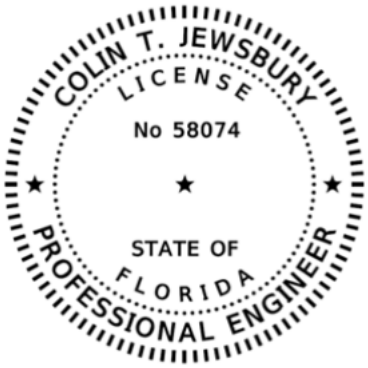
This data report has been prepared for the exclusive use of AECOM in accordance with generally accepted geotechnical engineering practices for the purpose of the subject project. No other warranty, expressed or implied, is made.

We are pleased to be of assistance to you in this matter. When we may be of further service to you or should you have any questions, please contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.
Florida Registry 5950

Christopher de la Cruz, E.I.
Assistant Project Engineer

Colin T. Jewsbury, P.E.
Orlando Branch Manager
Florida License No. 58074



THIS ITEM HAD BEEN DIGITALLY SIGNED AND SEALED BY:

January 24, 2024

ON THE DATE ADJACENT TO THIS SEAL

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THIS SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

ARDAMAN & ASSOCIATES, INC.
8008 S. ORANGE AVENUE
ORLANDO, FLORIDA 32809
(407) 855-3860
FLORIDA REGISTRY 5950
COLIN T. JEWSBURY, P.E. NO 58074

CDC/CTJ/cdc
22-6474 Mobile Launch Platform Rehabilitation.docx (Geo 2023)

Table 1

MOBILE LAUNCH PLATFORM REHABILITATION SITE
ARDAMAN & ASSOCIATES, INC. GEOTECHNICAL TESTING LABORATORY
HYDRAULIC CONDUCTIVITY TEST REPORT

Boring	Visual Description	Depth (feet	Specific Gravity [assumed]	Specimen Orientation	Initial Length (cm)	Initial Diameter (cm)	Initial Volume (cm^3)	Mass of Dry Solids (grams)	Initial Water Content (%)	Initial Dry Density (lb/ft^3)	Initial Saturation (%)	Final Volume (cm^3)	Volume Change (%)	Final Water Content (%)	Final Dry Density (lb/ft^3)	Final Saturation (%)	Isotropic Effective Confining Stress (lb/in^2)	Back-pressure (lb/in^2)	Average Hydraulic Gradient	Flow (cm^3)	Outflow/Inflow Ratio	Test Duration (days)	B-factor at End of Test (%)	ASTM D5084 Test Method	Fines Content -200 (%)	**Hydraulic Conductivity k (cm/sec)**
SB0-300	Greenish-gray sandy clay with trace shell	50.0 - 55.0	2.70	V	11.301	9.099	734.84	936.98	39.7	79.6	96	676.05	-8.0	34.4	86.5	98	15	175	23.8	5.40	1.05	1	96	A	50.1	**9.1E-07**
SB0-301	Gray clayey fine sand	50.0 - 55.0	2.70	V	11.174	8.973	706.60	1,002.04	33.5	88.5	100	649.34	-8.1	32.8	96.3	100	15	175	19.4	1.99	0.98	1	97	A	43.5	**1.9E-06**
	Greenish-gray sandy clay with shell	55.0 - 60.0	2.70	V	9.774	8.933	612.57	775.38	42.1	79.0	100	553.98	-9.6	34.3	87.3	100	15	175	31.6	3.51	1.03	3	95	A	56.5	**4.6E-08**
SB0-302	Gray clay	50.0 - 55.0	2.70	V	12.800	8.855	788.27	647.01	84.1	51.2	99	758.22	-3.8	79.1	53.2	99	15	175	22.2	1.67	1.12	5	98	A	94.9	**3.5E-08**
	Gray clayey fine sand	55.0 - 60.0	2.68	V	10.982	9.031	703.47	1,195.00	21.6	106.0	100	680.16	-3.3	22.5	109.6	100	15	175	19.2	5.65	1.03	1	99	A	16.8	**8.7E-05**
SB0-303	Gray clayey fine sand	50.0 - 55.0	2.68	V	10.122	9.058	652.26	875.00	37.3	83.7	100	609.78	-6.5	33.6	89.5	100	15	175	21.3	1.63	1.14	1	98	A	35.3	**3.7E-06**
SB0-304	Gray sandy clay with shell	50.0 - 55.0	2.70	V	11.499	8.826	703.52	783.71	51.6	69.5	98	671.13	-4.6	47.4	72.9	98	15	175	28.2	4.77	1.11	2	97	A	66.6	**1.3E-07**
	Gray clayey fine sand with shell	55.0 - 60.0	2.75	V	11.490	8.879	711.44	1,106.49	27.5	97.1	99	692.54	-2.7	26.4	99.7	100	15	175	14.4	15.57	0.96	1	99	A	27.3	**6.6E-07**

COMMENTS:
(1) Deaired tap water permeant.

The test data and all associated project information presented hereon shall be held in confidence and disclosed to other parties only with the authorization of the Client. Physical and electronic records of each project are kept for a minimum of 3 years. Test samples are kept in storage for at least 10 working days after mailing of the test report, prior to being discarded, unless a longer storage period is requested in writing and accepted by Ardaman & Associates, Inc.

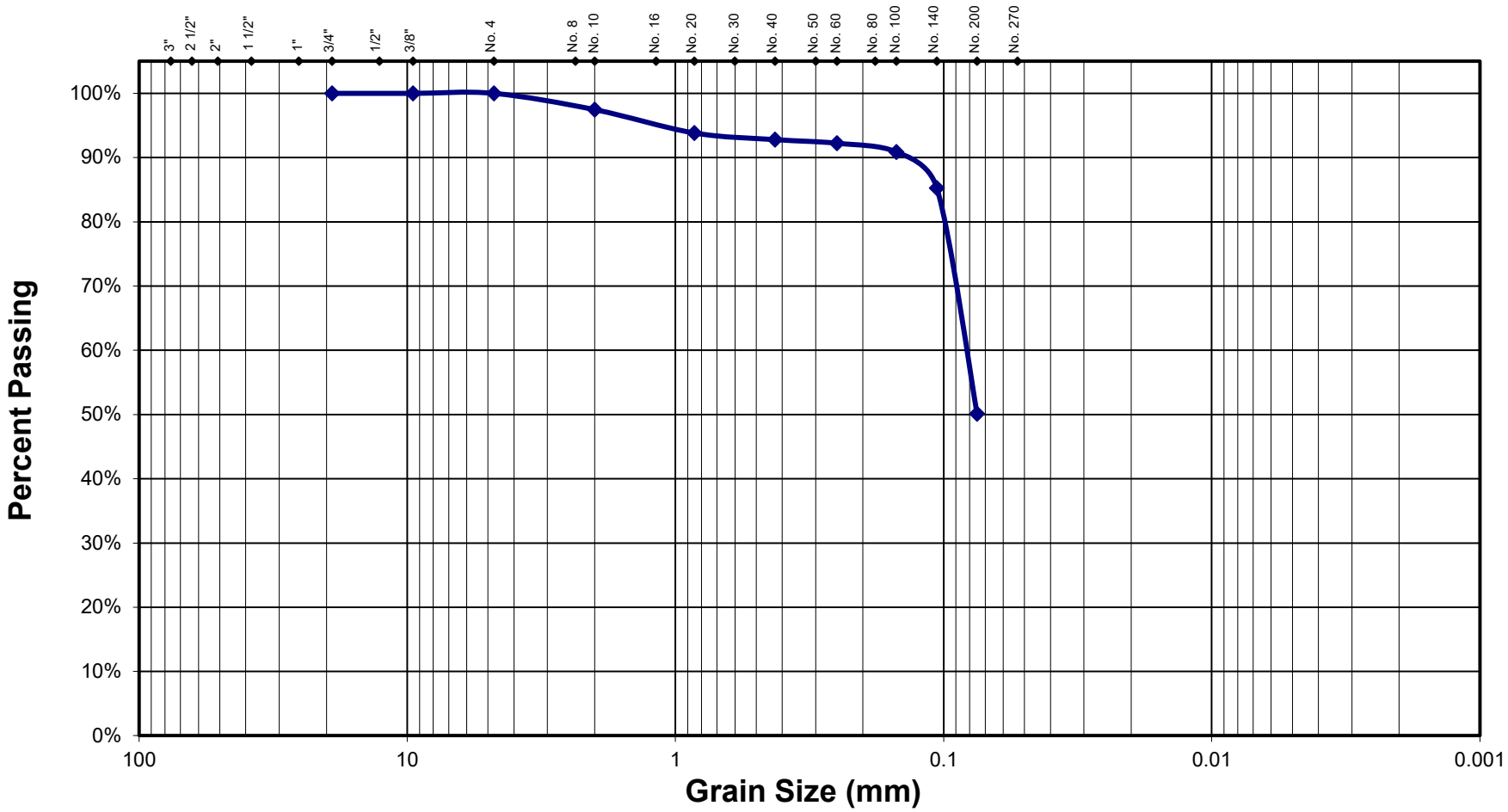
ASTM D5084 Test Methods: Method A - Constant Head; Method C - Falling Head; Rising Tailwater; Method D - Constant Rate of Flow
Where: V denotes vertical test specimen; H denotes horizontal test specimen.

Checked By: __TSI____ Date: ____12/29/22_____

APPENDIX I

Sieve Analysis Test Results

GRAIN SIZE DISTRIBUTION CURVE



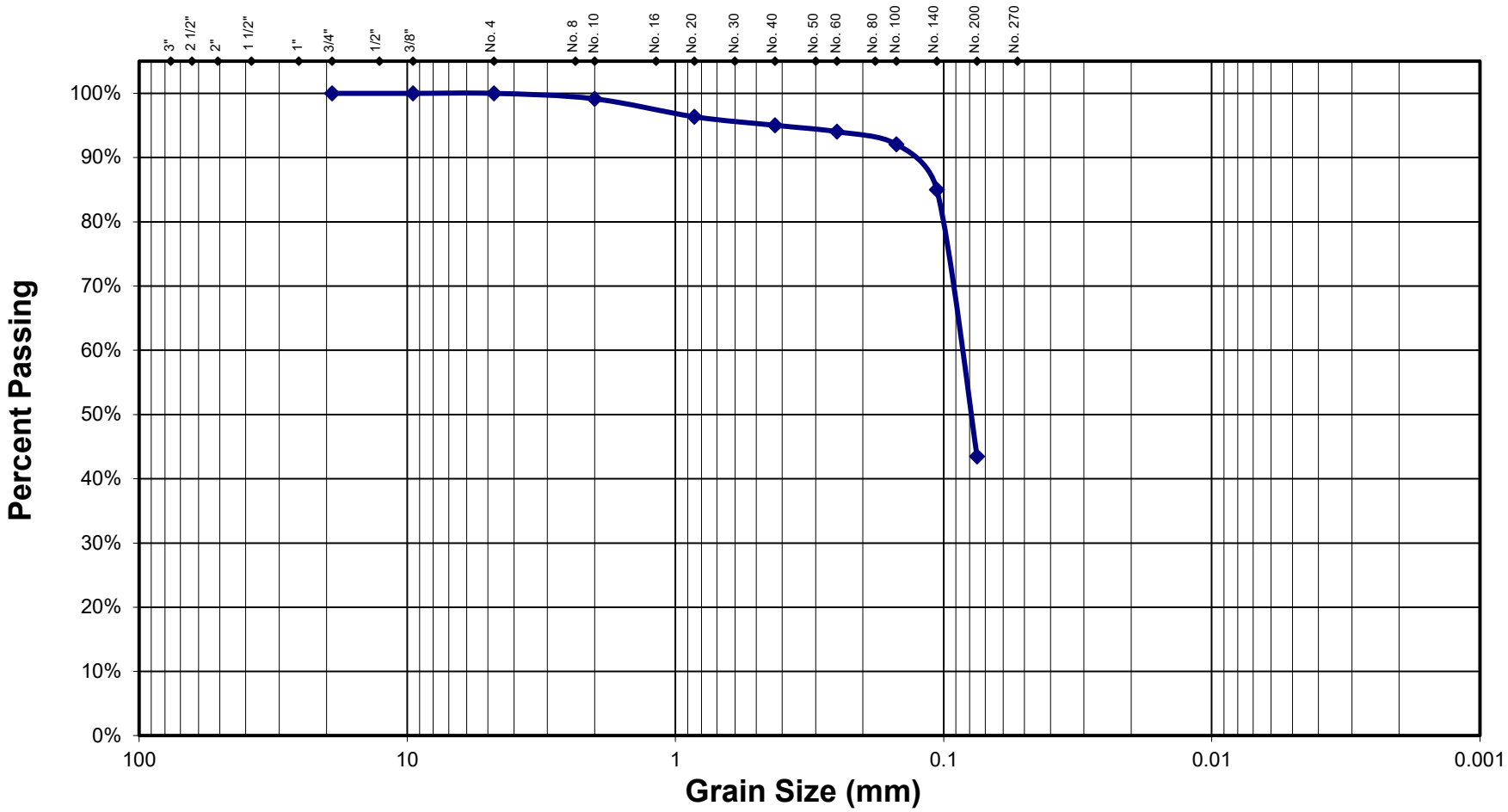
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-300 **Sample Depth (ft):** 50 - 55
Sample Description: CH - Greenish-gray sandy clay with trace shell
Percent Passing No. 200 Sieve = 50.1% **LL:** 42 **PL:** 26 **PI:** 16

ARDAMAN & ASSOCIATES, INC.
Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



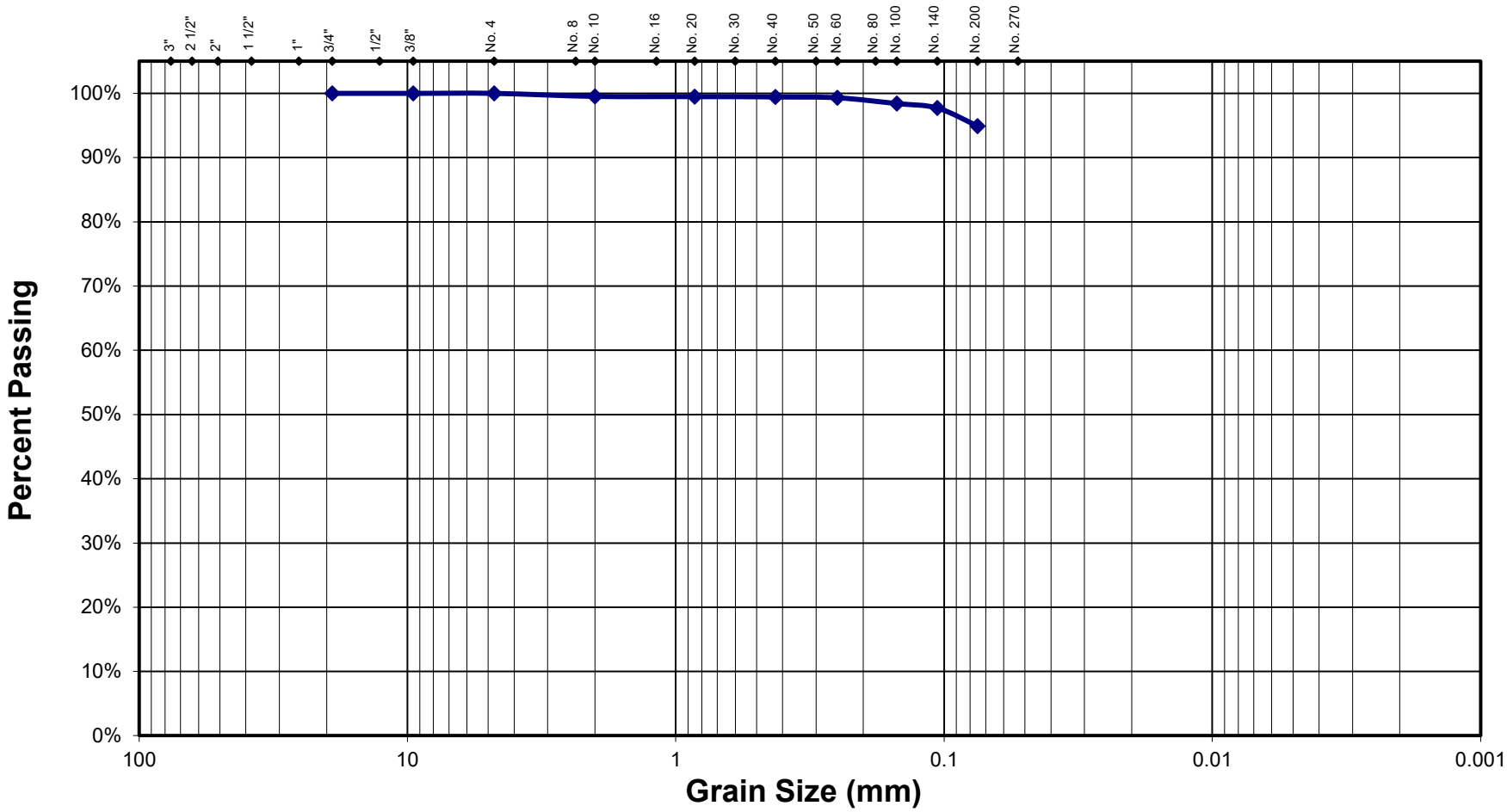
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-301 **Sample Depth (ft):** 50 - 55
Sample Description: SC - Gray clayey fine sand
Percent Passing No. 200 Sieve = 43.5% **LL:** 43 **PL:** 26 **PI:** 17

ARDAMAN & ASSOCIATES, INC.
Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



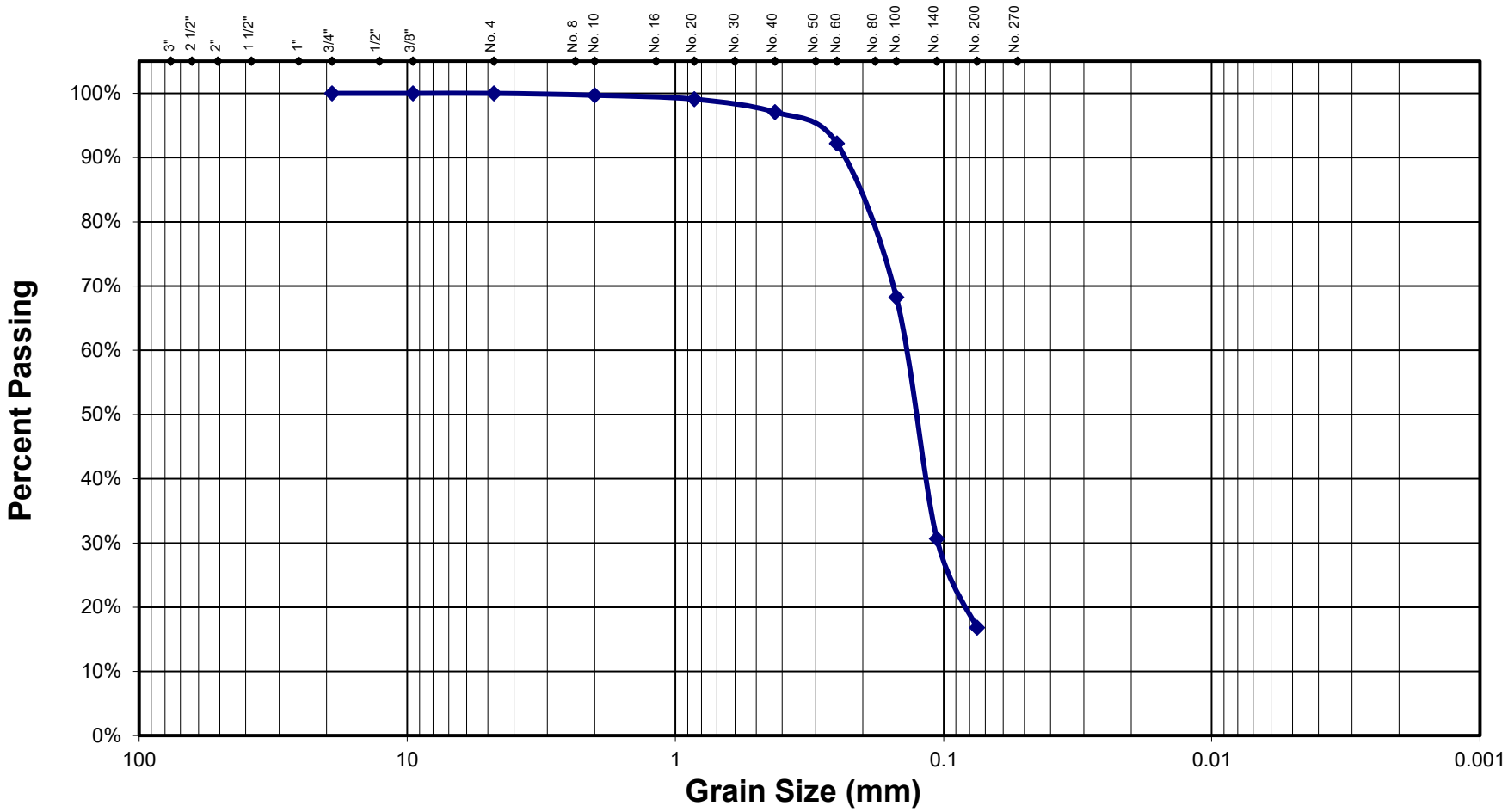
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-302 **Sample Depth (ft):** 50 - 55
Sample Description: CH - Gray clay
Percent Passing No. 200 Sieve = 94.9% **LL:** 58 **PL:** 21 **PI:** 37

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Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



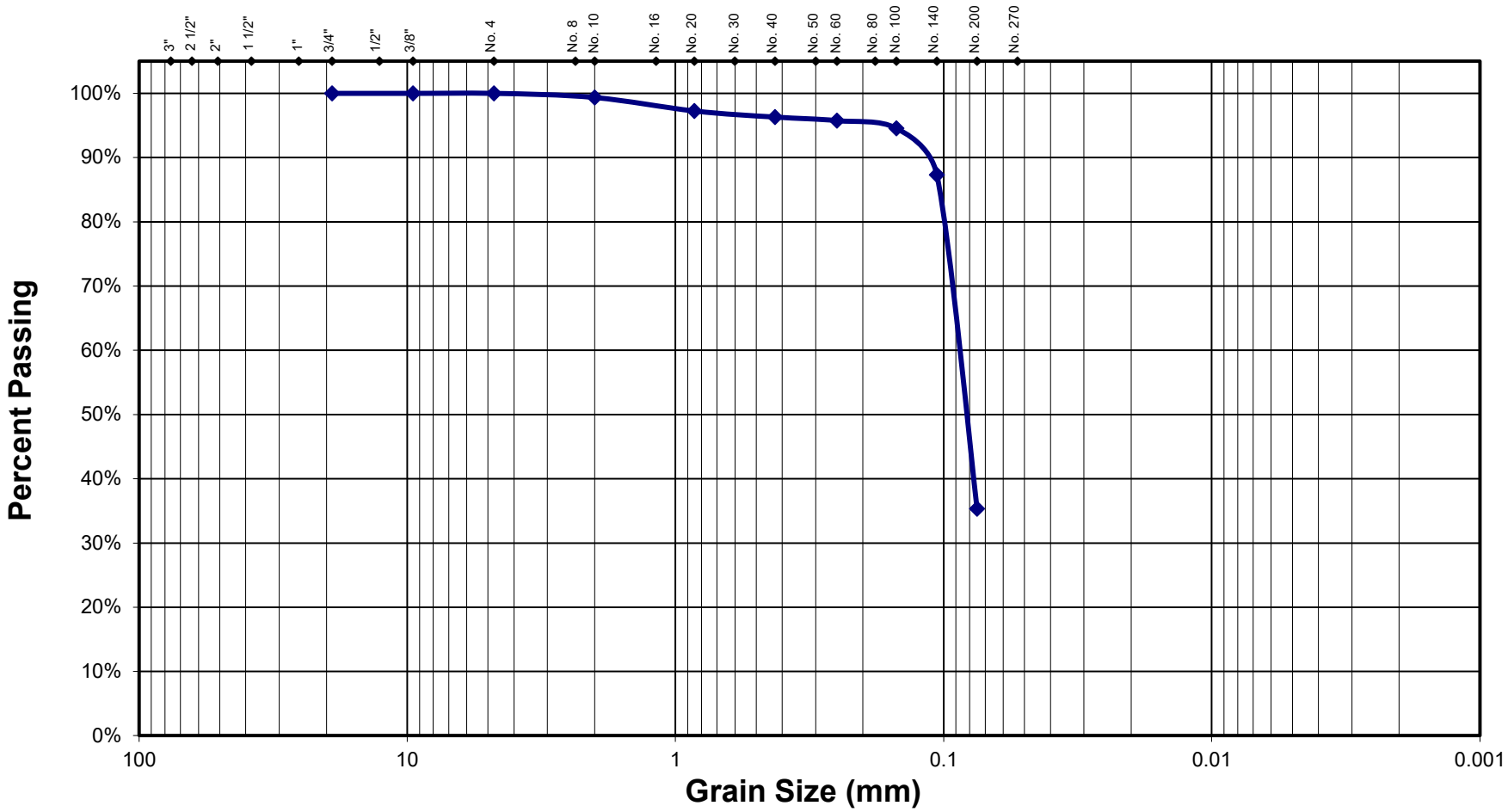
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-302 **Sample Depth (ft):** 55 - 60
Sample Description: SC - Gray clayey fine sand
Percent Passing No. 200 Sieve = 16.8% **LL:** Not Plastic **PL:** Not Plastic **PI:** Not Plastic

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Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



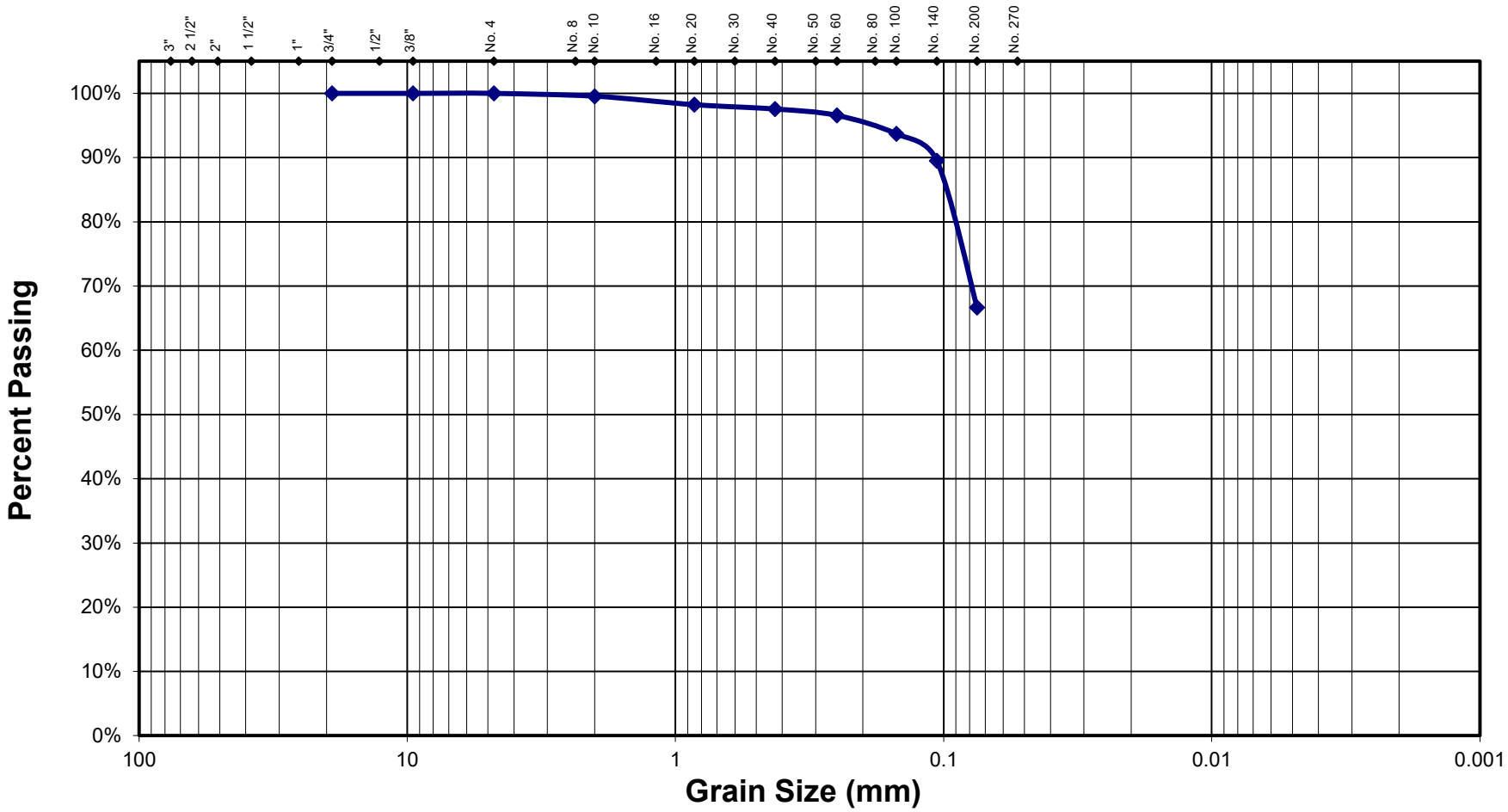
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-303 **Sample Depth (ft):** 50 - 55
Sample Description: SC - Gray clayey fine sand
Percent Passing No. 200 Sieve = 35.3% **LL:** 46 **PL:** 27 **PI:** 19

ARDAMAN & ASSOCIATES, INC.
Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



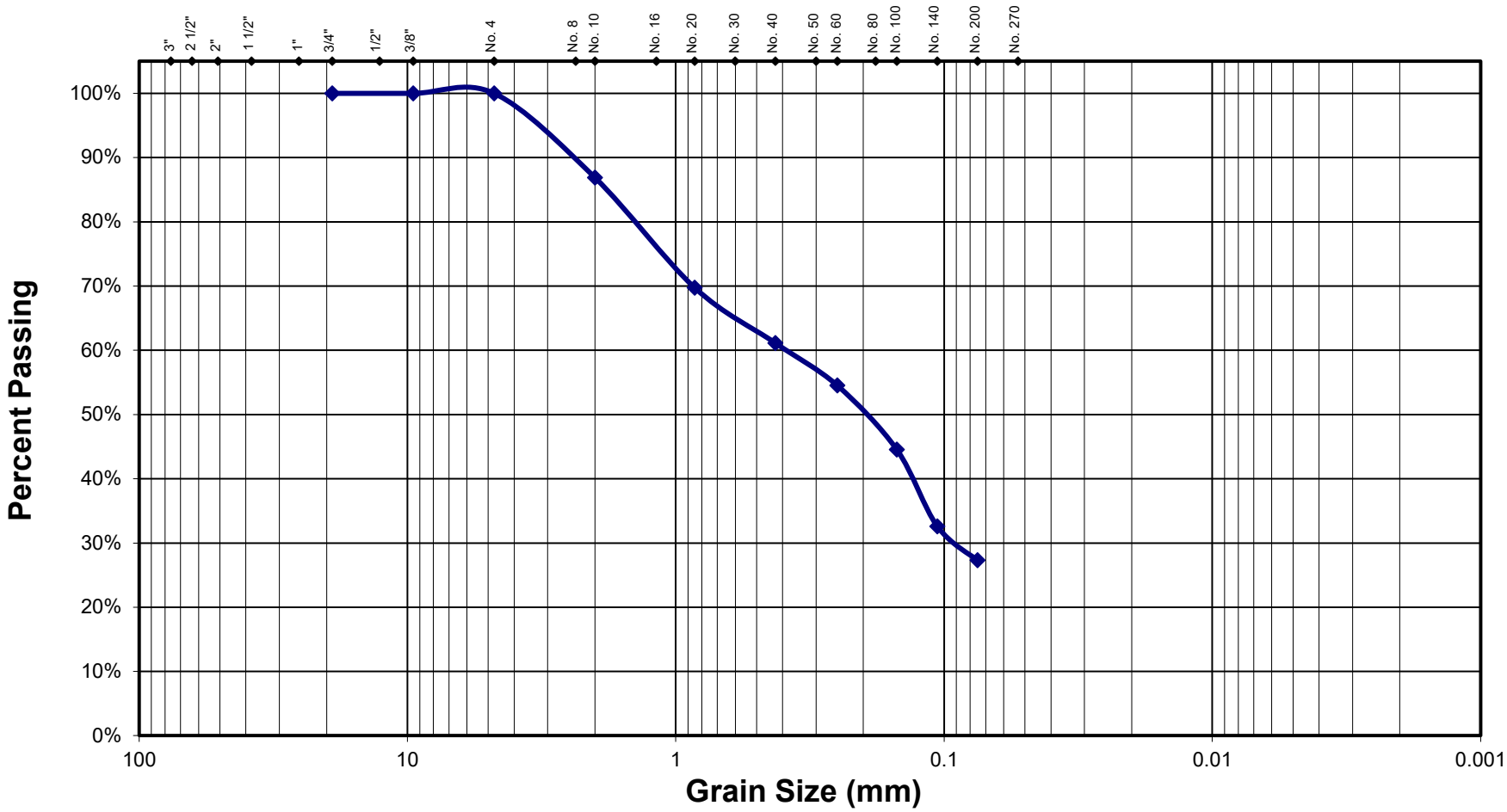
GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-304 **Sample Depth (ft):** 50 - 55
Sample Description: CH - Gray sandy clay with shell
Percent Passing No. 200 Sieve = 66.6% **LL:** 71 **PL:** 28 **PI:** 43

ARDAMAN & ASSOCIATES, INC.
Geotechnical, Environmental and Materials Consultants

GRAIN SIZE DISTRIBUTION CURVE



GRAVEL	SAND		SILT	CLAY
	Coarse to Medium	Fine		

Project Name: Mobile Launch Platform Rehabilitation Site
A&A File Number: 21-6474
Project Location: Kennedy Space Center, Florida
Client Name: AECOM

Boring: SB0-304 **Sample Depth (ft):** 55 - 60
Sample Description: SC - Gray clayey fine sand with shell
Percent Passing No. 200 Sieve = 27.3% **LL:** 39 **PL:** 19 **PI:** 20

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Geotechnical, Environmental and Materials Consultants

APPENDIX II

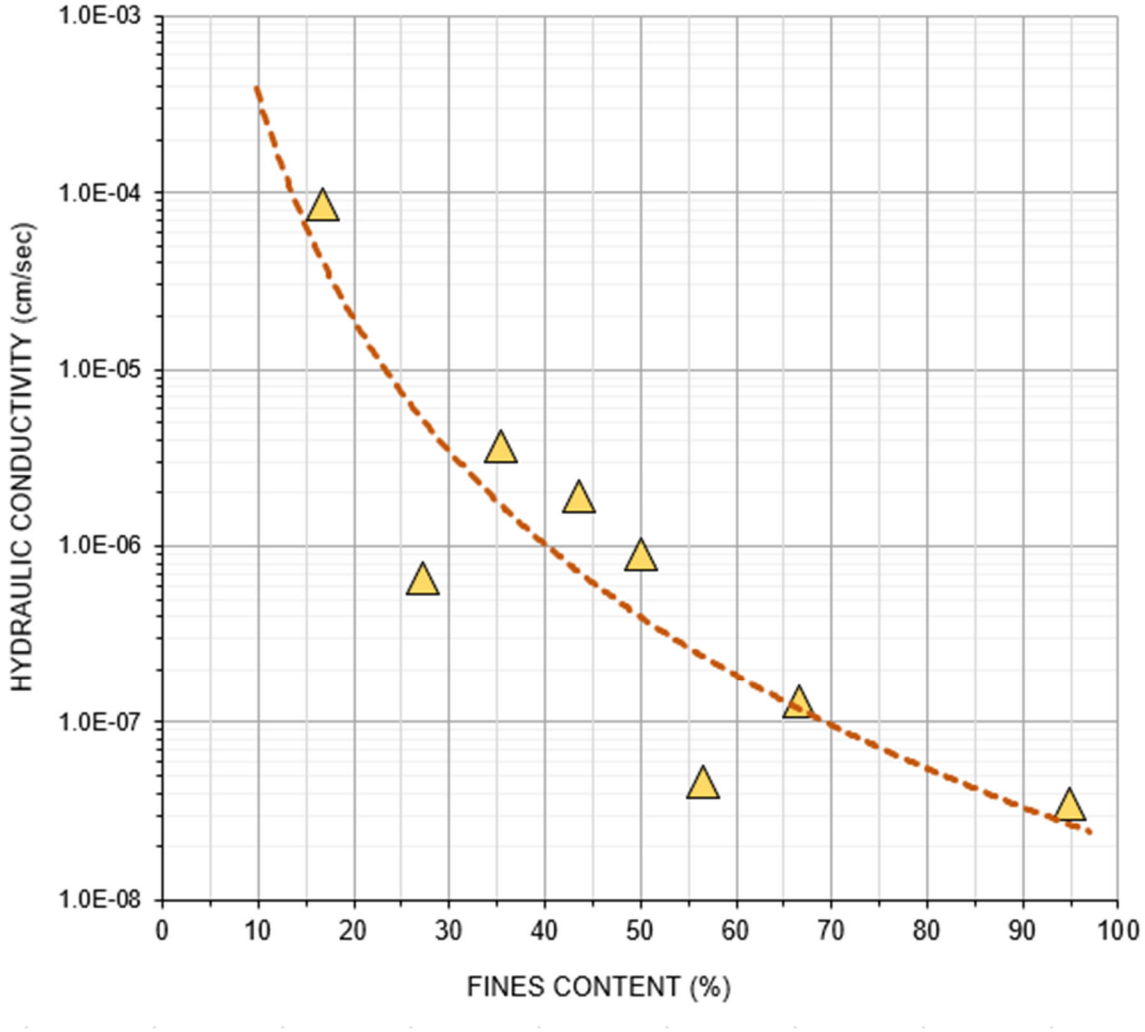
Fines Content vs. Hydraulic Conductivity Graph

APPENDIX II

Fines Content vs. Hydraulic Conductivity

Mobile Launch Platform Rehabilitation Site

Kennedy Space Center, Florida



APPENDIX E

FIELD NOTES – BIOSPARGE ACTIVITIES (ELECTRICAL, TROUBLESHOOTING, EXPANSION, OM&M)

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4/21/22

p 1 of 4

NASA MLPV TRAILER PANEL INSTALL

JB/CHROME

0700 James Bradford onsite in AECOM #707

WEATHER: 71°F (H 77°)
MOSTLY CLOUDY

CALLED MATT LUTHI of BECHTEL TO INFORM of SOW.
* NO CONFLICTS

CHROME ELECTRIC
SEAN DAVIS FORD F-250 W/TRAILER
JEFF GILLIS FORD F-250

0715 H/S TAILGATE
SOW: INSTALL PANEL (TRANSFORMER)
* NO DIGGING.

0820 JEFF GILLIS and SEAN DAVIS OFFSITE

0830 - SEAN DAVIS RETURNS W/ FORREST NELSON TO HELP W/ INSTALLATION

1000 INSTALLED DISCONNECTS

JB/CHROME 4/21/22

p 2 of 4

1100 INSTALLED TRANSFORMER

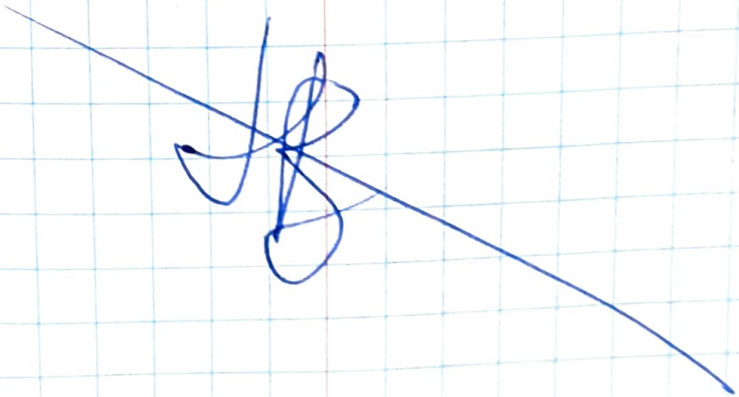
1200 BREAK FOR LUNCH
- CHROME OFFSITE

1245 CONTINUE INSTALLATION
- ORDER PARTS FOR TOMORROW

1400 CLEAN AREA

1410 CHROME ELEC OFFSITE

1420 JB offsite



4/22/22

3 of 4

JB/CHROME

NASA MLPV TRAILER PANEL INSTALL CONT

0830 JAMES BRADFORD received call from CHROME ELECTRIC. ORDERED parts WERE IN AND READY TO BE INSTALLED
- JB DEPARTS ORLANDO

0940 JB ONSITE. JB texts CHROME location

1000 CHROME ONSITE
- JOHN KACER } FORD F-150
- FORREST NELSEN }

N & S TAILGATE
- WEATHER: 76°F (47°C)
PARTLY CLOUDY

- CONTINUE INSTALLATION
- Pull WIRES FROM TRANSFORMER TO DISCONNECT TO CONTROL PANEL
- Land WIRES IN CONTROL PANEL, DISCONNECT, & TRANSFORMER (PANEL SIDE)

* STILL NEED CONDUIT AND WIRE FROM SOURCE TO 1st DISCONNECT

4/22/22

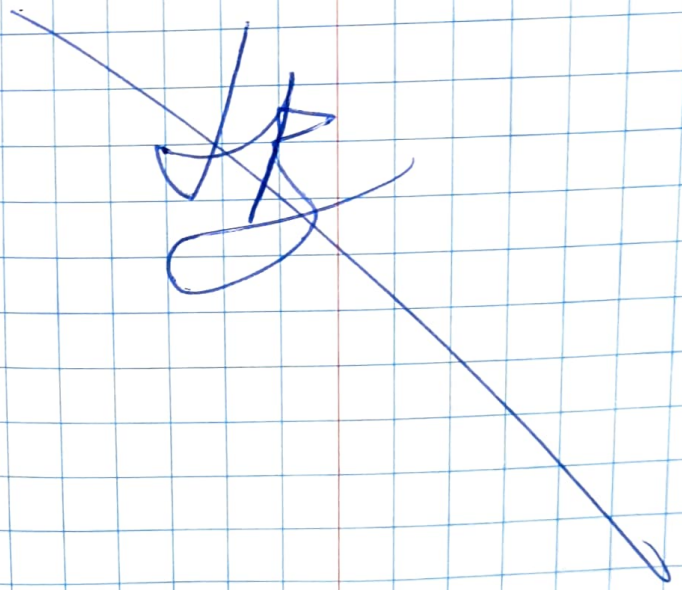
4 of 4

JB/CHROME

11:25 CLEAN UP AREA

11:30 CHROME ELECTRIC OFFSITE

11:45 JB offsite



04/26/22

p 1 of 2

JB/CHROME

NASA MLPV TRAILER
PANEL INSTALL CONT.

08 IS JAMES BRADBURN ONSITE; CHROME ELECTRIC ARRIVES:
SHAWN DAVIS
FORREST NELSEN } F250

W/S TAILGATE
WEATHER: 72°F (H:82°)
Sunny

SOW: CONTINUE INSTALLING TRANSFORMER & PANEL DISCONNECTS

Install Pipe from stub out (ground) to 1st Disconnect.

- Lockout/Tagout on source panel breaker is faded & unreadable.
- Unable to add lock; no scissor provided (extra spots)
- CHROME calls NASA POWER to determine owner of Lockout/Tagout
- Current lock = #2320H
  PANEL LP (LP-E01-002)

NOTE: NOT A KSC LOCKOUT (maybe BECHTEL)

0940 CLEAN AREA

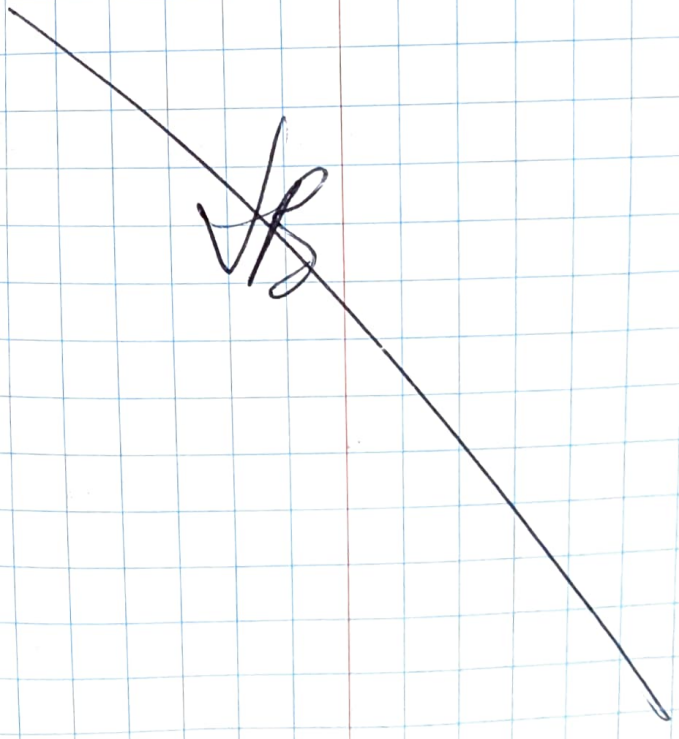
01/26/22

p 2 of 2

JB/CHROME

0945 CHROME ELECTRIC OFFSITE
*NOTE: Lockout/Tagout issue is still unresolved and under investigation

1020 JB offsite



05/12/2022 page 1 of 1 LKC

7:55 Check in at Bechtel Trailer TR0667 Mathew
- Provided hard hat and safety glasses

8:04 arrive at trailer. Jeff McDowell (KSC) and Shawn Danse (Chrome Electric) onsite.

8:15 KSC locates complete
- Shawn determined location of grounding rod based on utility markings.
- Shawn will keep up with utility locate markings since his office is on Center near the VAB (South)
- Showed me breaker switch on main panel (photo saved to network) "Biosparge breaker switch" tag on switch by BOSS. Shawn will coordinate with BOSS when time to shut down.

8:25 - return hard hat and glasses
8:30 - off site.

5/23/22 KSC MLPF p. 1 of 1 DS/Chrome

1345 - Justin Slater onsite.
Weather: Sunny, light wind, 90°F.
1410 - Chrome Electric onsite.
1415 - H&S meeting.
- Chrome begin working on wiring for transformer at the trailer while we wait for the power outage.
Chrome employees are:
Shawn Davis
Lenon Berry
Dave Ross
1545 - Boss onsite to remove tag & lock-out the power.
1605 - Disconnect wires from main transformer.
1615 - Begin pulling wire from conduit near the trailer.
1625 - Wire out. Dave puts panels back on main transformers.
1630 - Stretch out wire to measure its length.
1640 - Chrome takes one of their trucks to the lot they keep it in out here.
1650 - Chrome back.
1700 - Offsite.

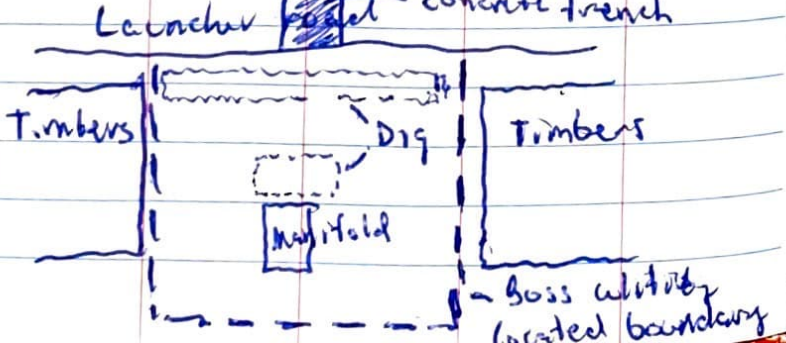
DS

NMSI MLPV
Leg 5 Troubleshoot

815 James Bradford onsite. Dustin Slater onsite. Boss (Jeff) already onsite locating utilities.
Weather: 78°F ; Partly cloudy → Sunny

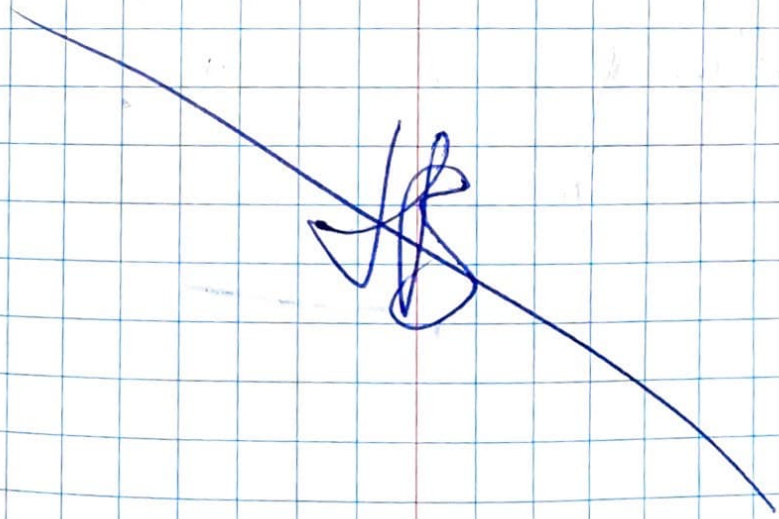
835 Called Tony Bacca (Bechtel) to notify of SOW

- Began digging at manifold box on southern side towards the road.
- Towards the trench
+ Water seepage at about 28 inches.
No pipe. Dog stub indicates toward road.
Trenched along road (parallel) at concrete trench section where utilities were marked. No pipe at 32-36 inches with ~~located~~ Boss located limit.



1045 Called Linnea King to discuss ongoing issues
Discovered pipe was directionally drilled
1130 Lunch break
1230 Began digging West side → found purple locating wire.
Pipe heads west

1400 Began backfilling ; clean site will further locate tomorrow.
1515 ALL PERSONNEL OFFSITE

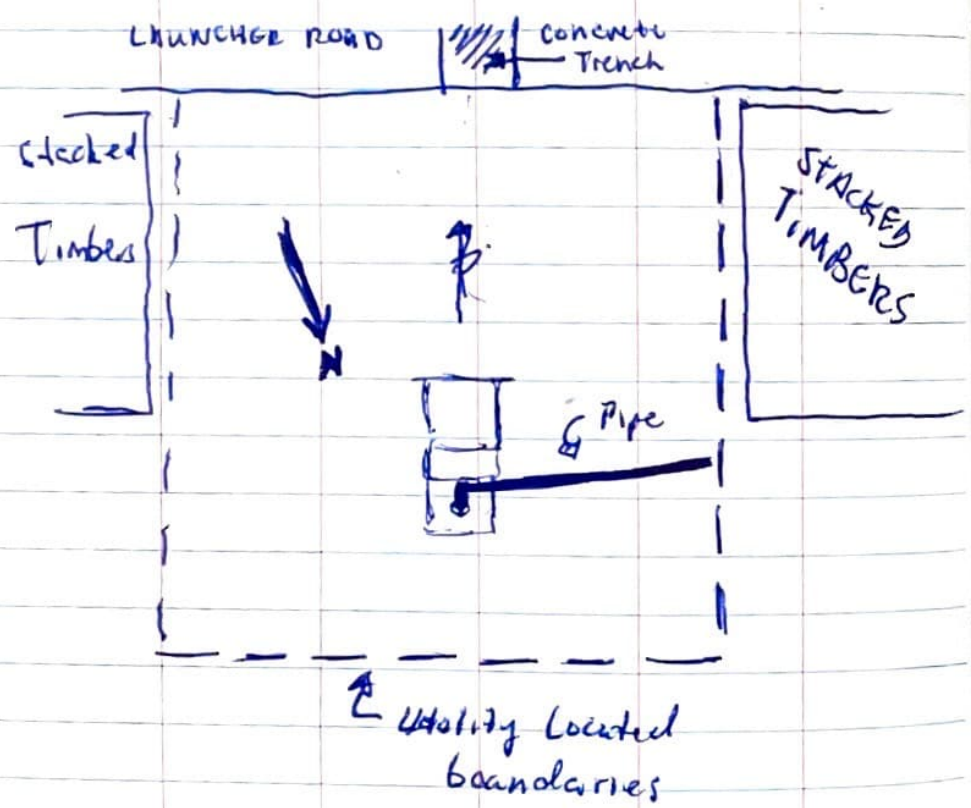


NASA MLPV LEG 5 Troubleshoot

0830 James Bradford onsite. Maden Parsotan onsite
Weather: 79°F ; partly cloudy H 87°F

0900 Texted Tony Bocca to notify we were onsite and SOW.

- Dug up pipe to within limits of BOSS located boundaries



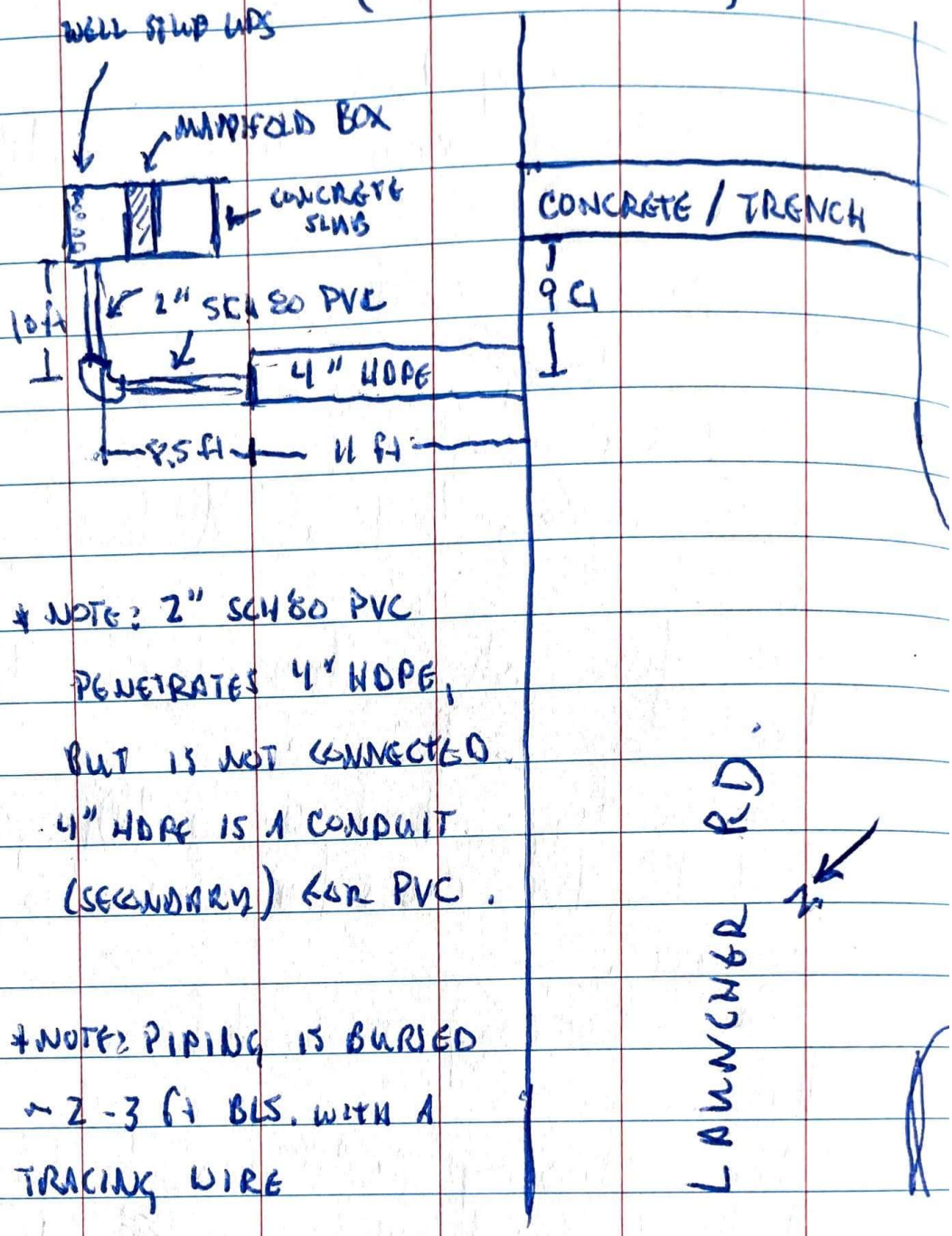
pipe is ~ 28 - 30 inches deep.
It descends vertically into ground as 2" galvanized steel. Approximately 2 feet down, it transition to a 2" PVC schedule 80 elbow. The elbow is facing Launcher road. 2" SCH 80 PVC Pipe heads towards launcher road.
*NOTE: Towards Launcher road is a southern direction. The pipe exits the slab in a western direction. We were unable to locate that transition due to water seepage.

+ ALL Pipe (Horizontal) within trench that we uncovered was SCH 80 PVC.
+ Could not locate transition to HDPE pipe
+ Very large amount of TIMBERS on possible transition location

1045 Back-filled over and cleaned up debris.
Locked down MLPV Trailer and
1130 Shut system down in preparation for incoming hurricane
1230 ALL PERSONNEL OFF SITE

JB

MAP OF UNDERGROUND PIPING (EAST OF LAUNCHER)



* NOTE: 2" SCH 80 PVC PENETRATES 4" HDPE, BUT IS NOT CONNECTED. 4" HDPE IS A CONDUIT (SECONDARY) FOR PVC.

* NOTE: PIPING IS BURIED ~ 2 - 3 ft BLS. WITH A TRACING WIRE

0800- Austin Slaton onsite-
Weather: Sunny, 75°F.
0815- Jeff & Alfredo onsite to complete utility locates
0825- James Bradford onsite-
0835- Locates complete-
0840- Jeff & Alfredo offsite-
- Begin digging to locate 4S transfer line.
- find line where it makes a 90° turn back towards the road.
- Continue digging & locate to HDPE pipe that the PVC runs through under the road.
- Can't see any cracks of find any leaks.
- James digs up right next to stub up at the trailer to check for leaks there.
- No leaks at stub up either.
1100- Call Linnea to inform her of what was found-
1115- Begin backfilling holes-
1200- OS/JB offsite-

SITE: **NASA MLPV**

PLANNED ACTIVITIES: Locate break in Zone 5 piping underground between trailer and manifold using sewer camera.

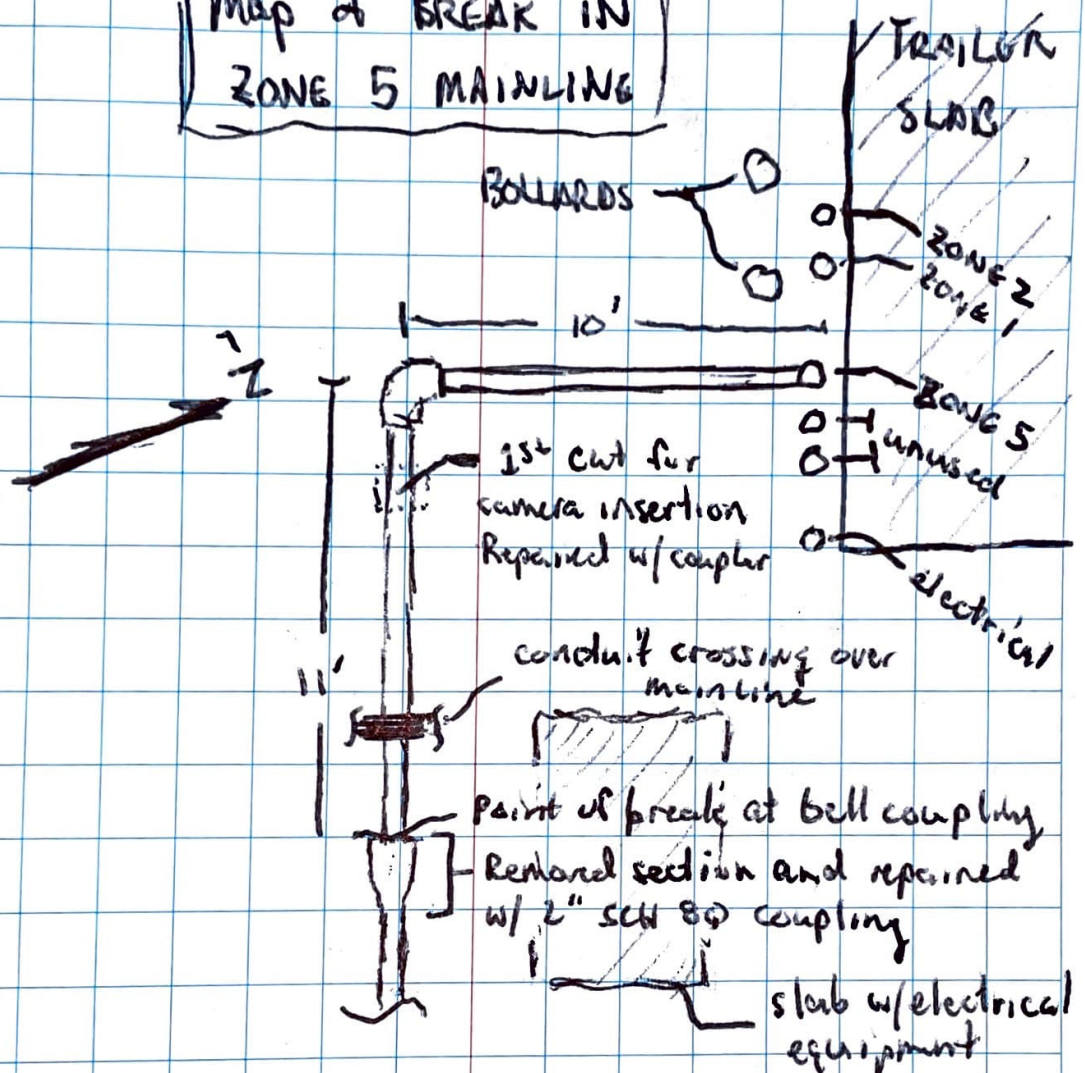
DATE: 2/16/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE: Dustin Slater (DS)

TIME	FIELD NOTES
0730	JB onsite. DS onsite. System operating on arrival. Weather: 64degF and mostly sunny. High of 79degF and partly cloudy predicted.
	Begin clearing gravel from trailer area.
0815	Dig down to Zone 5 piping, about 2'-3' bls.
9:30	Exposed first 90deg elbow in schedule 80 pvc piping and about 4' of piping after elbow.
	Cut pipe about 6" after elbow and insert camera into piping.
1025	Found break in pipe approximately 11' from insertion point.
	Continue excavating piping to about 3' past break.
1200	Exposed break and repaired section using (2) 2" sch80 pvc couplers.
1215	JB and DS offsite for lunch
1315	Returned from lunch and began testing piping.
	Zone 5 piping pressurized and delivered air to manifold panel
	Purged water in line. Backfilled trench.
1400	Balanced flow rates at Zone 5 manifold.
	BSW-26: 2.2 cfm at 20 psi,
	BSW-27: 2.6 cfm at 24 psi,
	BSW-28: 2.0 cfm at 20 psi,
	BSW-29: 2.8 cfm at 20 psi,
	BSW-30: 1.6 cfm at 20 psi,
	BSW-31: 2.2 cfm at 22 psi,
1445	JB and DS offsite. System operating on departure.
	Note: After discussing zone timing with Josh Lerch of AECOM, we programmed the zone timing to switch to Zone 5 for two hours per day until the next O&M. At that time, we will reassess the zone timing.

Map of BREAK IN ZONE 5 MAINLINE



NOTE: ZONE 5 MAINLINE IS ~ 2-3' BLS

SITE: **NASA MLPV**

PLANNED ACTIVITIES: Site Walkthrough with Ridge Environmental for the proposed biosparge system expansion.

DATE: 1/19/2023

NOTES BY: James Bradford (JB) - AECOM

ADDITIONAL ON SITE: Ridge Environmental (Ridge): Patrick Zomer

TIME	FIELD NOTES
0905	James Bradford arrives at KSC Badging Station.
0915	Ridge arrives at Badging Station. We head in to get temporary badge for Ridge.
0935	JB and Ridge depart Badging Station for site.
0945	JB and Ridge onsite. JB texts Tony Bocca of Bechtel Construction to inform of arrival and set up a possible meeting. Meeting tentaively set for 10:30.
	JB and Ridge begin site walkthrough.
	Ridge expresses concern with water disposal if existing piping is below water level and requires dewatering during the tie-in process.
	Access is also an area of concern. Ridge would like to remove fencing for easier access to well area, or move fencing back to include well area.
	Ridge would like to extend the work area to include the storm drain to the west and the first AS well to the east (ASW1). This expansion of work area is to help locate the existing piping. The piping is most likely above the storm drain to the west and is definitely connected to ASW1. This expansion will require Bechtel to move some materials currently being stored in the proposed location.
1145	Tony Bocca and his superintendent of Bechtel arrive at the proposed construction location. Ridge discusses concerns with Bechtel and Bechtel agrees to the fence removal or moving the fencing northward, provided Ridge gives at least 1 day notice prior to changes. Ridge will also provide help, if needed, with fence modifications. Ridge also agrees to expanding the locating/dig area and will move stored materials out of the proposed location.
	Ridge and Bechtel discuss dewatering disposal procedures and permitting process. Ultamitely, it is up to the permitting authority to decide what to do with the water if dewatering is required.
1200	All personnel off site.

Site:	**MLPV - Biosparge Area**
SOW:	MW Install
Date:	2/15/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:00	PB departs Orlando for MLPV
7:00	PB + EDS on-site. H&S meeting Weather: 68F Clear SOW: Start Biospare Well Installation Vehicle: 977
7:50	Mobilize to BSW-36
8:13	Post hole first 5', then drill BSW-36
9:14	Collect lithology boring from 45-50'. See detailed eletronic boring log for details.
9:34	Mobilize to BSW-34
9:40	Post hole first 5', then drill BSW-34
10:27	First core attempt 0 recovery. Equipment flodded with liquified sand
11:19	Second core attempt 0 recovery. Equipment flooded with liquified sand
11:24	Mobilize to BSW-32.
11:42	EDS breaks for lunch
12:24	back from lunch
12:33	Post hole first 5', then drill BSW-34
13:27	First core attempt 0 recovery. Equipment flodded with liquified sand
13:34	Mobe to CCF to inventory and drop off IDW
13:57	Back at MLPV
14:04	Install BSW-32
14:32	Refusal with DPT rods at 40'
14:51	Redrill BSW-32 with flight augers.
16:29	Complete BSW-32. Will grout and develop tomorrow
16:41	PB + EDS off site

Site:	**MLPV - Biosparge Area**
SOW:	MW Install
Date:	2/16/2023
Worker:	Caroline Bekins (CB)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:15	CB departs Orlando for MLPV
7:30	CB + EDS on-site. H&S meeting Weather: 70F Sunny SOW: Start Biospare Well Installation
7:40	Mobilize to CCF to dispose of IDW into staged drums
8:15	Develop well BS-32
8:25	Post hole first 5' for BS-33
8:45	Complete development of BS-32 and install BS-33 using flight augers to 50' bls
9:30	Install casing to BS-33
9:56	Develop BS-33
10:35	Complete development of BS-33; begin grout- EDS to leave clearance of 3' bls for sand so that Ridge can tie in piping to wells
10:45	Pellets in casing. Need to re-drill BS-33
11:36	Complete re-drill of BS-33
11:45	Develop BS-33
12:25	Complete development of BS-33; begin grout- EDS to leave clearance of 3' bls for sand so that Ridge can tie in piping to wells
12:40	BS-33 complete. Mobilize to CCF to empty IDW into staged drums
13:25	Post hole first 5' for BS-34 and start to install
13:50	Install casing to BS-34
14:45	Develop BS-34
15:05	Complete development of BS-34 and begin to grout - EDS to leave clearance of 3' bls for sand so that Ridge can tie in piping to wells
15:30	BS-34 complete. Set up equipment at BS-35.
15:45	CB + EDS off site.

Site:	**MLPV - Biosparge Area**
SOW:	MW Install
Date:	2/17/2023
Worker:	Patrick Bendl (PB) Chris S (CS)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:15	PB departs Orlando for MLPV
7:15	PB + EDS on-site. H&S meeting Weather: 73F Clear SOW: Continue Biospare Well Installation Vehicle: 977
7:45	Post hole first 5', then drill BSW-36
9:00	Begin developing BSW-35
9:30	End development
10:04	Complete BSW-35
10:10	PB off-site
10:13	Mobeilize to BSW-36
10:21	Post hole first 5', then drill BSW-36
11:50	Begin developing BSW-36
12:20	End development
13:06	Complete BSW-36
13:11	Drum IDW at CCF
13:36	EDS begins to pack up
13:50	EDS + CS off-site

SITE: **NASA MLPV**

PLANNED ACTIVITIES: Dig and locate Zone 1 & 2 main lines. Connect new biosparge wells to existing main lines. Pressure test lines. Backfill and compact trenches.

DATE: 2/21/2023

NOTES BY: James Bradford (JB) of AECOM

ADDITIONAL ON SITE: Ridge Environmental (RIDGE): Patrick Zomer, Joe Orfanides, Cameron Orfanides

TIME	FIELD NOTES
0645	JB leaves home office.
0815	JB arrives at KSC Badging Station. RIDGE at badging station to receive temporary badges.
0930	JB and RIDGE onsite. Weather: 67degF and cloudy. High of 85degF
	Shut sparge system down, shut off power to system, and tagout/lockout disconnect. Begin digging to locate Zone 1 & 2 main lines. Note: The new wells
1000	Jennifer Gootee and Linnea King of AECOM onsite for a site visit.
1030	Main lines located about midway between biosurgery well BSW-34 and the road. Note: pipes are not parallel to Launcher Road, but at an angle heading almost due west.
	Uncover about 10-feet of main line pipes to provide adequate space for adding a 2-inch tee to each line.
1205	Lunch break.
1305	RIDGE ties into main lines with 2-inch tees.
	Note: the existing pipe is Duraplus 63mm SDR 12.5 blue piping (possibly ABS).
1355	Excavate the trench from the main line to biosparge well, BSW-34, and then parallel to the line of biosparge wells from BSW-32 to BSW-36.
1500	Continue installing piping from main line to biosparge wells.
	Note: BSW-32, 33, and 34 will connect to Zone 2 main line, while BSW-35 and 36 will connect to Zone 1 main line.
1600	The Zone 1 main line tie is complete.
1620	Pressure test modified Zone 1 main line and branches.
1730	Pressure test modified Zone 2 main line and branches.
1740	Backfill and compact trenches with blue burial tape.
1800	Pick up equipment and secure area. Trenches are backfilled, but area is not graded and a final compaction is required.
1815	All personnel offsite.

SITE: **NASA MLPV**

PLANNED ACTIVITIES: Grade construction area, build forms, mix and pour concrete pads, install vaults and components for wellhead.

DATE: 2/22/2023

NOTES BY: James Bradford (JB) of AECOM

ADDITIONAL ON SITE: Ridge Environmental (RIDGE): Patrick Zomer, Joe Orfanides, Cameron Orfanides

TIME	FIELD NOTES
0815	JB onsite. RIDGE onsite. Weather: 66-degF and mostly sunny. High of 82-degF.
	Begin grading construction area.
0900	Build forms for vault pads.
0925	Setup for form building. Begin installing vault at BSW-32.
1000	Finished grading and compacting trench areas. Remove orange fencing.
1055	Finished plumbing BSW-32.
1230	Lunch break.
1330	Continue plumbing, setting vaults, and setting forms.
1500	Forms and vaults set. Begin mixing concrete. (50) 60# bags with (50) gallons of water.
1710	Pads are completed.
1720	Restart system and pressure test both Zones 1 & 2 with globe valves at wellheads closed
1800	Start spreading grass seed. Then spread straw over seed.
1835	RIDGE offsite.
1845	JB offsite. System left in normal operation with the valves for BSW-32 to BSW-36 closed at the wellheads.

6/2/22

VB/MP

NASA MLPV
AS WELL REDEVELOPMENT

0905 James Bradford & Madan Periyan on site.

* NOTE: AS WELLS are outside of fencing
+ Some wells are covered with dirt

- CALLED LINNEA KING to DISCUSS well locations, access, & possible difficulties.

~ 1000 - CALLED MATT LUTHI (BECHTEL) to discuss SOW for upcoming days.

WEATHER: 82°F (High 85°F)
PARTLY CLOUDY → SUNNY

SOW: REDEVELOP WELLS (AS)

1015 BEGIN DEVELOPING WELLS

WELL ID	DTW	BEFORE Total Depth	AFTER Total Depth
AS-25	3.48	48.50	48.55
AS-24	4.15	49.20	49.23
AS-23	4.73	48.90	48.92
AS-22	3.86	49.01	49.04
AS-21	4.06	48.96	49.16
AS-20	4.13	49.26	49.42
AS-19	3.90	47.87	48.33

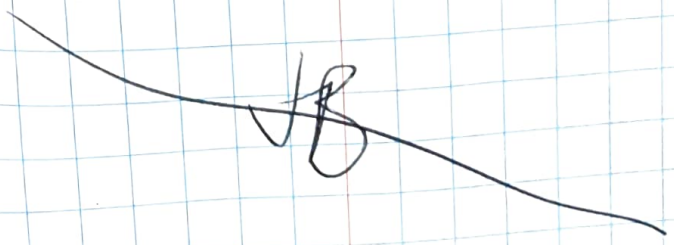
6/2/22

VB/MP

WELL ID	DTW	TOTAL DEPTH Before	After
AS-18	4.43	49.16	49.36
AS-17	4.18	49.10	49.32
AS-16	4.04	48.70	48.72
AS-15	4.06	49.27	49.30
AS-14	4.05	48.36	49.40
AS-13	4.36	49.25	49.30
AS-12	3.96	48.76	49.16
AS-11	3.99	49.20	49.21
AS-10	4.01	49.34	49.36
AS-9	4.15	49.46	49.48
AS-8	4.20	49.49	49.50

1440 Pick up equipment. Drive out of location

1545 ALL PERSONNEL OFFSITE.



6/3/22 p 3 of 3 JB/MP

JWB 0830 ~~0900~~ James Bradford and Madden Parsotam on site

- SOW: CONTINUE RE DEVELOPING WELLS ~~Track COC~~ CHECK TRAILER FOR O&M LOG CONTINUITY
- WEATHER: 82°F (H 85°F) MOSTLY SUNNY
- CALL MATTHIAS (BECHTEL) to check in.
- CONTINUE DEVELOPING WELLS

WELL ID	DTW	TOTAL DEPTH BEFORE	TOTAL DEPTH AFTER
AS-7	4.22	49.54	45.56
AS-6	4.28	49.61	49.62
AS-5	4.28	49.84	49.84
AS-4	4.34	49.70	49.72
AS-3	4.42	49.67	49.69
AS-2	4.46	49.75	49.75
AS-1	4.47	49.83	49.85

1645 CHECK TRAILER FOR O&M LOG CONTINUITY

1230 ALL PERSONNEL OFFSITE

JB

6/4/22 p.1 of 1 LK/Chrom

8:00 Linnea King Clark onsite
Chrome Electric onsite

8:15 Boss hasn't arrived yet.
H&S mtg.
Overcast, rain in forecast 73°F

Scope: feed cable to main breaker panel + connect to trailer.

8:45 off site, gate closed behind us
(Outage was cancelled due to weather)

06/11/22 p. 1 of 1 LKL/CHROME

7:45 Call KSC KSC(321-867-7627) gave me Power Consof # 321-867-2777. Confirmed outage (#63825) is still approved and scheduled.

8:15 arrive on site, Chrome on-site waiting for Boss to arrive for shutting off power.

9:12 Boss Engineer arrived

9:20 BOSS off site, outage initiated

9:23 Began pulling wire

10:31 Chrome notified BOSS that work may be completed in about 15 min.

10:38 Wire pulled, panel reassembled

10:44 Boss returned

10:58 Power restored

11:03 Test power at disconnect panel Shawn Davis wanted like to be present during startup to confirm the high leg in the tower panel can handle the load it is connected properly (in-line with the transformer)

11:30 All off-site, fence remained open for touring buses.

6/20/22 p 1 of 1 JL/JB/MP/CHROME

0830 JOSH LERCH, JAMES BRADFORD, & MADAN } AECOM
PARTHAN ONSITE.
CHROME ONSITE
WEATHER: 81°F, MOSTLY SUNNY

0915 CALL MATT LUHTI (BECHTEL) TO CHECK IN
- POWER SYSTEM UP
  * HMI PROGRAMMING LOST (ERASED)
- REINSTALLED HMI PROGRAMMING
- MODEM NOT ACTIVATED (AT&T ERROR)
- PLC PROGRAMMING NOT WORKING PROPERLY & CALLED GSD TO REPROGRAM
- TESTED motors for proper rotation & EVERYTHING TESTED GOOD.
- CHROME OFFSITE

1200 System will NOT OPERATE PROPERLY IN AUTO. ALL TESTING PERFORMED IN MANUAL

1400 - SHUT SYSTEM DOWN - GSD will CONTINUE to REPROGRAM TO FIX PLC OPERATIONS
- LOCKED OUT POWER (LO/TO)

1430 ALL PERSONNEL OFFSITE

6/21/22 p 1 of 1 JB/MP

0830 JAMES BRADFORD ONSITE, MADAN PARBOTEEN ONSITE
WEATHER: 81°F (H84°F) PARTLY CLOUDY
- START SYSTEM (IN MANUAL MODE)
OPERATE LOG 2
* SET FLOW TO ~16 L/m
- COLLECT FIELD READINGS
* NOTE: CRANE OPERATIONS PROHIBITED
COLLECTION OF READINGS ALONG ROAD
* NOTE: OVERGROWTH PREVENTED
COLLECTION OF READINGS ALONG
MARSH (NEXT TO R/R TRACKS)
- NEED SPARE BALL VALVES
* HANDLES ARE RUSTING OFF
OPERATE LOG 1
COLLECT READINGS
* FOR DETAILS, REFER TO O&M LOG
OPERATE LOG 5
NOTE: HIGH FLOW, NO PRESSURE
* POSSIBLE BROKEN LINE UNDERGROUND
- SHUT SYSTEM DOWN
1515 ALL PERSONNEL OFFSITE

6/28/22 p 1 of 1 JB

NASA MLP PLC TROUBLESHOOT

0830 JAMES BRADFORD ONSITE
WEATHER: 82°F Sunny (H 87°F)
- CALL MATT LUHTI (BECHTEL) TO
LET HIM KNOW OF SOW

- TURNED POWER ON
* BEGAN reconfiguring modem

1100 JB offsite (laptop issues)

1300 CONTINUED reconfiguring modem
& HMI

1430 REMOTE ACCESS ACHIEVED
- SHUT DOWN ALL BUT HMI, PLC,
& MODEM

1515 ALL PERSONNEL OFFSITE

Bekins, Caroline

From: Bradford, James
Sent: Tuesday, July 5, 2022 8:27 PM
To: King Clark, Linnea
Cc: Lerch, Josh
Subject: NASA MLPV Update

Follow Up Flag: Follow up
Flag Status: Flagged

Linnea,

The PLC has been reprogrammed and is up and running. However, we have determined that there is a substantial air leak in Leg 5 (Zone 3) between the stub up at the trailer and the wellhead panel near the AS wells on the other side of Launcher Road, all of which is underground. We will need to dig up sections of the line to determine the depth of the buried piping, the condition of the piping, and the possible location of the leak.

Also note that the zone timing has been reprogrammed to operate Zone 1 and Zone 2 at 12 hours per day.

Thanks,

James Bradford
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AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: JAMES BRADFORD | Date: 07/05/2022 | Time: 0945

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	NO	
System Operational on Departure (yes/no)	Each Visit	YES	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	YES	
Check Condensate Oil Separator and Coalescers	Each Visit	YES	
Check Oil Level in Compressor	Each Visit	YES	
Check Compressor Belts	Each Visit	YES	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	

Equipment Trailer Readings (Biosparge)

Control Panel

	(hrs)	amps (A)
Air Compressor	17923.8	
Heat Exchanger	17995.7	
Temperature (TSHH-801)	100	oF

PLC HMI

Zone 1 Hours		hrs
Zone 2 Hours		hrs
Zone 3 Hours		hrs

Compressor

Dilution Valve Open		%
Coalescer Differential Pressure		psi

Compressor HMI

	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	178	167		oF
Load/Unload Time	33/18	39/18		sec/sec

Trailer

Tank Pressure	~100	~100		psi
Pressure Regulator	21	23		psi
Manifold Pressure	~~7.5~~	~~6.5~~		psi
Main Flow	140	140		cfm
Manifold Temperature	100	100		oF
Zone Pressure	24	18.5		psi
Zone Flow	17.5	16		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW25	**Biosparge Expansion**	**BSW26 (Leg 5)**	**BSW27 (Leg 5)**	**BSW28 (Leg 5)**	**BSW29 (Leg 5)**	**BSW30 (Leg 5)**	**BSW31 (Leg 5)**
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)								
Differential (in. WC)		Flow (ACFM)						
Flow (SCFM)		Flow (SCFM)						

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)								
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0061R**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments: ZONE 3 (LEG 5) will not hold pressure between the trailer and the wellhead panel.

ZONE 4 is open as a bleed → set to 25 cfm

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

Zone 3 was programmed out of system cycle.
ZONES 1 & 2 are set to operate 12 hrs/day.

LEG 5 / ZONE 3 TROUBLESHOOT

- Measured 22 cfm out of trailer
- @ wellhead panel → 0 cfm (1.7 ~ 1.8 psi)
- Pulled gauges from (2) wellheads; felt air flow emit ~~from~~ at gauge openings
  * Gauges pulled from AS 26 & AS 27
- Adjusted flows to 2 cfm
- Shut down Zone 3 remotely
  * FLOW STOPPED

Conclusion: MANIFOLD / ZONING IS CORRECT.

- Reinstalled gauges
- Disconnected hose from trailer solenoid valve to stubs entering ground
- Installed BALL VALVE at solenoid valve
- Opened ZONE 3 and shut ball valve.

* Measured 28.6 psi at flow meter inside trailer.

Conclusion: LEAK is underground

7/5/22 p 1 of 2 JB

NASA MLPV O&M

0945 James Bradford onsite. System off upon arrival

Weather: 85°F - Partly Cloudy
H 88°F

Called Matt Lantz (Bechtel) to check in and provide SOW

1000 Called Dan Hamer (ESD) to sort out programming issues.

1120 System operating correctly
+ Collect trailer readings
- for details, refer to O&M log
AC Hrs = 17923.8

Note: Zone 3 (Leg 5)
- Verified manifold connections are correct.
No pressure & flow indicating break in line underground.
Removed Zone 3 timing from programming due to possible break

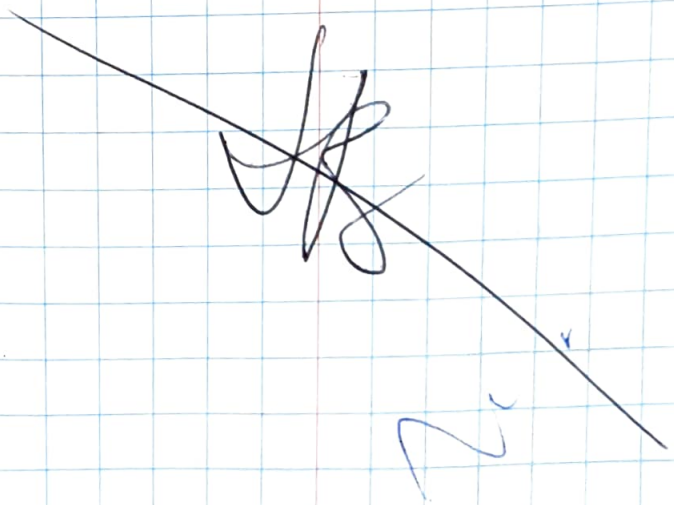
7/5/22 p 2 of 2 JB

1320 Called Linnon King (AECOM) to notify of break in line. (Leg 5)

Lock up equipment

1345 ~~All personnel offsite~~ Tested Zone 3 manifold for pressure @ trailer
~~-~~ 28.6 psi @ flow meter w/ line outside capped (just after BV)

1430 All personnel offsite



NASA MLPV O&M

0830 DUSTIN SLATER ONSITE. JAMES BRADFORD ONSITE
WEATHER: 82°F Sunny (H 92°F)
System running upon arrival.

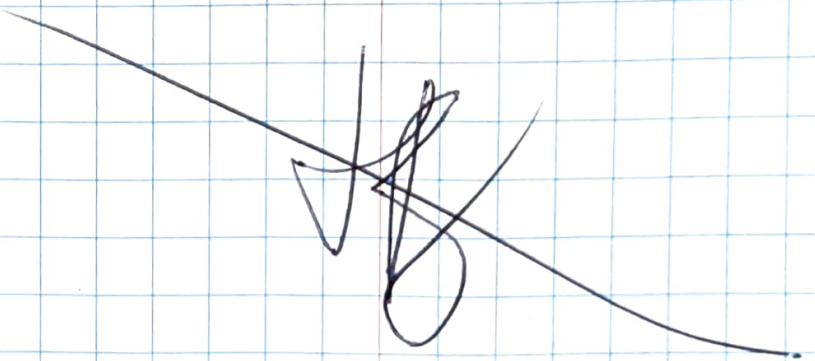
0920 Contacted MATT LUHTI (Bechtel) to inform of SOW
* TEXTED * →
BEGIN O&M READINGS
* NOTE: WATER LEVEL NEXT TO R/R TRACKS IS HIGH. BRUSH IS overgrown. Could not safely collect readings at wellheads AS-1 through AS-25 or monitor wells outside of fence. ONLY ASMW-1 & ASMW-2 are accessible. ASMW-3 is covered by materials from BECHTEL.

† FOR DETAILS OF READINGS, REFER TO O&M LOG.
AC HRS 18050.0

1015 JB LEFT SITE TO PURCHASE NEW USB FLASH TO FIX START UP LOGGING ERROR ON SYSTEM

- CONTINUED WORKING W/ DAN HAMER (ESD) (REMOTELY) TO OPTIMIZE ALL THE PROGRAMMING IN THE PLC & HMI.

1545 ALL PERSONNEL OFFSITE



8/2/22

JB/DS

NASA MLPV

0830 DUSTIN SLATER ONSITE. JAMES BRADFORD ARRIVES
WEATHER: 82°F SUNNY
H 89°F, POSSIBLE THUNDERSTORMS

- SHUT SYSTEM DOWN TO PERFORM MAINTENANCE. REPAIRED LEAK AT MAIN FLOW METER (ROTAMETER)
+ REMOVED ROTAMETER because it was leaking and unneccessary. THERE IS AN ERDCO flow meter also on the main line.
+ FOR DETAILS, REFER O&M Log.
- Adjusted LOAD/unload range from 65/110 to 85/120
- [redacted]
- Added qt. of oil to comp.
- Re formatted USB drive to fix emails.
- Collected trailer readings

1530 ALL PERSONNEL OFFSITE

JB

8/16/22

JL/JB

NASA MLPV

0930 J. Lorch + J. Bradford onsite
weather: 85°F Sunny

- System operating upon arrival
AS Hours: 18996

* For field Readings, see O&M Log

- Most wells not accessible due to overgrown vegetation

1230 all personel offsite

12/12/2022 JB/MP

NASA MLPV O&M

0830 JAMES BRADFORD & MADAN PARSOTAN ONSITE.
SYSTEM RUNNING UPON ARRIVAL
H&S TAILGATE:
WEATHER: 63°F, PARTLY CLOUDY (H72°F)

- BEGIN COLLECTING READINGS
* FOR DETAILS, REFER TO O&M LOG.

0545 SHUT SYSTEM DOWN FOR MAINTENANCE
- ADDED ~1 QT OIL TO COMPRESSOR
- CHANGED SOAK-ENDS IN OIL/WATER SEPARATOR
- TIGHTENED BELTS
* NEED REPLACEMENT 1" WELL CAP FOR MW-3 (BROKEN)
* NOTE: FIELD IS STILL OVERGROWN, PREVETING SAFE ACCESS TO AS WELLHEADS AND MONITOR WELLS ALONG TRACKS (RAILROAD)

~~1040~~ START ~~SHUT~~ SYSTEM DOWN AFTER ~~FOR~~ MAINTENANCE

1110 REPLACED MANHOLE COVER FOR MLPV-IW0057

1150 ALL PERSONNEL OFFSITE.

SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 2/14/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE: Madan Parsotan (MP)

TIME	FIELD NOTES
0845	JB onsite. MP already onsite. Weather: 57degree F and sunny. High of 73 degree
	System running upon arrival.
0905	Shut system down for maintenance items
	Added 1-qt oil to compressor
	Tightened belts on compressor.
	Cleared all maintenance warnings on compressor.
1105	Restart system
	Collect readings for AS Zone 1 operation.
	*FOR DETAILS REFER TO O&M LOG
1135	Collect readings for AS Zone 2 operation.
	*FOR DETAILS REFER TO O&M LOG
1245	All personnel offsite

SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 3/2/2023

NOTES BY: James Bradford

ADDITIONAL ON SITE: Chris Setrin

TIME	FIELD NOTES
0830	James Bradford and Chris Setrin on site. System running on arrival
	Weather: 70degF and sunny. High of 85degF expected
	Switch zones to manual. Set Zone 1 in operation.
	Increased flow from 15 scfm to 18 scfm.
	Adjust at wellheads for BSW-35 and BSW-36 to 2.9 and 2.1 scfm, respectively.
	Cleared biosparge vaults of overgrowth.
	Measured all other flow rates at the well heads for Zone 1.
	Note: for details, refer to O&M Log
1100	Switch from Zone 1 to Zone 2. Increased flow rate from 16 to 19 scfm.
	Adjusted flow rates at wellheads for BSW-32, BSW-33, and BSW-34 to 3.7, 3.3, and 2.5, respectively.
	Note: for details, refer to O&M Log
1245	Checked and balanced flow rates at Zone 5. For details, refer to O&M Log.
	Note:ASW-03 and ASW-14 need new ball valves at the wellhead. Pressure gauge for Zone 5 manifold needs replacement.
1330	Placed system back into auto.
	All personnel off site.

SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 3/14/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE: Chris Setrin (CS)

TIME	FIELD NOTES
0830	CS onsite. JB onsite. System running upon arrival.
	Weather: 60degF and sunny. High of 66degF expected.
	Switch zones to manual. Zone 1 in operation,
	Begin collecting trailer readings.
	*For details, refer to O&M log.
0915	Begin collecting field readings for Zone 1.
	*For details, refer to O&M log.
1140	Switch zones from Zone 1 to Zone 2.
	Begin collecting trailer readings and field readings for Zone 2.
	*For details, refer to O&M log.
1400	Shut system down for maintenance items.
	Tightened compressor belts.
	Added 1-qt oil to compressor.
	Replaced gauge on Zone 5 manifold line.
1430	Restarted system. Switch to Zone 5.
	Begin collecting trailer and field readings for Zone 5.
1630	Switch system back to auto. Zone 2 is in operation,
	Clean area and prepare for departure.
1700	All personnel offsite.

SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 4/18/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE: Madan Parsotan (MP)

TIME	FIELD NOTES
0845	JB onsite. MP onsite.
	Weather: 62degF and Sunny, High of 75degF and sunny predicted.
	Change zone programming to 8 hours of operation per day for each zone.
0910	Begin collecting readings for Zone 1
	*For details, refer to O&M log
1135	Switch to Zone 3 (Leg 5) and begin collecting readings.
	*For details, refer to O&M log
1230	Switch to Zone 2 (Leg 2) and begin collecting readings.
	*For details, refer to O&M log
1415	Shut system down for maintenance items.
	Compressor is at 28963 hrs and requires 4000 hour service.
	Completed 4000 hr service (oil, air filter, oil filter, and air-oil separator)
	Cleaned pre-filter
1530	Restarted system. Pickup area.
1620	All personnel offsite.

APPENDIX F

OM&M LOGS

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AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: James Broadhead, Madison Parpoten | Date: 6/21/22 | Time: 0830

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes no)	Each Visit	no	
System Operational on Departure (yes no)	Each Visit	no	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	
Check Compressor Belts	Each Visit	yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	

Equipment Trailer Readings (Biosparge)

Control Panel

	(hrs)	amps (A)
Air Compressor	1791.2	30-48
Heat Exchanger	1791.0	1.96
Temperature (TSHH-801)	85	oF

PLC HMI

Zone 1 Hours		hrs
Zone 2 Hours		hrs
Zone 3 Hours		hrs

Compressor

Dilution Valve Open	0	%
Coalescer Differential Pressure	1	psi

Compressor HMI

	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	167	163	171	oF
Load/Unload Time	45.3/27.1	27.2/45.3		sec/sec

Trailer

Tank Pressure	~100	~100	~100	psi
Pressure Regulator	25	25	25	psi
Manifold Pressure	6	6	6	psi
~~Main Flow~~ RADIUS	90	90	95	cfm
Manifold Temperature	90	90	95	oF
Zone Pressure	23	18	~~BKN~~	psi
Zone Flow	16	17	17	cfm

0-30 psi

~~0-30 psi~~ 1.4 psi

*Possible broken line in the ground

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)	19.6	19.7	19.6	19.5	19.6	19.6	19.5	19.5
Temp. (°F)	82	83	82	82	81	82	81	81
Differential (in. WC)	0.005	0.02	Blocked	0.015	0.025	0.035	0.03	0.02
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)	19.5	19.6	19.6	19.4	18.8	22.3	22.5	22.5
Temp. (°F)	82	82	81	83	83	81	81	81
Differential (in. WC)	0	0.06	0.015	0.02	0.035	0.01	0.025	0.04
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)	22.3	22.3	22.7	22.6	22.4	22.6	22.6	22.6
Temp. (°F)	83	80	81	81	82	81	83	83
Differential (in. WC)	0.03	0.035	0.09	0.06	0.025	0.04	0.05	0.03
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)	23.1							
Temp. (°F)	81	Pressure (PSI)			1.7			
Differential (in. WC)	0.02	Flow (ACFM)			0			
Flow (SCFM)		Flow (SCFM)						

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)	3.42 / 3.9	2.39						
Stress (" H2O)		0.0						
Dissolved Oxygen (mg/L)	1.94 / 2.11	3.03						
Temperature °C	27.1 / 29.2	28.5						
ORP (mV)	46 / 150	138						
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

TRAILER HAS PRESSURE; ADD VENTING

*Monitor wells close to tracks are covered with heavy brush/overgrowth

*Crew operations covered other wells nearby

*Couldn't find ASMW-0003 and ASPZ-0002, possibly covered by equipment

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

NOTE

	DTW	DO	TEMP	ORP
BASELINE ASPZ-2 :	3.45	2.21	26.6	138
ASPZ-1 :	3.42	1.94	27.1	46

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: JAMES BRADFORD / DUSTIN SLATER | Date: 07/12/22 | Time: 0830

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	YES	
System Operational on Departure (yes/no)	Each Visit	YES	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	NO	
Check Condensate Oil Separator and Coalescers	Each Visit	YES	
Check Oil Level in Compressor	Each Visit	YES	
Check Compressor Belts	Each Visit	YES	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	

Equipment Trailer Readings (Biosparge)

Control Panel

	(hrs)	amps (A)
Air Compressor	18090.0	21-42
Heat Exchanger	18162.0	2
Temperature (TSHH-801)	104	oF

PLC HMI

Zone 1 Hours	0.0	hrs
Zone 2 Hours	* RESET *	hrs
Zone 3 Hours	0.0	hrs

Compressor

Dilution Valve Open	0	%
Coalescer Differential Pressure	1	psi

Compressor HMI

	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 3 (ASW26-31)	
Air Outlet Temperature	169	171		oF
Load/Unload Time	40/39	38/33		sec/sec

Trailer

Tank Pressure	~85	~85		psi
Pressure Regulator	21	21		psi
Manifold Pressure	6	6		psi
Main Flow	90	80		cfm
Manifold Temperature	98	95		oF
Zone Pressure	23.5	19		psi
Zone Flow	19	27		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW25	**Biosparge Expansion**	**BSW26 (Leg 5)**	**BSW27 (Leg 5)**	**BSW28 (Leg 5)**	**BSW29 (Leg 5)**	**BSW30 (Leg 5)**	**BSW31 (Leg 5)**
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)								
Differential (in. WC)		Flow (ACFM)						
Flow (SCFM)		Flow (SCFM)						

INACCESSIBLE

OFF

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			4.09	~~3.85~~				
Stress (" H2O)			+0.4	0.0				
Dissolved Oxygen (mg/L)			5.24	6.04				
Temperature °C			29.4	28.6				
ORP (mV)			134	167				
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)								
	5	5	5	5	5	5		

INACCESSIBLE

OFF

COVERED

Comments

EXAMPLE

AMS
A/C = 171.0 HRS
AE = 171.3 HRS
~~Facility~~ = 171.3 HRS

NOTE: HIGH WATER LEVEL AND TALL BRUSH PREVENT SAFE ACCESS TO AS WELLHEADS AND NOTED MONITOR WELLS.

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off.
3. NF = Gauge/meter not functional

NOTE: AS ZONE HOURS 1 through 4 were reset to 0.0 @1500.

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: JOSH LERCH + JAMES BRADFORD Date: 8/16/22 Time: 9:30

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	- Check on radiator, replacement
System Operational on Departure (yes/no)	Each Visit	yes	- ORDER 2000 hr kit for
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	NO	next O&M
Check Condensate Oil Separator and Coalescers	Each Visit	yes	- NxB15, check belt size order if
Check Oil Level in Compressor	Each Visit	OK	necessary
Check Compressor Belts	Each Visit	yes	3 in inventory (XPA1207)
Oil Change (with Air/Oil Separator every 4,000 hrs)	2,000 / 4,000 hrs.	NOT due	- Order Coalescing Filter

Equipment Trailer Readings (Biosparge)

(FLA 61.7)

(BLEED) ZONE 4

18824.4

Control Panel	(hrs)	amps (A)
Air Compressor (from compressor)	22618	37
Heat Exchanger	18996	1.9
Temperature (TSHH-801)	99	oF

PLC HMI		
Zone 1 Hours	426.3	hrs
Zone 2 Hours	426.3	hrs
Zone 3 Hours	0	hrs

Compressor		
Dilution Valve Open	0%	%
Coalescer Differential Pressure		psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	174	174		oF
Load/Unload Time	28/21	27/20		sec/sec

Trailer				
Tank Pressure	~100	~100		psi
Pressure Regulator	25	27		psi
Manifold Pressure	24	24		psi
Main Flow	120	115		cfm
Manifold Temperature	100	100		oF
Zone Pressure	22.5	20		psi
Zone Flow	16	16		cfm

14

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)		Flow (ACFM)						
Differential (in. WC)		Flow (SCFM)						
Flow (SCFM)								

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			4.86	4.90				
Stress (" H2O)			+0.06	-2.0				
Dissolved Oxygen (mg/L)			6.17	5.12				
Temperature °C			28.8	28.8				
ORP (mV)			117	104				
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0061R		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: D. Slater, M. Parsotan **Date:** 9/13/22 **Time:** 0800

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	
System Operational on Departure (yes/no)	Each Visit	yes	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	
Check Compressor Belts	Each Visit	yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	good still	

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor	19592.7	41
Heat Exchanger	19665.3	2
Temperature (TSHH-801)	85	oF

PLC HMI		
Zone 1 Hours	825.8	hrs
Zone 2 Hours	708.8	hrs
Zone 3 Hours 347	1487.8	hrs

Compressor		
Dilution Valve Open		%
Coalescer Differential Pressure	2	psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	176	183		oF
Load/Unload Time	25/20	27/20		sec/sec
Trailer				
Tank Pressure	85	85		psi
Pressure Regulator	25	25		psi
Manifold Pressure	25	25		psi
Main Flow	120	150		cfm
Manifold Temperature	130	132		oF
Zone Pressure	23	20		psi
Zone Flow	17	12		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)		Flow (ACFM)						
Differential (in. WC)		Flow (SCFM)						
Flow (SCFM)								

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			3.86	3.85	4.26			
Stress (" H2O)								
Dissolved Oxygen (mg/L)			3.65	2.77	4.32			
Temperature °C			27.7	27.4	29.1			
ORP (mV)			132	169	154			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0061R**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: D. Slater, M. Ponnsotan	Date: 10/11/22	Time: 0815

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	Yes	
System Operational on Departure (yes/no)	Each Visit	Yes	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	Yes	
Check Condensate Oil Separator and Coalescers	Each Visit	Yes	
Check Oil Level in Compressor	Each Visit	Yes	
Check Compressor Belts	Each Visit	Yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	No	No filters in trailer

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor (20597)	19989.5	2.9
Heat Exchanger	20032.6	1.9
Temperature (TSHH-801)	64	oF

PLC HMI		
Zone 1 Hours	1043.2	hrs
Zone 2 Hours	925.1	hrs
Zone 3 Hours	1951.5	hrs

Compressor		
Dilution Valve Open	0	%
Coalescer Differential Pressure	3	psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	~~85~~ 157	109		oF
Load/Unload Time	38/18	37/18		sec/sec
Trailer				
Tank Pressure	95	85		psi
Pressure Regulator	27	27		psi
Manifold Pressure	20	25		psi
Main Flow	140	160		cfm
Manifold Temperature	80	85		oF
Zone Pressure	23	21		psi
Zone Flow	16	18		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)								
Temp. (°F)		Pressure (PSI)						
Differential (in. WC)		Flow (ACFM)						
Flow (SCFM)		Flow (SCFM)						

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			4.15	4.89	4.97			
Stress (" H2O)								
Dissolved Oxygen (mg/L)			5.10	6.64	6.58			
Temperature °C			26.5	26.3	27.1			
ORP (mV)			149	178	168			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: Dustin Slaton **Date:** 11/15/22 **Time:** 0860

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	YES	
System Operational on Departure (yes/no)	Each Visit	YES	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	YES	
Check Condensate Oil Separator and Coalescers	Each Visit	YES	
Check Oil Level in Compressor	Each Visit	YES	
Check Compressor Belts (XPA1207)	Each Visit	YES	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	No	No filters on trailer

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor (61.7 FLA)	25306	35
Heat Exchanger	28857	2.0
Temperature (TSHH-801)	54	°F
PLC HMI		
Zone 1 Hours	1577.7	hrs
Zone 2 Hours	1259.1	hrs
Zone 3 Hours	3.9	hrs
Compressor		
Dilution Valve Open	0	%
Coalescer Differential Pressure	3	psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	162	174		°F
Load/Unload Time	37/18	37/17		sec/sec
Trailer				
Tank Pressure	100	35		psi
Pressure Regulator	32	30		psi
Manifold Pressure	28	27		psi
Main Flow	170	180		cfm
Manifold Temperature	76	78		°F
Zone Pressure	26	27		psi
Zone Flow	14	21		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY.

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)		Flow (ACFM)						
Differential (in. WC)		Flow (SCFM)						
Flow (SCFM)								

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			4.45	4.24	5.02			
Stress (" H2O)			0.1	0.1	0.1			
Dissolved Oxygen (mg/L)			4.47	6.31	6.37			
Temperature °F			25.9	25.8	26.2			
ORP (mV)			141	174	163			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °F								
ORP (mV)	5	5	5	5	5	5		

Comments

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: J. BRADFORD / M. PARSOTAN **Date:** 12/12/2022 **Time:** 0830

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	YES	
System Operational on Departure (yes/no)	Each Visit	YES	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	YES	NEEDS REPLACEMENT NEXT VISIT
Check Condensate Oil Separator and Coalescers	Each Visit	YES	REPLACED OIL SOAKED SEP
Check Oil Level in Compressor	Each Visit	YES	ADDED ~ 1 QT
Check Compressor Belts	Each Visit	YES	ADJUSTED TENSION (TIGHTENED)
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	NEEDS 2000 HR

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor	21260.7	27-47
Heat Exchanger	21334.3	2
Temperature (TSHH-801)	62	oF

PLC HMI		
Zone 1 Hours	1708.1	hrs
Zone 2 Hours	1590.7	hrs
Zone 3 Hours	5.7	hrs
ZONE 4 Compressor	31.7.7	
Dilution Valve Open		%
Coalescer Differential Pressure	OK/OK	psi

COMP HOURS 25955

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	163	163		oF
Load/Unload Time	28/19	39/16		sec/sec
85-120				

Trailer				
Tank Pressure	80-110	80-110		psi
Pressure Regulator	28	29		psi
Manifold Pressure	25	25.5		psi
Main Flow	130	150		cfm
Manifold Temperature	127	128		oF
Zone Pressure	22.5	20.5		psi
Zone Flow	15	18		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)								
Temp. (°F)		Pressure (PSI)						
Differential (in. WC)		Flow (ACFM)						
Flow (SCFM)		Flow (SCFM)						

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			4.98	5.05	5.85			
Stress (" H2O)			0.00	+0.15	0.00			
Dissolved Oxygen (mg/L)								
Temperature °C			24.6	24.7	24.8			
ORP (mV)			99	159	168			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

ASMW-3 1" WELL CAP BROKEN

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: Dustin Slater, David Pram **Date:** 1/16/23 **Time:** 09:10

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	
System Operational on Departure (yes/no)	Each Visit	yes	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	
Check Compressor Belts (XPA1207)	Each Visit	yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.		No filters in trailer - Need to order some

Equipment Trailer Readings (Biosparge)

Control Panel

	(hrs)	amps (A)
Air Compressor (61.7 FLA)	26744	40
Heat Exchanger	22177.7	2
Temperature (TSHH-801)	50	°F

PLC HMI

Zone 1 Hours	2137.2	hrs
Zone 2 Hours	2060	hrs
Zone 3 Hours	5.7	hrs

Compressor

Dilution Valve Open		%
Coalescer Differential Pressure	2	psi

Compressor HMI

	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	163	164		°F
Load/Unload Time	27/18	29/16		scc/scc

Trailer

Tank Pressure	105	100		psi
Pressure Regulator	27	26		psi
Manifold Pressure	25	23		psi
Main Flow	125	150		cfm
Manifold Temperature	54	55		°F
Zone Pressure	22	23		psi
Zone Flow	13	17		cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW25	**Biosparge Expansion**	**BSW26 (Leg 5)**	**BSW27 (Leg 5)**	**BSW28 (Leg 5)**	**BSW29 (Leg 5)**	**BSW30 (Leg 5)**	**BSW31 (Leg 5)**
Pressure (PSI)		Pressure (PSI)						
Temp. (°F)		Flow (ACFM)						
Differential (in. WC)		Flow (SCFM)						
Flow (SCFM)								

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			5.25	5.28	6.17			
Stress (" H2O)			0	0	+0.1			
Dissolved Oxygen (mg/L)			7.27	7.74	6.39			
Temperature °F			28.9	20.5	21.8			
ORP (mV)			85	133	128			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °F								
ORP (mV)	5	5	5	5	5	5		

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: JAMES BRADFORD / MADDIN PARSONAV Date: 02/14/2023 Time: 0850

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	
System Operational on Departure (yes/no)	Each Visit	yes	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	ADDED ½ QT
Check Compressor Belts	Each Visit	yes	Tightened
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	

Equipment Trailer Readings (Biosparge)

C7488

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor	4875.7	23-36	Air Outlet Temperature				oF
Heat Exchanger	4877.5	2	Load/Unload Time	23/20	32/17		sec/sec
Temperature (TSHH-801)	55	oF	**Trailer**				
PLC HMI			Tank Pressure	80-110	80-110		psi
Zone 1 Hours	2492.3	hrs	Pressure Regulator	29	26		psi
Zone 2 Hours	2377.5	hrs	Manifold Pressure	34	24		psi
~~Zone 3 Hours~~ ZONE 4	4798.4	hrs	Main Flow	130	145		cfm
ZONE 5 Compressor	5.7		Manifold Temperature	70	76		oF
Dilution Valve Open		%	Zone Pressure	24	29		psi
Coalescer Differential Pressure		psi	Zone Flow	15	17		cfm

BLEED →

@ compressor 27488 NR

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)								
Temp. (°F)								
Differential (in. WC)								
Flow (SCFM)								
	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)								
Temp. (°F)		Pressure (PSI)						
Differential (in. WC)		Flow (ACFM)						
Flow (SCFM)		Flow (SCFM)						

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)			5.71	5.26	6.18			
Stress (" H2O)			0.0	0.0	+0.04			
Dissolved Oxygen (mg/L)			6.69	6.45	6.05			
Temperature °C			23.1	23.0	23.4			
ORP (mV)			151	180	154			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

SHUT SYSTEM DOWN AT 0905

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: James Bradford / Chris Stone **Date:** 3/02/2023 **Time:** 08:35

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	
System Operational on Departure (yes/no)	Each Visit	yes	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	—	
Check Condensate Oil Separator and Coalescers	Each Visit	—	
Check Oil Level in Compressor	Each Visit	yes	
Check Compressor Belts	Each Visit	—	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs	—	

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor	27839	
Heat Exchanger	23,295	
Temperature (TSHH-801)	95	oF
PLC HMI		
Zone 1 Hours	2658.7	hrs
Zone 2 Hours	2537.2	hrs
Zone 3 Hours	32.5	hrs
Compressor		
Dilution Valve Open		%
Coalescer Differential Pressure		psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	190	190	190	oF
Load/Unload Time				sec/sec
Trailer				
Tank Pressure	100-110	100-110	100-110	psi
Pressure Regulator	22	22	22	psi
Manifold Pressure	24	24	24	psi
Main Flow	145-150	145-150	145-150	cfm
Manifold Temperature	125	125	125	oF
Zone Pressure	20	22	10	psi
Zone Flow	18	19	18	cfm

Gauge is bad and needs replaced

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)	19.2	19.2	19.2	19.2	19.1	19.1	19.3	19.1
Temp. (°F)	74.6	75.7	74.0	73.8	71.6	74.6	73.2	73.7
Differential (in. WC)	0.015	0.005		0.02	0.03	0.01	0.004	0.03
Flow (SCFM)								

	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)	19.1	19.2	19.2	19.2	19.1	22.0	21.4	21.5
Temp. (°F)	71.4	74.1	76.8	77.7	72.1	78.8	73.5	74.3
Differential (in. WC)	0	0.03	0.01	0.01	0.1	0.02	0.015	0.01
Flow (SCFM)								

	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)	21.9	21.7	21.5	21.8	21.8	21.7	23.5	23.6
Temp. (°F)	68.0	67.4	69.0	71.8	75.4	71.4	76.8	73.3
Differential (in. WC)	0.04	0.025	0.03	0.035	0.025	0.075	0.035	0.01
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)	19.8	Pressure (PSI)	20	23	19	20	23	22
Temp. (°F)	75.9	Flow (ACFM)						
Differential (in. WC)	0.03	Flow (SCFM)	2.2	2.3	2.1	2.0	2.0	2.2

BSW 34: 22.0 / 78.4 / 0.025

BSW 35: 19.1 / 0.015 / 75.5

BSW 32: 22.4 / 76.9 / 0.075

BSW 33: 22.2 / 73.6 / 0.03

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)								
Zone/Leg	1	2	1	1	2	1	1	2

	IW0031	IW0061	IW0062	IW0063	IW0064	IW0061R		
Depth to Water (feet BTOC)								
Stress (" H2O)								
Dissolved Oxygen (mg/L)								
Temperature °C								
ORP (mV)	5	5	5	5	5	5		

Comments

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

Notes: • Ball valve broke on ASW03
• ASW14 needs a ball valve.

BSW 35
19.2
74.8
0.03

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: James Bartlett/Chris Sitrin Date: 03/14/2023 Time: 0830

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	YES	
System Operational on Departure (yes/no)	Each Visit	YES	
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	Yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	Added a quart of oil.
Check Compressor Belts	Each Visit	yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NO	

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor 28123	~~29,124.6~~	
Heat Exchanger	23602.7	
Temperature (TSHH-801)	62	oF

PLC HMI		
Zone 1 Hours	2781.5	hrs
Zone 2 Hours	2667.7	hrs
Zone 3 Hours	58.7	hrs

Compressor		
Dilution Valve Open		%
Coalescer Differential Pressure	2.5	psi

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature	167	167	167	oF
Load/Unload Time	25/14	25/14	25/14	sec/sec
Trailer				
Tank Pressure	100-110	80-100	80-116	psi
Pressure Regulator	28	27	31	psi
Manifold Pressure	24	24	28	psi
Main Flow	160	140	120	cfm
Manifold Temperature TSHH	80	75	65	oF
Zone Pressure	20	22.5	22	psi
Zone Flow	20	22	14	cfm

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (PSI)	19.0	19.0	19.0	19.1	19.1	19.1	19.1	19.1
Temp. (°F)	76.6	71.7	68.5	72.1	71.2	71.0	71.2	66.1
Differential (in. WC)	0.04	0.05	0.055	0.015	0.02	0.01	0.06	0.02
Flow (SCFM)								

	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (PSI)	18.9	19.0	19.0	19.0	19.0	20.3	20.3	20.4
Temp. (°F)	67.1	68.5	69.6	70.3	70.5	68.0	75.2	75.2
Differential (in. WC)	0.025	0.02	0.01	0.005	0.02	0.005	0.005	0.015
Flow (SCFM)								

	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (PSI)	20.3	20.4	20.2	20.3	20.5	20.1	20.1	20.2
Temp. (°F)	78.3	76.3	76.6	79.9	76.3	70.9	68.1	76.8
Differential (in. WC)	0.01	0.025	0.005	0.015	0.005	0.015	0.015	0.01
Flow (SCFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (PSI)	19.8	Pressure (PSI)	20	23	19	19.5	21	22
Temp. (°F)	67.1	Flow (ACFM)						
Differential (in. WC)	0.005	Flow (SCFM)	2	3	2.6	2.4	2.5	2.3

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)	4.45	3.63	5.67	5.66	5.93	1.85	2.38	1.41
Stress (" H2O)	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Dissolved Oxygen (mg/L)	2.21	7.69	6.17	5.59	5.76	5.44	8.52	4.11
Temperature °C	23.0	24.7	23.3	23.6	23.7	23.3	22.2	22.4
ORP (mV)	96	100	116	126	128	138	137	~~102~~ 101
Zone/Leg	1	2	1	1	2	1	1	2

	IW0031	IW0061	IW0062	IW0063	IW0064	IW0061R		
Depth to Water (feet BTOC)	1.81	5.09	5.17	2.73	2.62	2.87		
Stress (" H2O)	0.0	0.0	0.0	0.0	0.0	0.0		
Dissolved Oxygen (mg/L)	3.79	0.85	0.73	0.76	0.61	8.78		
Temperature °C	23.2	23.8	23.8	22.7	22.8	23.9		
ORP (mV)	47.5	10.75	18.25	43.25	58.58	100.5		

Comments

3/4" 3/4" 3/4" 3/4"

1. NR indicates not recorded.
2. Biosparge expansion started Feb 2016. AS system remains shut down since 24-Apr 2018. System operates in 3 hour cycles, 4 times per day: 3hrs on and 3 hrs off
3. NF = Gauge/meter not functional

Notes:

- ASW03 ball valve replaced. @1234

Pressure
Temp
Diff

BSW32	BSW 33	Key
20.6	20.7	
78.6	77.7	
0.025	0.06	

BSW 34	BSW 35
20.2	19.1
74.6	75.2
0.045	0.03

BSW 36
19.1
77.2
0.01

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: James Bradford | Madan Parcotam | **Date:** 4/18/23 | **Time:** 0910

Maintenance & Monitoring

Item	Frequency	Completed (yes/no)	Comments or Notes
System Operational on Arrival (yes/no)	Each Visit	yes	
System Operational on Departure (yes/no)	Each Visit	yes	Restarted system @ 1530
Clean Inlet Filters (In-line, Bleed Air)	Each Visit	yes	
Check Condensate Oil Separator and Coalescers	Each Visit	yes	
Check Oil Level in Compressor	Each Visit	yes	changed oil
Check Compressor Belts (XPA120")	Each Visit	yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs	yes	Oil, oil filter, & ASF/oil separator

Equipment Trailer Readings (Biosparge)

Control Panel	(hrs)	amps (A)
Air Compressor (61 " FLA)	28758	~24-42
Heat Exchanger	24338.1	2
Temperature (TSHH-801)	70	°F

PLC HMI		
Zone 1 Hours	3172.4	hrs
Zone 2 Hours	3049.5	hrs
Zone 3 Hours	131.5	hrs
Zone 4 Hours	6175.8	hrs

Compressor		
Dilution Valve Open	—	%
Coalescer Differential Pressure	3	psig

Compressor HMI	Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Outlet Temperature (°F)	171	176	177	°F
Load/Unload Time (sec)	4/22	16/20	3/22	sec

Trailer				
Tank Pressure (psig)	80-110	80-110	80-110	psig
Pressure Regulator (psig)	25	23	24	psig
Manifold Pressure (psig)	24	25	26	psig
Main Flow (ACFM)	130	130	115	ACFM
Manifold Temperature (°F)	90	85	85	°F
Zone Pressure (psig)	20.5	21.5	22	psig
Zone Flow (ACFM)	16	16	13	ACFM
Zone Flow (SCFM)				SCFM

Biosparge System Readings

MAKE SURE COMPRESSOR IS RUNNING BEFORE TAKING MEASUREMENTS. IF PRESSURE LESS THAN 18 PSI OR IF PRESSURE VARIES MORE THAN 1 PSI BETWEEN WELLS, CALL PROJECT MANAGER IMMEDIATELY

	ASW01	ASW02	ASW03	ASW04	ASW05	ASW06	ASW07	ASW08
Pressure (psig)	20	20	20	20	20	20	20.5	20.5
Temp. (°F)	78	77	76	75	77	76	76	75
Differential (in. WC)	0.035	0.06	0.08	0.035	0.035	0.02	0.165	0.035
Flow (ACFM)								
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (psig)	20	20.5	20.5	20	20	22	22	22
Temp. (°F)	71	69	71	70.5	71	81	81	80
Differential (in. WC)	0.005	0.015	0.01	0.005	0.015	0.015	0.015	0.01
Flow (ACFM)								
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (psig)	22	22	22	22	22	21.5	22	22
Temp. (°F)	72	72	74	72	78	78	75	75
Differential (in. WC)	0.015	0.015	0.015	0.005	0.015	0.04	0.02	0.01
Flow (ACFM)								

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	22							
Temp. (°F)	79	Pressure (psig)	21	23.5	19.5	20	21	22
Differential (in. WC)	0.18	Flow (ACFM)	2.2	2.6	2.0	2.0	2.2	2.0
Flow (ACFM)		Flow (SCFM)						
		Biosparge Expansion	BSW32 (Zone 2) 21	BSW33 (Zone 2) 21	BSW34 (Zone 2) 24	BSW35 (Zone 1) 21	BSW36 (Zone 1) 24	
Pressure (psig) *		Pressure (psig)	22	22	22.5	20.5	20.5	
Temp. (°F)		Flow (ACFM)	0.13	0.14	0.15	0.065	0.03	
Differential (in. WC)		Flow (SCFM)						
Flow (ACFM)								

Dissolved Oxygen (DO) in mg/L, Temperature in °C, and Oxidation-Reduction Potential (ORP) in mV, DTW in feet below top of casing

	ASPZ-1R	ASPZ-2	ASMW-1	ASMW-2	ASMW-3	ASMW-4	ASMW-5	ASMW-6
Depth to Water (feet BTOC)	3.51	2.89	4.61	4.75	5.12	0.95	1.51	0.35
Stress (in. WC)	-0.01	0.00	0.00	0.00	0.00	0.02	0.00	0.44
Dissolved Oxygen (mg/L)	3.62	8.03	5.65	5.38	5.95	5.48	2.36	2.65
Temperature (°F)	24.4	23.9	24.3	24.4	24.8	24.0	23.8	23.9
ORP (mV)	181	241	190	178	175	241	116	179
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)	1.20	4.51	4.53	2.13	2.02	2.10		
Stress (" H2O)	0.03	0.17	0.82	0.0	0.0	0.94		
Dissolved Oxygen (mg/L)	2.35	1.41	2.46	2.62	3.49	9.10		
Temperature °F	23.6	24.5	24.9	24.0	157	182		
ORP (mV)	169	-34	105	245	24.3	24.2		

Comments

ASW-09 - VALVE IS OPEN 100%

1. A blank cell indicates not recorded.
2. ACFM = Actual Observed Cubic Feet per Minute

TEMP

APPENDIX G

BIOSPARGE SYSTEM ELECTRICAL CONNECTION ACTIVITIES PHOTO LOG

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AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Electrical Connection Activities

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 1 **Date:** Apr 22, 2022 **Direction:** SE **Comments:** Secondary disconnect panels and transformer installed	
Photograph: 2 **Date:** Apr 22, 2022 **Direction:** SE **Comments:** Secondary disconnect panels and transformer installed	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Electrical Connection Activities

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

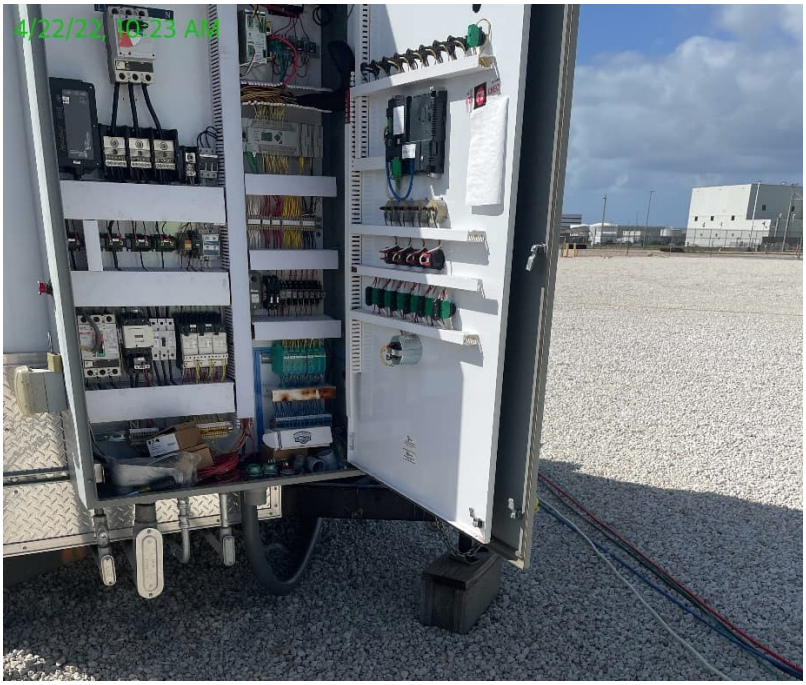
Photograph: 3

Date: Apr 22, 2022

Direction:

Comments:

Main Control Panel



Photograph: 4

Date: Apr 26, 2022

Direction:

Comments:

Main Breaker: Panel LP (LP-E01-002)



AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Electrical Connection Activities

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 5

Date: June 11, 2022

Direction:

Comments:

Wire installation. Fed through existing underground conduit.



Photograph: 6

Date: June 11, 2022

Direction:

Comments:

Wire installation. Fed through existing underground conduit.



AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Electrical Connection Activities

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 7

Date: June 11, 2022

Direction:

Comments:

Wire installation. Fed through existing underground conduit.



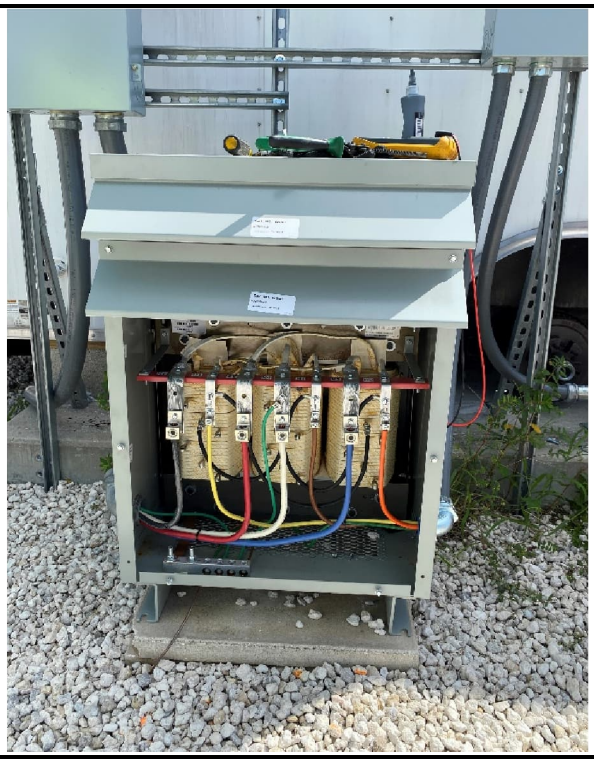
Photograph: 8

Date: June 11, 2022

Direction:

Comments:

Wire installation. Fed through existing underground conduit.



APPENDIX H

BIOSPARGE SYSTEM TROUBLE SHOOTING PHOTO LOG

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AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 1

Date: September 22, 2022

Direction: W

Comments:

Phase I: From above ground manifold.

No damaged observed.



Photograph: 2

Date: September 22, 2022

Direction: SE

Comments:

Phase I: From above ground manifold..



AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 3 **Date:** September 22, 2022 **Direction:** **Comments:** Phase I: From above ground manifold. No damaged observed.	
Photograph: 4 **Date:** December 9, 2022 **Direction:** **Comments:** Phase II: East side of Launcher Road to above ground manifold. No damaged observed.	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 5 **Date:** December 9, 2022 **Direction:** **Comments:** Phase II: East side of Launcher Road to above ground manifold. No damaged observed.	
Photograph: 6 **Date:** December 9, 2022 **Direction:** **Comments:** Phase II: East side of Launcher Road to above ground manifold. No damaged observed.	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 7 **Date:** September 23, 2022 **Direction:** **Comments:** Backfilled	
Photograph: 8 **Date:** February 16, 2023 **Direction:** **Comments:** Phase III: From system trailer toward Launcher Road.	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 9 **Date:** 6, 2023 **Direction:** **Comments:** Phase III: Scoping camera image	
Photograph: 10 **Date:** February 16, 2023 **Direction:** **Comments:** Phase III: Damaged transfer pipe, approximately 11 feet from trailer.	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Leg 5 Troubleshooting

Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 11

Date: February 16, 2023

Direction:

Comments:

Phase III: Repaired with coupling.



Photograph: 12

Date: February 16, 2023

Direction:

Comments:

Phase III: Backfilled



APPENDIX I

BSW036 LITHOLOGY

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WELL NUMBER MLPV-BSW0036

AECOM

TOTAL DEPTH 50 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER KSC
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 02/17/2023 **COMPLETED** 02/17/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
ON **Ground Elevation** N/A
DRILLING EQUIPMENT Geoprobe 7822DT
EASTING N/A **NORTHING** N/A
DRILLING METHOD DPT
HOLE DIAMETER 0.25 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Monument (stickup)

DEPTH (ft)	SAMPLE TYPE	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
0				**Well Casing MLPV-BSW0036** Type: Schedule 40 PVC Diameter: 1 in Top: -2 ft bgs Bottom: 48 ft bgs
5				**Surface Seal** Type: Portland Cement Top: 2 ft bgs Bottom: 44 ft bgs Type I/II
10				
15				
20				
25				
30				
35				
40				
45				**Well Seal** Type: Bentonite Pellets Top: 44 ft bgs Bottom: 47 ft bgs

(Continued Next Page)

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 12:49 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\WELL INSTALL LOGS\MLPV\MLPV BSW 32-36.GPJ

WELL NUMBER MLPV-BSW0036

AECOM

TOTAL DEPTH 50 FT BGS

CLIENT NASA **PROJECT NAME** Kennedy Space Center

PROJECT NUMBER KSC **SITE NAME** Mobile Launch Platform Park Sites (SWMU 56)

DEPTH (ft)	SAMPLE TYPE	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
50				**Sand** Type: #1 Filter Sand Top: 47 ft bgs Bottom: 50 ft bgs 20/30 **Well Screen MLPV-BSW0036** Type: Schedule 40 PVC Slot Size: 0.01 in Top: 48 ft bgs Bottom: 50 ft bgs

AECOM SMART LOG_8X11 NO WL - BLANK GINT PROJECT FOR COLLECT.GPJ - 3/8/23 12:49 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\WELL INSTALL LOGS\MLPV\MLPV BSW 32-36.GPJ

APPENDIX J

BIOSPARGE SYSTEM EXPANSION ACTIVITIES PHOTO LOG

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AECOM

Photo Log

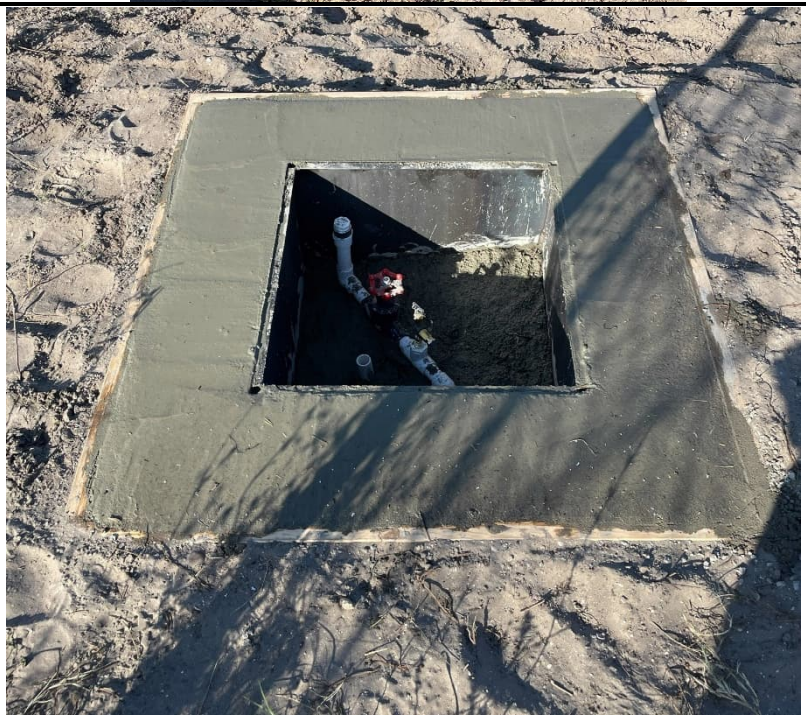
Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Expansion Activities
Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 1 **Date:** February 16, 2023 **Direction:** N **Comments:** Well installation using direct push technology.	
Photograph: 2 **Date:** February 2023 **Direction:** SW **Comments:** After well installation, prior to wellhead completion.	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Expansion Activities
Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 3 **Date:** February 2023 **Direction:** n/a **Comments:** Completed wellhead	
Photograph: 4 **Date:** February 2023 **Direction:** n/a **Comments:** Vault set in pad	

AECOM

Photo Log

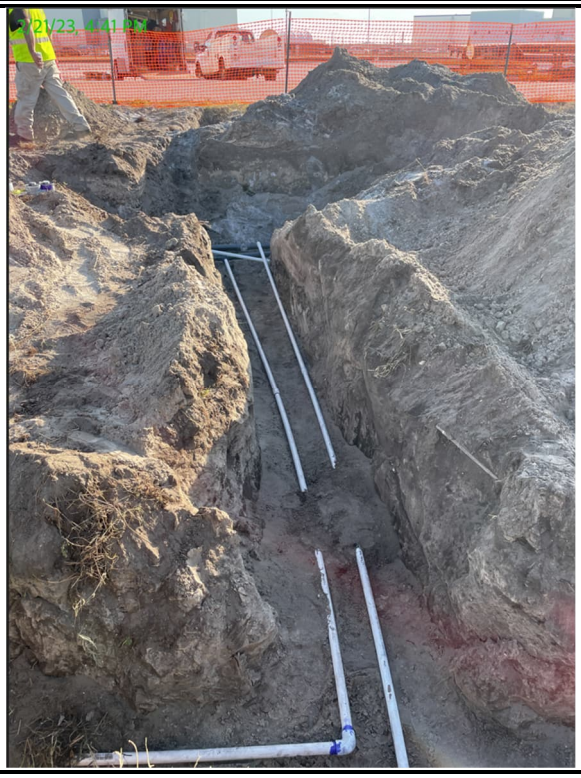
Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Expansion Activities
Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 5 **Date: February 2023** **Direction:** N **Comments:** BS032 (north) through BS036 (south, bottom of photo).	
Photograph: 6 **Date:** February 2023 **Direction:** E **Comments:** Trench to biosparge well	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Expansion Activities
Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 7 **Date:** February 2023 **Direction:** W **Comments:** Transfer pipe from wellhead to header lines	
Photograph: 8 **Date:** February 2023 **Direction:** N **Comments:** Header line connections	

AECOM

Photo Log

Project: Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area, SWMU 056 (80KSC019F0075)
Event: Biosparge System Expansion Activities
Site Location: Kennedy Space Center, Merritt Island, Florida
FDEP Facility ID: DOD_18_3072

Photograph: 9 **Date:** February 22, 2023 **Direction:** W **Comments:** Magnetic tape	
Photograph: 10 **Date:** February 2023 **Direction:** S **Comments:** Backfilled and compacted.	

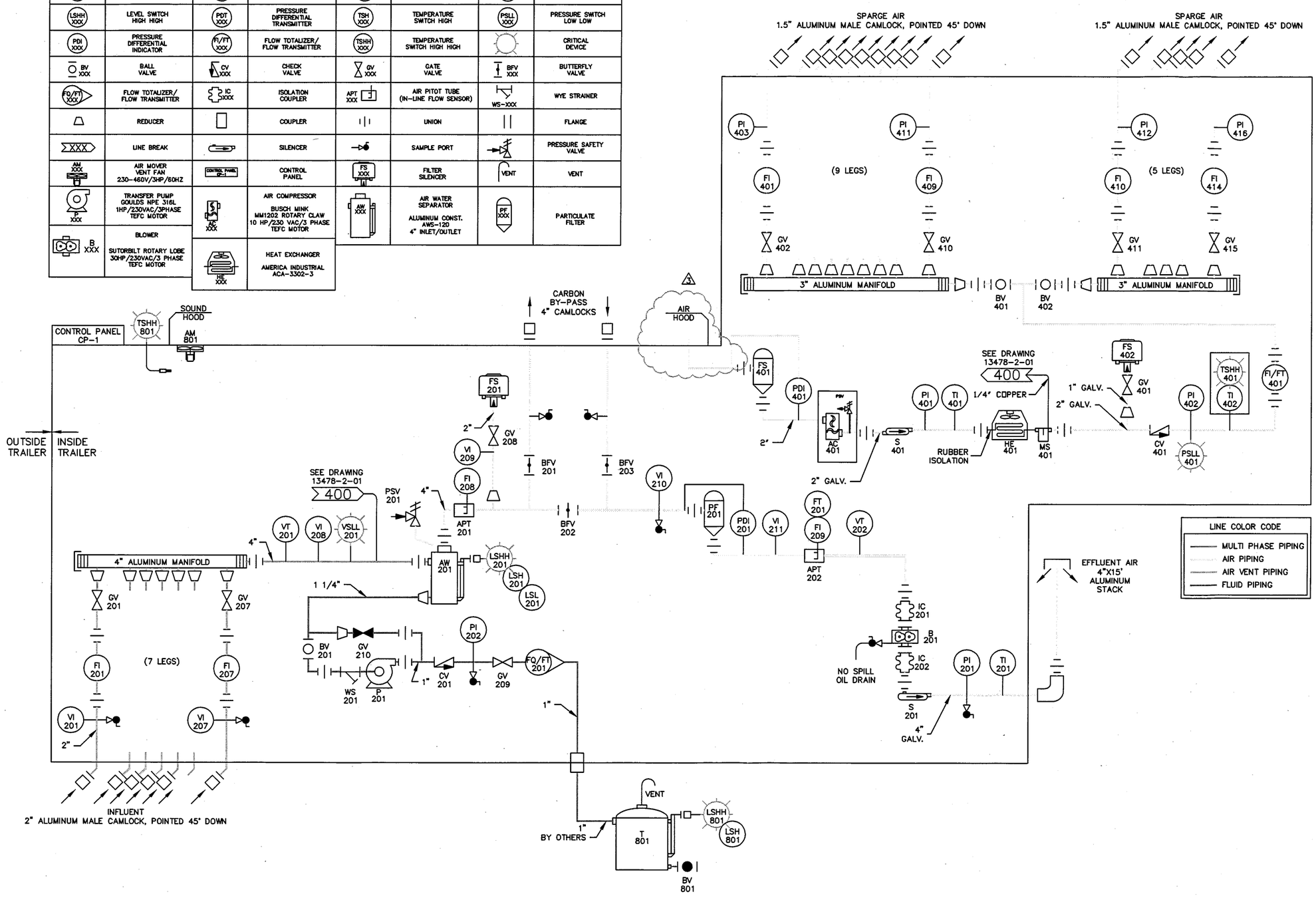
APPENDIX K

SPARGE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM

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DATE	BY	REVISION
01/18/13	CUST	REV-1
01/30/13	MF	REV-2
03/12/13	QA/QC	REV-3

LEGEND							
VI XXX	VACUUM INDICATOR	FI XXX	FLOW INDICATOR	VT XXX	VACUUM INDICATOR	LSH XXX	LEVEL SWITCH HIGH
TI XXX	TEMPERATURE INDICATOR	PI XXX	PRESSURE INDICATOR	VSLL XXX	VACUUM SWITCH LOW LOW	LSL XXX	LEVEL SWITCH LOW
LSHH XXX	LEVEL SWITCH HIGH HIGH	PDT XXX	PRESSURE DIFFERENTIAL TRANSMITTER	TSH XXX	TEMPERATURE SWITCH HIGH	PSLL XXX	PRESSURE SWITCH LOW LOW
PDI XXX	PRESSURE DIFFERENTIAL INDICATOR	FI/FT XXX	FLOW TOTALIZER/ FLOW TRANSMITTER	TSHH XXX	TEMPERATURE SWITCH HIGH HIGH		CRITICAL DEVICE
BV XXX	BALL VALVE	CV XXX	CHECK VALVE	GV XXX	GATE VALVE	BFV XXX	BUTTERFLY VALVE
FQ/FT XXX	FLOW TOTALIZER/ FLOW TRANSMITTER	IC XXX	ISOLATION COUPLER	APT XXX	AIR PITOT TUBE (IN-LINE FLOW SENSOR)	WS-XXX	WYE STRAINER
	REDUCER		COUPLER		UNION		FLANGE
XXX	LINE BREAK		SILENCER		SAMPLE PORT		PRESSURE SAFETY VALVE
AM XXX	AIR MOVER VENT FAN 230-460V/3HP/60HZ	CONTROL PANEL CP-1	CONTROL PANEL	FS XXX	FILTER SILENCER		VENT
P XXX	TRANSFER PUMP GOULDS NPE 316L 1HP/230VAC/3PHASE TEFC MOTOR	AC XXX	AIR COMPRESSOR BUSCH MINK MM1202 ROTARY CLAW 10 HP/230 VAC/3 PHASE TEFC MOTOR	AW XXX	AIR WATER SEPARATOR ALUMINUM CONST. AWS-120 4" INLET/OUTLET	PF XXX	PARTICULATE FILTER
B XXX	BLOWER SUTORBILT ROTARY LOBE 30HP/230VAC/3 PHASE TEFC MOTOR	HE XXX	HEAT EXCHANGER AMERICA INDUSTRIAL ACA-3302-3				



LINE COLOR CODE

- MULTI PHASE PIPING
- AIR PIPING
- AIR VENT PIPING
- FLUID PIPING

ESD

~~Waste 2 Water~~

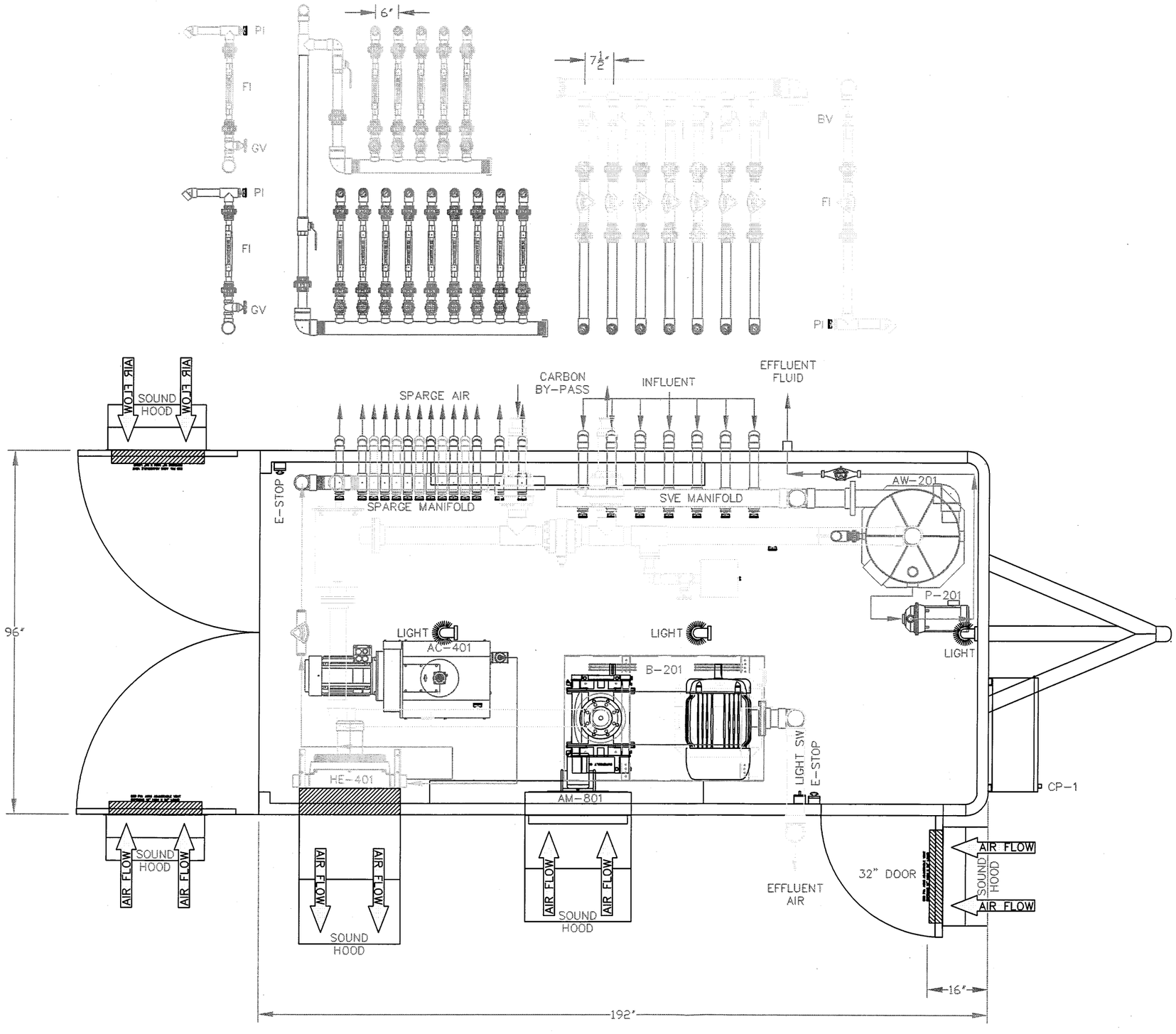
495 Oak Road
Ocala, FL 34472

PREPARED FOR:
FORTIS ENVIROMENTAL GROUP LLC

PROJECT NAME:
SYLVIA'S GROCERY
FOUNTAIN, FL

TITLE:
P&ID SVE

DRAWN BY:	PMG
ENGINEERING:	MF
MFG:	
QC:	
DATE:	04/17/12
DWG NO:	13478-2-01
SCALE:	NTS
SHEET:	01 OF 01



DATE	BY	REVISION
01/18/13	CUST	REV-1
01/30/13	MF	REV-2

ESD

~~Waste 2 Water~~

495 Oak Road
Ocala, FL 34472

PREPARED FOR:
FORTIS ENVIROMENTAL GROUP LLC

PROJECT NAME:
SYLVIA'S GROCERY FOUNTAIN, FL.

TITLE:
TRAILER LAYOUT

DRAWN BY:	PMG
ENGINEERING:	MF
MFG:	
QC:	
DATE:	04/17/12
DWG NO:	13478-3-01
SCALE:	NTS
SHEET:	01 OF 01

APPENDIX L

FIELD NOTES – MONITORING WELL INSTALLATION ACTIVITIES

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Company:	AECOM
Site:	**MLP/VAB - VAB South Parking Lot**
SOW:	MW Installation
Date:	10/24/2022
Worker:	Megan Johansson (MJ)
Additional on-site:	Linnea King Clark (LKC)
	EDS
	BOSS Locate

Well ID	FIGURE WELL ID
77	C7
78	C6

TIME	FIELD NOTES
8:00	Linnea King Clark & Megan Johansson on site with BOSS Locate crew & EDS drill crew.
	H&S mtg
	Weather: 70F sunny. High of 84F
	SOW: MW Install
	MJ Vehicle: 977
	LKC Vehicle: 257
	BOSS begins locates.
	MJ & LKC discuss gameplan and details.
8:25	LKC & BOSS mobilize to next site to continue locates.
8:30	EDS mobilize to MW E11(MW-00076)
8:35	Begin posthole digging, then with sonic drill.
11:00	LKC OFFSITE
12:00	Lunch beak.
12:30	End lunch break.
13:00	Demobilize, grout, decontam equipment.
13:14	Mobilize to C7 (MW-00077)
13:23	Begin posthole digging then with sonic drill.
14:30	Demobilize, grout, decontam equipment.
14:47	Mobilize to C6 (MW-00078)
14:50	EDS paused install to finish well pad installations.
	Begin on well pad MW-00076.
15:20	Complete MW-00076 well pad installation.
15:22	Begin on well pad MW-00077.
15:40	Complete MW-00077 well pad installation.
15:41	Return to MW-00078 well installation
16:20	Stop work for today. Will continue on MW-00078 tomorrow.
16:30	EDS OFFSITE
16:40	MJ OFFSITE

Company:	AECOM
Site:	**MLP/VAB - VAB South Parking Lot**
SOW:	MW Installation
Date:	10/25/2022
Worker:	Megan Johansson (MJ)
Additional on-site:	EDS

Well ID	FIGURE WELL ID
76	E11
78	C6
79	C9
80	E12

TIME	FIELD NOTES
8:00	Megan Johansson and EDS on site H&S mtg Weather: 63F sunny. High of 84F SOW: MW Install Vehicle: 977
8:10	Drillers begin developing MW-76. Simultaneously continue drilling MW-78.
8:30	Complete development of MW-76.
9:30	Complete drilling on MW-78
9:35	Mobilize to decontamination area to decontaminate equipment.
9:50	Mobilize to MW-79.
9:55	Cut asphalt, post hole first 5', then drill MW-79.
12:10	Complete drilling MW-79. Will grout after lunch break.
12:40	Return from lunch break. Continue finishing MW-79.
12:55	Mobilize to 80. Cut asphalt, post hole first 5', then drill MW 80.
15:50	Complete drilling of MW-80. Begin well development of MW-80. Simultaneously install MW-79's well pad.
17:30	Complete MW-79 wellpad install and complete install of MW-80 with the exception of the wellpad.
17:40	EDS OFFSITE
17:45	MJ OFFSITE

Company:	AECOM
Site:	**MLP/VAB - VAB South Parking Lot**
SOW:	MW Installation
Date:	10/26/2022
Worker:	Megan Johansson (MJ)
Additional on-site:	EDS

Well ID	FIGURE WELL ID
77	C7
81	C8
82	D10

TIME	FIELD NOTES
8:00	Megan Johansson and EDS on site
	H&S mtg
	Weather: 64F sunny. High of 84F
	SOW: MW Install
	Vehicle: 977
8:10	Mobilize to MW-77.
9:00	Begin development of MW-78.
9:05	Begin overdrilling of MW-77.
9:20	Begin install of MW-80 wellpad.
9:40	Complete development of MW-78.
10:00	Complete MW-80 wellpad install.
10:00	Carl from EDS on site
10:40	Begin development of MW-79.
	Carl from EDS OFFSITE
11:10	Complete development of MW-79.
11:30	Complete drilling of MW-77.
11:35	Decontam equipment.
11:50	Mobilize to MW-81.
12:10	Break for lunch.
12:40	End lunch break. Cut asphalt, post hole first 5', then drill MW-81.
15:00	Complete drilling MW-81.
15:12	Mobilize to MW-82.
15:15	Decontam equipment.
15:30	Begin drilling. Cut asphalt, post hole first 5', then drill MW 82.
17:25	Drilled down to 45' on MW-82. Stopping for day. Rig is overheating.
17:30	EDS and MJ OFFSITE

Company: AECOM
Site: **MLP/VAB - VAB South Parking Lot**
SOW: MW Installation
Date: 10/27/2022
Worker: Megan Johansson (MJ)
Additional on-site: EDS

Well ID	FIGURE WELL ID
83	E13
84	E10

TIME	FIELD NOTES
8:00	Megan Johansson and EDS on site
	H&S mtg
	Weather: 63F sunny. High of 84F
	SOW: MW Install
	Vehicle: 977
8:10	Continue MW-82 install
8:25	Begin development of MW-77.
9:00	Complete development of MW-77.
9:15	Complete wellpad install of MW-81.
9:20	Complete drilling MW-82.
9:55	Begin development of MW-81.
9:45	Decontam equipment.
10:00	Begin drilling. Cut asphalt, post hole first 5', then drill MW 83.
10:30	Development of MW-81 complete.
12:10	Break for lunch.
12:40	Lunch end. Continue installing MW-83.
13:20	Complete drilling MW-83
13:30	Decontam equipment
13:42	Mobilize to MW-84
14:10	Begin drilling. Cut asphalt, post hole first 5', then drill - MW 84.
16:00	Begin MW-82 wellpad install.
16:30	Begin MW-83 wellpad install.
16:40	Complete MW-82 wellpad install
17:05	Complete install of MW-84. Will install wellpad tomorrow. Stopping for the day.
17:20	Complete MW-83 wellpad install
17:50	EDS and MJ OFFSITE

Company: AECOM
Site: **MLP/VAB - VAB South Parking Lot**
SOW: MW Installation
Date: 10/28/2022
Worker: Megan Johansson (MJ)
Additional on-site: EDS

Well ID	FIGURE WELL ID
85	E9

TIME	FIELD NOTES
8:00	Megan Johansson and EDS on site
	H&S mtg
	Weather: 63F sunny. High of 84F
	SOW: MW Install
	Vehicle: 977
8:20	Continue MW install of MW-84.
8:50	Begin development of MW-82.
9:05	Complete install of MW-84.
9:15	Decontam equipment.
9:20	Development of MW-82 complete.
9:20	Mobilize to MW-85.
9:34	Begin install of MW-85.
10:45	Begin development of MW-83.
11:15	Complete development of MW-83.
11:40	Begin development of MW-85.
12:10	Complete development of MW-85.
12:10	Break for lunch.
12:40	Back from lunch. Continue MW-85 install.
13:15	Complete MW-85 well install.
13:30	Decontam equipment
13:55	Load up equipment
14:00	Install wellpad MW-85
14:20	Complete MW-85 wellpad install
14:45	Install wellpad MW-84
15:00	Complete MW-84 wellpad install
15:20	Mobilize to CCF
15:25	Unload drums at CCF
15:45	EDS and MJ OFFSITE

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	MW Installation
Date:	10/31/2022
Worker:	Brittany Follett (BF)
Additional on-site:	EDS

Well ID	FIGURE WELL ID	
76	E11	
77	C7	Weld bolt holes back onto
78	C6	manhole
79	C9	
80	E12	
81	C8	
82	D10	
83	E13	
84	E10	Pending development
85	E9	
86	Z1	
87	E4	
88	D6	Started

TIME	FIELD NOTES
6:50	BF departs Orlando for MLPV
8:00	BF and EDS on-site
	H&S meeting
	Weather: 82F mostly cloudy with a10% chance of rain in the morning
	SOW: Continue MW Install
	Vehicle: 957
8:20	EDS begins setting up equipment on MW0086 (location Z1 on figure)
8:51	Begin MW0086. Posthole first 5 feet
9:05	Linnea King Clark on-site to drop off additional IDW drums
9:30	LKC off-site
9:59	Complete installation of MW0086. See digital well construction log for details
10:03	Begin development
10:30	Complete development of MW0086
10:35	Begin well pad construction
11:11	Complete well pad construction
11:15	Pack up remainder of equipment to mobilize to next location
11:35	Mobilize to MW0087 (location E4 on figure)
11:45	Arrive at MW0087
11:55	EDS off-site for lunch
12:30	EDS back from lunch
12:40	Set up on MW0087
12:45	Begin MW0087. Cut through asphalt / Posthole first 5 feet
16:10	Complete installation of MW0087. See digital well construction log for details
16:30	BF Labels drums 228328 (water) and 228329 (soil). Label MW Cap for MW0087
16:51	Mobilize rig to MW0088 (location D6 on figure)
17:00	Prep well pad construction area for MW0087
17:11	Posthole first 5 feet for MW0088 and begin well construction
17:44	Complete drilling for the day - 23 feet bls for MW0088
18:00	Complete well pad construction for MW0087
18:05	EDS off-site
18:10	BF off-site
19:28	BF arrives in Orlando. End of day

Company: AECOM
Site: **MLPV - Hot Spot 2**

SOW: MW Installation
Date: 11/1/2022
Worker: Brittany Follett (BF)
Addtl on-site: EDS

Well ID	FIGURE WELL ID	
77	C7	Weld bolt holes back onto manhole
84	E10	Pending development
85	E9	
86	Z1	
87	E4	Pending development
88	D6	Pending development
89	D7	Pending development/well pad
90	E14	Pending development/well pad

TIME	FIELD NOTES
6:20	BF departs Orlando for MLPV
7:30	BF and EDS on-site
	H&S meeting
	Weather: 79F mostly cloudy. Fog in the morning with a 10% chance of rain in the
	SOW: Continue MW Install
	Vehicle: 957
7:52	Continue the installation of MW0088
8:15	Utilities cleared at location D7 on figure (NE fence line of VAB)
9:35	Break for SpaceX launch
9:45	Back from SpaceX launch
10:03	Caroline Bekins on-site to train on the Well installation process
10:05	Complete installation of MW0088. See Digital Well Construction Log for details
10:12	Mobilize equipment to MW0089 (location D7 on figure)
10:20	Decon drill rods
10:48	Begin installation of MW0089. Posthole fist 5 feet
10:58	Caroline Bekins off-site
12:05	Complete boring to a depth of 45 feet bls. Will complete well install after lunch break
12:18	Break for lunch
12:50	Return from lunch
13:00	Continue installation of MW0089
13:30	Complete installation of MW0089. Pack up equipmentto mobilizers the next location
13:35	Mobilize to MW0090 (location E14 on figure)
13:53	Decon drill rods
14:05	Quick maintenance on one of the rig hydraulic lines - fixing a small leak
14:20	Complete maintenance. Begin installation of MW0090. Posthole first 5 feet
16:15	Begin well pad construction for MW0088
16:48	Complete installation of MW0090
16:55	Complete pad installation or MW0088
17:05	Decon drill rods
17:15	Mobilize equipment to MW0091 (location E3 on figure)
17:20	Pack up equipment and straighten up the site for the night
17:45	EDS and BF off-site
19:15	BF arrives in Orlando. End of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	MW Installation
Date:	11/2/2022
Worker:	Brittany Follett (BF)
Additional on-site:	EDS

Well ID	FIGURE WELL ID	
77	C7	Weld bolt holes back onto manhole
84	E10	Pending development
89	D7	
90	E14	
91	E3	

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:30	BF on-site
7:45	EDS On-site after filling water tank H&S meeting Weather: 79F mostly cloudy. Fog in the morning with a 10% chance of rain in the afternoon SOW: Continue MW Install catch up on well pad installation and development Vehicle: 957
8:00	Begin well pad construction for MW0089
8:35	Begin development of MW0087
8:45	Complete well pad installation of MW0089
9:00	Begin well pad installation of MW0090
9:10	Complete development of MW0087
9:20	Begin development of MW0089
9:25	Complete well pad installation for MW0090
9:48	Complete development of MW0089
9:55	Begin development of MW0088
10:15	Complete development of MW0088
10:16	Mobilize drill rig to MW0091 (location E3 on figure)
10:23	Begin development of MW0090
10:27	Begin installation of MW0091. Posthole first 5 feet
11:00	Complete development of MW0090
12:15	Complete boring to a depth of 57 feet. Will install well pipe after lunch
12:20	EDS off-site to lunch. BF to Logistics building to pick up additional IDW labels
12:50	Back from lunch
12:55	Label IDW drum 227313 (water)
13:00	Continue installation of MW0091
13:35	Begin development of MW0091
14:01	Complete development of MW0091
14:05	Grout and complete installation of MW0091. See Digital Well Construction Log for details
14:38	Begin well pad construction for MW0091
15:13	Complete well pad construction for MW0091
15:24	Decon drill rods
15:26	Pack up remaining equipment to mob to first soil core location in the morning
15:43	Mobilize to CCF to drop drums into clam shells
15:55	Arrive at CCF to drop 2 soil drums
16:06	Depart CCF to MW0089 to pick up remainder of equipment

16:16	Mobilize to first soil core location
16:26	Arrive at first soil core location to drop rig off
16:55	Begin SB0300. Posthole first 5 feet/clear rock from surface
17:25	Begin collecting Lithology. See Digital Boring Log for Details
	No recovery from 15 to 23 feet
18:00	Stop drilling for the day. Drillers to a depth of 30 feet. Collected Lithology from 0 to 25 feet so far
18:05	Cleanup site for the night
18:15	All off-site
19:30	BF arrives in Orlando end of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	Soil Cores
Date:	11/3/2022
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:30	BF on-site
7:45	EDS On-site after filling water tank
	H&S meeting
	Weather: 82F Sunny with a 10% chance of rain in the afteroon
	SOW: Continue Soil Core Installation
	Vehicle: 957
8:00	Continue SB0300
	No recovery from 25 to 35 feet
	No recovery from 35 to 40 feet
	No recovery from 45 to 60 feet
10:32	Complete boring at 60 feet. See Digital Boring Log for details
10:45	Grout boring
11:10	Complete grout. Decon drill rods
11:20	Complete decon. Begin mobilizing equipment to SB0301
11:48	Begin SB0301. Posthole first 5 feet
12:15	Break for lunch
12:55	Back from lunch. Carl XX (EDS) on-site. Continue SB0301
	No recovery from 15 to 21 feet
	No recovery from 45 to 50 feet
16:08	Complete boring at 60 feet. Grout and complete boring
16:55	Mobilize to SB0300. Stepping out approximately 5 feet west of the original boring
17:15	Begin boring for SB0300. Posthole first 5 feet
17:38	Stop digging for the day at 5 feet
17:45	EDS off-site
17:50	BF off-site
19:10	BF arrives in Orlando. End of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	Soil Cores
Date:	11/4/2022
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:30	BF and EDS on-site
	H&S meeting
	Weather: 79F Mostly Sunny
	SOW: Continue Soil Core Installation
	Vehicle: 957
8:00	Continue MLPV-SB0300 soil sampling
10:08	Sending the first sample core rod down
10:45	Collect MLPV-SB0300-055.0
11:00	Caroline Bekins on-site to drop off IDW water drums
11:15	No recovery on SB0300 (55-60)
	Called Linnea King Clark (PM) to let her know. Will move on to next location (SB0301) to collect samples
11:18	Caroline Bekins off-site
11:20	Grout and complete SB0300
11:50	Complete grouting and mobilize to SB0301 / decon drill rods
12:00	Begin SB0301 sampling. Posthole first 5 feet. Move location 5 feet north
15:00	Depart site to meet lab courier at badging office
15:15	Arrive at badging office. Courier not here yet
15:45	Drop samples off with the lab and head back to the site
16:15	SB0301-055.0 collected
16:25	SB0301-057.0 collected. 2 feet fell out of the bottom of the 55-60 foot interval while trying to remove the rigid sample casing - drillers able to preserve top 3 feet
16:30	Grout and complete SB0301
16:40	Pack up equipment for the weekend. Will mobilize to the next location (SB0302) on Monday
16:55	EDS Off-site
17:00	BF off-site
18:20	BF arrives in Orlando. End of day

Company: AECOM
Site: **MLPV - Hot Spot 2**
SOW: Soil Cores
Date: 11/7/2022
Worker: Brittany Follett (BF)
Addtl on-site: Environmental Drilling Services (EDS)

Well ID	FIGURE WELL ID	
76	E11	
77	C7	Weld bolt holes back onto manhole
78	C6	
79	C9	
80	E12	
81	C8	
82	D10	
84	E10	Pending development
85	E9	
86	Z1	
87	E4	
88	D6	
89	D7	
90	E14	
91	E3	

TIME	FIELD NOTES
6:40	BF departs Orlando for MLPV
7:50	BF on-site. EDS Indicated that they may be a little late this morning (8:30)
	BF checks out remainder of soil core locations
8:30	EDS onsite
	H&S meeting
	Weather: 79F Mostly cloudy - possible showers in the morning and afternoon
	SOW: Continue Soil Core Installation
	Vehicle: 957
8:45	EDS packs up equipmentto mobilize to next soil core location
9:25	Mobilize to SB0302 - unpack all of the equipment
9:47	Begin SB0302. Posthole first 5 feet. Collecting samples first and Lithology second
12:03	Send first sample rod down (50-55)
12:30	SB0302-055.0-20221107 collected
12:35	Send second sample rod down (55-60)
13:15	SB0302-057.0-20221107 collected
13:30	Grout and complete sample boring for SB0302
13:53	Decon drill rods and mobilize to SB0303
14:15	Begin sample boring for SB0303. Posthole first 5 feet
17:45	SB0303-055.0-20221107 won't come out of the sample rod. Will try to get it out in the morning. Both ends of casing covered
17:50	Push 8" rod to 60 feet
18:05	EDS Off-site. BF to system trailer to turn it off for the upcoming tropical storm
18:20	System power disconnected. BF off-site
19:40	BF arrives in Orlando. End of day

Company: AECOM
Site: MLPV - Hot Spot 2
SOW: Soil Cores
Date: 11/8/2022
Worker: Brittany Follett (BF)
Additional on-site: Environmental Drilling Services (EDS)

TIME	FIELD NOTES
6:20	BF departs Orlando for MLPV
7:30	BF on-site. EDS already on-site and pulled sample core from sample rod SB0303-055.0-20221107
	H&S meeting
	Weather: 81F Mostly cloudy - possible showers in the morning and afternoon
	SOW: Continue Soil Core Installation
	Vehicle: 957
8:00	Continue SB0303 sample collection
8:16	No recovery on SB0303-057.0. Called Linnea King Clark about it. Told to grout SB0303 and move on to the next boring location SB0304
8:32	Grout and complete SB0303. Decon drill rods
9:09	Mobilize to SB0304
9:20	Fill water tank
9:25	Begin SB0304. Posthole first 5 feet
9:33	Full water truck back for drilling
9:50	Remove empty IDW drums from the back of the EDS trailer. Drums will be moved to Wilson Corners for storage for the tropical storm. 6 soil and 9 water drums
11:00	Fill water tank
11:18	Back with full water tank. Resume drilling
11:36	Send first sample core down boring
11:40	Caroline Bekins (CB) on-site to pick up drums to transfer to Wilson Corners
11:50	CB off-site
11:56	Collect SB0304-055.0-20221108
12:13	Send second sample rod down
12:15	CB on-site for second drum pick up.
12:20	CB off-site - 3 empty drums left
12:55	Collect SB0304-057.0-20221108
13:00	Break for lunch
13:30	Back from lunch
13:35	Grout and complete boring. Decon rods
14:15	CB on-site to oversee drillers mobilize to CCF. BF off-site to badging office to drop off sample cores
14:25	CB and EDS drop IDW drums at CCF. All clamshells tied down
14:30	BF at badging office to drop off 7 sample cores. Ardaman already there
14:40	Arrive back at lay down area to pack up equipment do cleanup site for tropical storm shutdown. CB off-site
15:45	EDS off-site
15:50	BF Off-site
17:15	BF Arrives in Orlando. End of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	Soil Cores
Date:	11/16/2022
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

TIME	FIELD NOTES
7:20	BF departs Orlando for MLPV
8:30	BF on-site. EDS already on-site
	H&S meeting
	Weather: 78F Cloudy. 30% chance of rain after 1300
	SOW: Continue Soil Core Installation
	Vehicle: 905
8:45	BF off-site to Wilson Corners to grab IDW drums. No dig still in effect from Artemis launch until 9:04
9:00	BF on-site with IDW drums
9:14	Begin SB0302 Lithology. Posthole first 5 feet - fill water truck while posthole is in progress
	No recovery at 15 to 25 feet bls
	No recovery at 45 to 60 feet bls
12:37	Complete SB0302 - lithology at 60 feet bls
12:40	Grout and complete boring
13:10	Break for lunch
13:30	Back from lunch. Mobilize to SB0303
13:35	Depart to Fill water truck at CCF
13:46	Begin SB0303. Posthole first 5 feet
13:54	Water truck returns with full tank
13:58	Continue SB0303
	No recovery at 15 to 18 feet bls
16:20	Push down to 55 feet bls and stop for the day
16:26	EDS off-site for the night
16:30	BF Off-site to Orlando
17:50	BF arrives in Orlando. End of day

Company: AECOM
Site: **MLPV - Hot Spot 2**
SOW: Soil Cores
Date: 11/17/2022
Worker: Brittany Follett (BF)
Addtl on-site: Environmental Drilling Services (EDS)

Well ID	FIGURE WELL ID	
76	E11	
77	C7	Weld bolt holes back
78	C6	onto manhole
79	C9	
80	E12	
81	C8	
82	D10	
83	E13	
84	E10	Pending development
85	E9	
86	Z1	
87	E4	
88	D6	
89	D7	
90	E14	
91	E3	
92	E5	

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:25	BF on-site.
7:35	EDS on-site
	H&S meeting
	Weather: 64F Cloudy
	SOW: Continue Soil Core and MW Installation
	Vehicle: 905
7:55	Continue SB0303
	No recovery from 45 to 55 feet bls
8:55	Complete boring at 60 feet bls. Grout and complete boring
9:40	Mobilize to SB0304
9:55	Begin SB0304. Posthole first 5 feet
	No recovery 15 to 23 feet bls
	No recovery 45 to 60 feet bls
13:18	Complete boring at 60 feet bls. Grout and complete boring
13:45	Mobilize to MLPV-MW0092 - location E5 on figure
14:00	Lunch break
14:30	Back from lunch
14:36	Begin MLPV-MW0092. Posthole first 5 feet
15:57	Ran out of water at 45 feet bls. Go fill water truck
16:16	Return with full water tank. Continue MW installation
16:58	Complete boring at 57 feet. Begin well construction- see Digital Well construction log for details. Grout and complete well installation
17:17	Cleanup site for the night
17:30	All off-site
18:50	BF arrives in Orlando. End of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	Monitoring Well Installation
Date:	11/18/2022
Worker:	Brittany Follett (BF)
Addtl on-site:	EDS

Well ID	FIGURE WELL ID	
77	C7	Weld bolt holes back onto manhole
84	E10	Pending development
92	E5	
93	D8	Pending well pad
94	D2	Pending pad and development

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:25	BF on-site.
7:30	EDS on-site
	H&S meeting
	Weather: 64F Cloudy
	SOW: Continue Soil Core and MW Installation
	Vehicle: 905
8:00	Begin well pad construction MLPV-MW0092
	Pad will be slightly elevated (sloped) above the rocks
8:45	Complete well pad construction
8:53	Begin development of MLPV-MW0092
9:23	Complete development. Mobilize to MLPV-MW0093 location D8 on figure
9:38	Begin MLPV-MW0093. Break through concrete and posthole first 5 feet
11:20	Complete bong at 45 feet bls. Begin well installation See Digital Well construction log for details
11:28	Grout and complete boring
12:06	Begin development of MLPV-MW0093
12:15	BF off-site to meet with BOSS utility locators for northern Bechtel area locations
12:20	Well not developing. Check the well pipe - broken
12:30	Begin well reinstallation
13:40	Complete well reinstall
13:45	Pack up equipment and mobilize to MLPV-MW0094 location D2 on figure
14:08	Begin MLPV-MW0094. Posthole first 5 feet
15:48	Complete boring at 45 feet bls. Begin well construction See Digital Well Construction Log for details
15:54	Grout and complete well installation
16:16	Move to MLPV-MW0095 location C1 on figure
16:22	Pack equipment and cleanup site for the weekend
16:45	All off-site
18:10	BF arrives in Orlando. End of day

Company:	AECOM
Site:	**MLPV - Hot Spot 2**
SOW:	Monitoring Well Installation
Date:	11/21/2022
Worker:	Brittany Follett (BF)
Addtl on-site:	Environmental Drilling Services (EDS)

Well ID	FIGURE WELL ID	
76	E11	
77	C7	Weld bolt holes back onto
78	C6	casing
84	E10	Pending development
94	D2	
95	C1	
96	D1	Pending well pad

TIME	FIELD NOTES
6:40	BF departs Orlando for MLPV
7:50	BF and EDS on-site
7:30	H&S meeting
	Weather: 70F Cloudy. 10% chance of rain after 1100
	SOW: Continue MW Installation
	Vehicle: 905
8:10	Begin MLPV-MW0095 location C1 on figure. Posthole first 5 feet
9:40	Complete boring at 35 feet. Begin well construction - See Digital Well Construction Log for details
9:50	Grout and complete installation of MLPV-MW0095
10:10	Begin well pad construction for MLPV-MW0094 and -MW095
10:50	Mobilize equipment to MLPV-MW0096 location D1 on figure.
11:10	Begin MLPV-MW0096. Posthole first 5 feet
12:30	Break for rain. Taking a lunch while on hold
14:10	Rain has stopped - resume work
14:45	Complete boring at 45 feet. Begin well construction - see Digital Well Construction Log for details
15:07	Begin development of MLPV-MW0096
15:29	Complete development. Grout and complete installation of MLPV-MW0096
15:55	Decon drill rods and straighten up site for the night
16:45	EDS off-site
18:00	BF arrives in Orlando. End of day

Company: AECOM

Site: **MLPV - Hot Spot 2**

SOW: Monitoring Well Installation

Date: 11/22/2022

Worker: Brittany Follett (BF)

Addtl on-site: EDS

Well ID	FIGURE WELL ID	
77	C7	Weld bolt holes back onto casing
78	C6	
84	E10	Pending development
96	D1	Pending well pad
2IR	2IR	Pending well pad
97	D9	Pending well pad/development

TIME	FIELD NOTES
6:15	BF departs Orlando for MLPV
7:30	EDS on-site. BF to Wilson Corners to pick up additional soil drums
8:00	H&S meeting Weather: 74F Cloudy. 20-50% chance of rain after 1100 SOW: Continue MW Installation Vehicle: 905
8:20	Begin MLPV-IW0002IR. Posthole first 5 feet
9:50	Complete boring at 33 feet. Begin installation of MLPV-IW0002IR - see Digital Well construction log for details
10:15	Begin development. Pack up equipment to move to MLPV-MW0097 (D9)
10:45	Complete development. Grout and complete installation of MLPV-MW0096
11:30	Rain delay and lunch break. BF Drives around to find wells that need well pad replacements - all wells found but under water
12:30	Phase 1 lightning alert
12:45	Mobilize equipmentto MLPV-MW0097 location D9 on figure
13:10	Begin MLPV-MW0097. Posthole first 5 feet
15:00	Complete boring at 45 feet. Begin well installation - see Digital Well construction log for details
15:14	Well sanded. Rain picking up - called off work for the day
15:20	All off-site
17:00	BF Arrives in Orlando. End of day

Company: AECOM

Site: **MLPV - Hot Spot 3 and 4 (Bechtel North Construction area)**

SOW: Complete well pads and retrofit new well pads on older wells

Date: 11/23/2022

Worker: Brittany Follett (BF)

Addtl on-site: EDS

Well ID	FIGURE WELL ID	Notes	Well iD	FIGURE WELL ID
76	E11		91	E3
77	C7	Weld bolt holes back onto casing	92	E5
78	C6		93	D8
79	C9		94	D2
80	E12		95	C1
81	C8		96	D1
82	D10		2IR	2IR
83	E13		97	D9
84	E10	Pending development		
85	E9			
86	Z1			
87	E4			
88	D6			
89	D7			
90	E14			

TIME	FIELD NOTES
6:30	BF departs Orlando for MLPV
7:50	EDS and BF on-site
	H&S meeting
	Weather: 73F Cloudy. 10% chance of rain in the afternoon
	SOW: install remainder of well pads and retro fit well pads on older wells
	Vehicle: 905
8:00	Begin development of MLPV-MW0097
8:23	Complete development. Grout and complete installation of MLPV-MW0097
8:30	BF Locates wells the need pad retrofits - Total Depth measured to ensure PCV isn't broken
	MLPV-IW0057 - PVC broken within first 2 inches of top of casing
	MLPV-IW0058 - 49.20 —> pad is slightly above grade with no cracks - will leave as is
	MLPV-IW0059 - 49.35 pad is slightly above grade with no cracks - will leave as is
	MLPV-IW0061/MLPV-IW0062 - 39.62 / 44.83
	MLPV-IW0047 - submerged under water
9:47	Decon drill rods and pack up IDW Drums for transport to CCF
10:26	Mobilize to CCF to drop off IDW drums
10:32	Arrive at CCF
11:05	Depart CCF. See IDW. log for drum and clamshell details
11:15	Arrive at MLPV-MW0097 to install well pad
12:07	Well pad complete
12:29	Mobilize to MLPV-IW0061 and MLPV-IW0062 to retrofit new pad
13:37	Complete well pad retrofit
13:40	Pack up equipment
13:50	EDS off-site
14:00	BF off-site after catching up on notes

Site:	MLPV - Hot Spot 3 and 4 (Bechtel North Construction area)
SOW:	Retrofit new well pads on older wells
Date:	1/9/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

6:00	PB Departs Sanford for MLPV
8:00	EDS having badging office issues
12:15PM	EDS on-site H&S meeting Weather: 74F Cloudy. 10% chance of rain in the afternoon SOW: retro fit well pads on older wells Vehicle: 903
12:20	Walk site create order to retrofit wells.
12:25	MLPV-IW0057 - pad is slightly above grade with no cracks - riser is snapped 2" below surface, replace pad and adjust TOC
12:30	MLPV-IW0058 - pad is slightly above grade with no cracks - will leave as is
12:35	MLPV-IW0059 - pad is slightly above grade with no cracks - will leave as is
12:40	MLPV-IW0061/MLPV-IW0062 - pads are slightly above grade with no cracks - will leave as is
12:55	Start Repairing MLPV-IW0007I Well pad is approximately 18" above grade. Riser is cut to install pad flush with current grade
13:30	Finish replacing pad on MLPV-IW0007I
13:40	Start Repairing MLPV-IW0063/MLPV-IW0064 well pads are approximately 10" below grade (buried). Area is dug out and new pads installed
15:30	Finish replacing pads on MLPV-IW0063/MLPV-IW0064
15:50	MLPV-IW0047 - slightly above grade with no cracks - will leave as is
16:00	Locate well pads inside of R parking lot
16:30	Located MLPV-IW0011I/MLPV-IW0037
16:35	Pack up equipment
16:45	PB + EDS off-site

Site:	MLPV - Hot Spot 3 and 4 (Bechtel North Construction area)
SOW:	Retrofit new well pads on older wells
Date:	1/10/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	PB Departs Sanford for MLPV
7:30	PB and EDS on-site H&S meeting Weather: 62F Cloudy. 10% chance of rain in the afternoon SOW: retro fit well pads on older wells Vehicle: 903
7:50	Begin retrofitting MLPV-IW0011I
8:45	Finish retrofitting MLPV-IW0011I
8:55	Begin retrofitting MLPV-IW0009I/MLPV-IW0009D. 9I riser is slightly bent at top 2 feet, can still send WLM and tubing down casing
9:40	MLPV-IW0053 - cannot locate pad/well with medal detector and shovel using gis maps, need to redrill
10:50	Finish retrofitting MLPV-IW0009I/MLPV-IW0009D
11:00	Begin retrofitting MLPV-IW0027I/MLPV-IW0027D.
12:05	Finish retrofitting MLPV-IW0027I/MLPV-IW0027D.
12:10	EDS off-site for 3/4" parts and lunch, PB stayed on site to locate MLPV-IW0053
13:20	EDS on-site
13:30	Begin retrofitting MLPV-IW0057
14:10	Finish retrofitting MLPV-IW0057
14:15	Begin retrofitting MLPV-IW00 58
15:05	Finish retrofitting MLPV-IW00 58
15:10	EDS out of manholes, going to get more and resume tomorrow. Pack up equipment
15:15	EDS off-site PB continue to locate MLPV-IW0053
15:30	cannot locate MLPV -IW0053, PB off-site

Site:	MLPV - Hot Spot 3 and 4 (Bechtel North Construction area)
SOW:	Retrofit new well pads on older wells
Date:	1/11/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

7:00	PB Departs Sanford for MLPV
8:00	PB and EDS on-site H&S meeting Weather: 57F Cloudy. 10% chance of rain in the afternoon SOW: retro fit well pads on older wells Vehicle: 903
8:10	Begin retrofitting MLPV-IW00 34 /MLPV-IW0035
9:35	Finish retrofitting MLPV-IW00 34 /MLPV-IW0035
9:40	Begin retrofitting MLPV-IW0037 ,40, 41
10:15	Finish retrofitting MLPV-IW0037 ,40, 41
10:20	Begin retrofitting MLPV-IW0045
11:25	Finish retrofitting MLPV-IW00 45
11:30	EDS pack up equipment.
11:50	PB and EDS off-site.

Site:	MLPV - Hot Spot 2
SOW:	MW Installation
Date:	1/16/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

5:00	PB departs Orlando for MLPV
6:00	PB at badging office
7:25	PB on-site.
7:15M	PB + EDS on-site
	H&S meeting
	Weather: 36F Clear
	SOW: MW Installation
	Vehicle: 903
7:50	Mobilize to MW-98
8:30	Cut asphalt, post hole first 5', then drill MW-98
9:25	Complete drilling MW-98
9:30	Begin development of MW-98
10:00	End development of MW-98
11:15	Complete MW-98 wellpad install
11:20	Mobilize to MW-99
11:25	Post hole first 5 feet.
11:40	EDS stop for lunch
12:20	EDS resume installing MW-99
13:00	Begin development of MW-99
1:30	End development of MW-99
14:55	Complete MW-98 wellpad install
15:10	mobe to CCFvto stage IDW
15:40	Finish staging IDW
15:45	PB + EDS off-site

Site:	MLPV - Hot Spot 2
SOW:	MW Install
Date:	1/17/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	PB departs Orlando for MLPV
7:25	PB + EDS on-site. H&S meeting
	Weather: 41F Clear
	SOW: ContinueMW Installation Vehicle: 903
7:50	Mobilize to MW-100
8:30	Post hole first 5', then drill MW-100
9:05	Complete drilling MW-100
9:10	Begin development of MW-100
9:55	End development of MW-100
10:00	Mobilize to WCPS-IW0002SRR
10:05	Drum IDW and retrive form boards and cones from yesterday.
11:00	install Pad on MW-100
11:45	Finish Well pad
11:50	Break for Lunch
12:30	Post hole first 5 feet WCPS-IW0002SRR.
13:05	Complete drilling WCPS-IW0002SRR.
13:10	Begin development of WCPS-IW0002SRR.
13:50	End development of WCPS-IW0002SRR.
14:25	Install well pad, Rig having issues starting to move back to staging area
14:45	drop off IDW
14:55	PB + EDS off site

Site:	MLPV - Hot Spot 2
SOW:	MW Install
Date:	1/19/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

7:15	PB departs Orlando for MLPV
8:15	PB + EDS + BOSS on-site
8:20	Locate
9:00	Boss locate
9:30	Boss off-site
9:40	H&S meeting
	Weather: 72 Clear
	SOW: Continue MW Installation
	Vehicle: 903
9:45	Mobilize to MW-101
10:00	Post hole first 5', then drill MW-101
10:35	Complete drilling MW-101
10:40	Begin development of MW-101
11:10	End development of MW-101
11:50	Complete MW-101
12:00	Break for lunch
12:40	PB meet Jeff to locate wells inside woods
13:00	Locate complete. EDS back from lunch
13:10	Drop off idw
13:45	Gather materials and move rig over train tracks into woods
15:45	Successfully move rig across rail road tracks
16:00	Create staging area across tracks prep for tomorrow
16:05	PB + EDS off site

Site:	MLPV - Hot Spot 2
SOW:	MW Install
Date:	1/20/2023
Worker:	Patrick Bendl (PB)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	PB departs Orlando for MLPV
7:30	PB + EDS
	H&S meeting
	Weather: 64 Clear
	SOW: Continue MW Installation
	Vehicle: 903
	Weather: 72 Clear
7:45	Mobilize to MW-102
10:15	Post hole first 5', then drill MW-102
10:35	Complete drilling MW-102
10:40	Begin development of MW-102
11:15	End development of MW-102
11:40	Break for lunch
12:10	Back from lunch
12:50	Complete MW-102
13:00	Carl on-site to drop off more swamp mats
13:30	Finsh bringing extra mats back to rig
13:45	Carl off-site
13:50	Finish backing rig out of woods
14:25	Load up rig for Monday
14:30	PB+EDS off-site

Site:	MLPV - Bio Sparge Area (BSA)
SOW:	MW Install
Date:	1/23/2023
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	BF departs Orlando for MLPV
7:30	BF + EDS H&S meeting SOW: Continue MW Installation Vehicle: 903 Weather: 70 Cloudy
7:45	Check locations in the woods to make sure area isn't flooded out due to storms over the weekend
8:15	Begin mobilizing back to MLPV-MW0103 location D3 on figure
8:45	Set up on MLPV-MW103
8:55	Begin MLPV-MW0103
9:11	Complete boring at 45 feet. Begin well installation see Digital Boring Log for details
9:20	Begin development of MLPV-MW0103
9:52	Complete development. Grout and complete installation of MLPV-MW0103
10:05	Move to MLPV-MW0104 location E1 on figure
10:30	Break to grab more materialsfrom lay down area
10:50	Back from break
11:05	Begin well pad construction
11:30	Complete well pad installation. Break for lunch
12:30	Back from lunch
12:45	Begin MLPV-MW0104
13:10	Complete boring at 57 feet. Begin well construction - see Digital well construction log for details
13:20	Begin development of MLPV-MW0104
13:55	Complete development. Grout and complete installation of MLPV-MW0104
14:10	Water break
14:40	Back from water break
14:50	Begin well pad construction
15:10	Complete well pad construction
15:20	Cleanup site and mobilize back to trucks
15:35	All off-site for the day
17:30	BF Arrives back in Orlando after stopping to fix Collect issues

Site:	MLPV - Bio Sparge Area (BSA)
SOW:	MW Install
Date:	1/24/2023
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	BF departs Orlando for MLPV
7:30	BF + EDS H&S meeting SOW: Continue MW Installation Vehicle: 903 Weather: 73 Cloudy Gate to Bechtel area closed - called Bechtel representative but got voicemail. Checked into Bechtel trailer - now allowed to open gate to go to parking area
8:20	Arrive at lay down area. EDS plans to bring rig out to load additional piping and material for location E2 on figure - deepest well remaining in the woods
8:40	Rig out of the woods - pack up equipment for deeper well
9:30	Mobilize to MLPV-MW0105
9:55	Arrive and set up on MLPV-MW0105
10:00	Begin MLPV-MW0105
10:18	Complete boring at 57 feet. Begin well installation- see Digital Well Construction Log for details
10:30	Begin development
11:05	Complete development. Grout and complete installation of MLPV-MW0105
11:30	Lunch break
12:10	Back from lunch
12:20	Begin well pad construction
12:35	Complete well pad construction. Pack up equipment to mobilize to MLPV-MW0106 location C3 on figure
13:00	Break to drop soil and water off at CCF and pick up additional well materials from lay down area
14:00	Mobilize to MLPV-MW0106
14:26	Arrive and set up on MLPV-MW0106
14:30	Begin MLPV-MW0106
14:50	Complete boring at 35 feet. Begin well construction - see Digital Well Construction Log for details
15:00	Begin development
15:25	Complete development. Grout and complete installation of MLPV-MW0106
15:35	Begin well pad construction
15:55	Complete well pad construction. Cleanup work area and mobilize out of the woods for the night
16:15	EDS Off-site. BF to check D5 location - possible rig access issues
16:50	BF off-site to Orlando

Site:	MLPV - Bio Sparge Area (BSA)
SOW:	MW Install
Date:	1/25/2023
Worker:	Caroline Bekins (CB)
Additional	Environmental Drilling Services (EDS)

6:30	CB departs AECOM depot for MLPV
7:30	CB and EDS on site H&S meeting SOW: Continue MW Installation Vehicle: 903 Weather: 68F Sunny
7:50	Arrive at location D4, dpt rig already on-site with materials. Begin borehole to 45 ft for MLPV-MW0107
8:25	Complete boring at 45 feet. Begin well construction. See digital well construction log. Screen interval 35-45'
8:35	Begin development
9:05	Complete development. Grout and complete installation of MLPV-MW0107
9:25	Break for water/bathroom
9:45	Begin well pad construction
10:10	Complete well pad construction for MLPV-MW0107. Cleanup work area and mobilize out of the woods
10:50	EDS to lay down area to drop off/pick up materials.
11:15	EDS confirms D5 is accessible. Drop off IDW water at CCF then break for lunch
12:35	Mobilize to southwest BSA to set up at D5: MLPV-MW0108
12:50	Begin borehole to 45' for MLPV-MW0108
1:20	Complete boring at 45 feet. Begin well construction. See digital well construction log. Screen interval 35-45'
1:30	Begin development
2:05	Complete development. Grout and complete installation of MLPV-MW0108
2:20	Begin well pad construction
2:35	Complete well pad construction for MLPV-MW0108. Cleanup work area and mobilize to lay down area
3:00	EDS off-site. CB to take pics of wells 92, 94, 95, 96, 97 and 2IR
3:30	CB off site, depart to depot
4:45	***CB arrives at depot***

Site:	MLPV - Orbiter Processing Facility 1&2 (OPF)
SOW:	MW Install
Date:	1/26/2023
Worker:	Brittany Follett (BF)
Additional on-site:	Environmental Drilling Services (EDS)

6:30	BF departs Orlando for MLPV
7:30	BF + EDS H&S meeting SOW: Continue MW Installation Vehicle: 903 Weather: 73 Cloudy
7:45	Check accessibility for locations west of the OPF building - locations are easily accessible. EDS mobilizes to pick up rig from MLPV-MW0108
8:25	EDS arrives back at OPF building. Set up on MLPV-MW0109 location C5 on figure
8:30	Begin MLPV-MW0109
8:50	Complete boring at 30 feet. Begin well construction see Digital Well Construction Log for details
9:00	Begin development
9:45	Complete development. Grout and complete installation of MLPV-MW0109
10:00	Begin well pad construction
10:20	Complete well pad construction. Clean up area and mobilize to MLPV-MW0110 location A1 on figure
10:45	Drop off soil and purge water at CCF and lunch break
12:00	Arrive back at MLPV-MW0110
12:05	Begin MLPV-MW0110 - this location was originally scope for a screen interval of 1-10 feet. Adjusted this after talking to Linnea King Clark (PM) to an interval of 1-11 feet bls
12:15	Complete boring at 11 feet. Begin well construction - see Digital Well Construction Log for details
12:25	Begin development
13:35	Complete development. Grout and complete installation of MLPV-MW0110
13:45	Begin well pad construction
13:55	Complete well pad construction. Pack up equipment. Mobilize to CCF to dump water and soil
14:05	Drop off remainder of soil and water buckets at CCF
14:30	Pack up drill rig and secure everything on trailer
14:50	All off-site
15:55	BF arrives in Orlando

APPENDIX M

MONITORING WELL CONSTRUCTION LOGS AND COMPLETION REPORTS

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WELL NUMBER MLPV-MW0076

AECOM

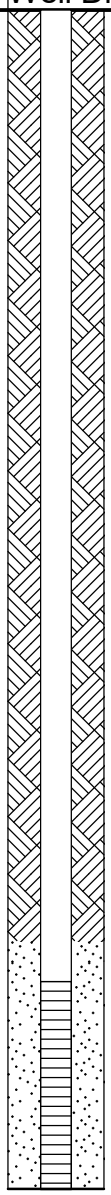
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/24/2022 **COMPLETED** 10/24/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234050.6 **NORTHING** 470966.2
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0076
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30

Well Screen
MLPV-MW0076
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0077

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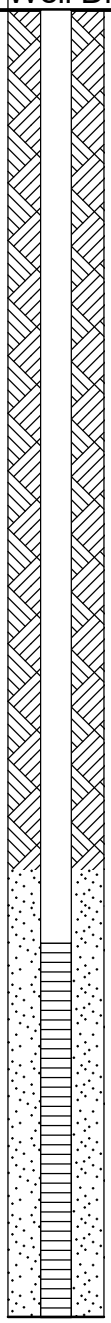
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/24/2022 **COMPLETED** 10/24/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234033 **NORTHING** 470954.7
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0077
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 24 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 24 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0077
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0078

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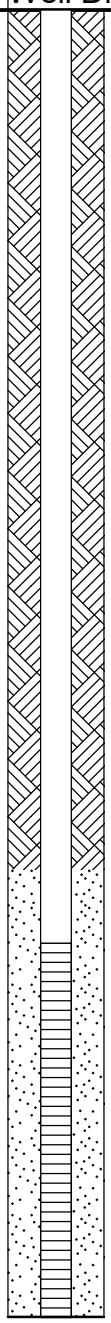
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/24/2022 **COMPLETED** 10/25/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234049.6 **NORTHING** 470985.1
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0078
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 24 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 24 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0078
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0079

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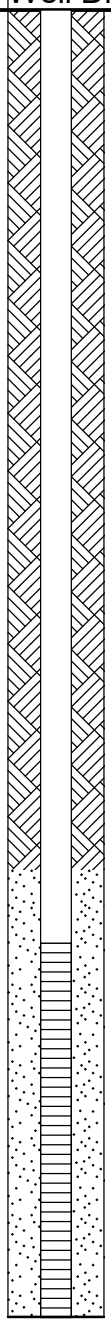
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/25/2022 **COMPLETED** 10/25/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234078.6 **NORTHING** 470946.7
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0079
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 24 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 24 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0079
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

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WELL NUMBER MLPV-MW0080

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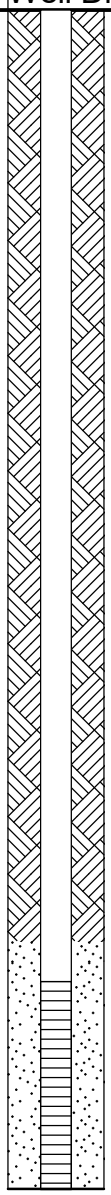
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/25/2022 **COMPLETED** 10/25/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234061.5 **NORTHING** 470925.9
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0080
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0080
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0081

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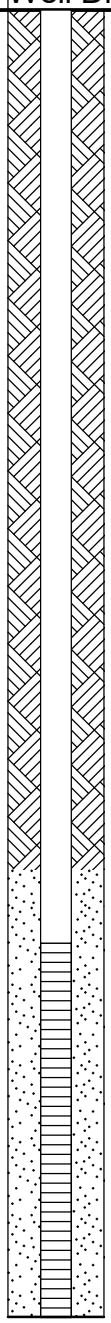
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/26/2022 **COMPLETED** N/A
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234091.7 **NORTHING** 470857.5
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0081
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 24 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 24 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0081
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0082

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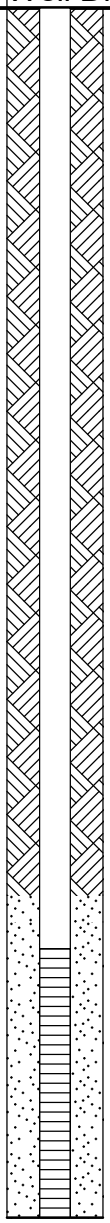
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/26/2022 **COMPLETED** 10/27/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234083.6 **NORTHING** 470864.8
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0082
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0082
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0083

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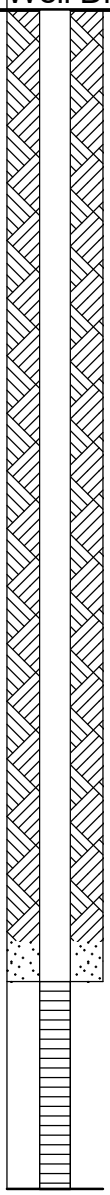
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/27/2022 **COMPLETED** 10/27/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234067.4 **NORTHING** 470855.9
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0083
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 47 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0083
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0084

AECOM

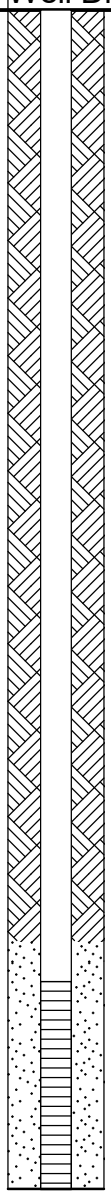
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/27/2022 **COMPLETED** 10/28/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234194.2 **NORTHING** 470831
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0084
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0084
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0085

AECOM

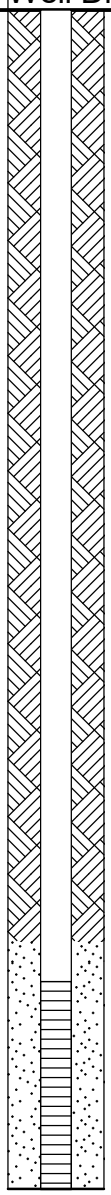
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/28/2022 **COMPLETED** 10/28/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234288.5 **NORTHING** 470921.4
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0085
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0085
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0086

AECOM

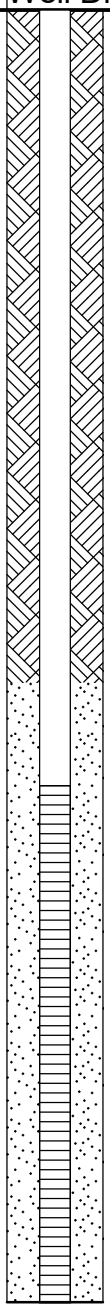
TOTAL DEPTH 25 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/31/2022 **COMPLETED** 10/31/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234541 **NORTHING** 471350
TOTAL DEPTH 25 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Well Diagram



Well Casing
MLPV-MW0086
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 15 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 13 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 13 ft bgs
Bottom: 14 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 14 ft bgs
Bottom: 25 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0086
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 15 ft bgs
Bottom: 25 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0087

AECOM

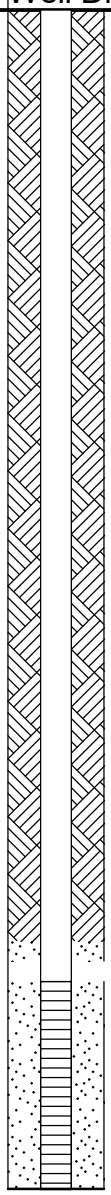
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/31/2022 **COMPLETED** 10/31/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234209.9 **NORTHING** 471356.7
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0087
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Well Screen
MLPV-MW0087
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 47 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0088

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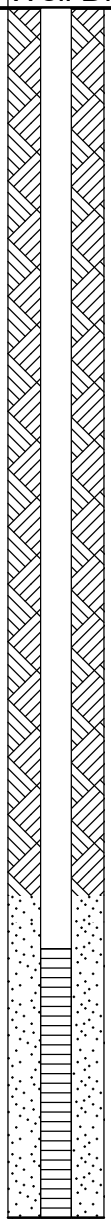
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 10/31/2022 **COMPLETED** 11/01/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234274.8 **NORTHING** 471383.2
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0088
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0088
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0089

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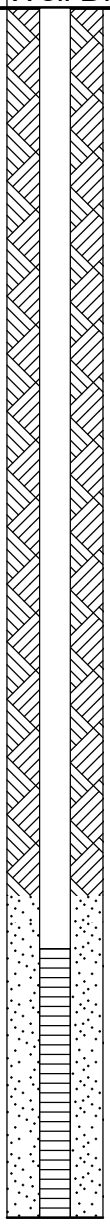
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/01/2022 **COMPLETED** 11/01/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234233.8 **NORTHING** 471322.3
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0089
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0089
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0090

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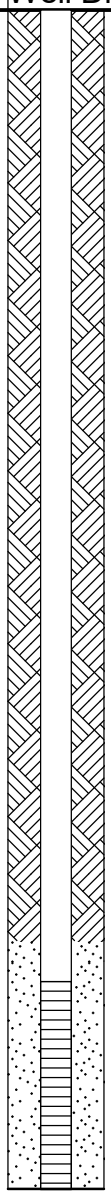
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/01/2022 **COMPLETED** 11/01/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234326.2 **NORTHING** 471354.3
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0090
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0090
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0091

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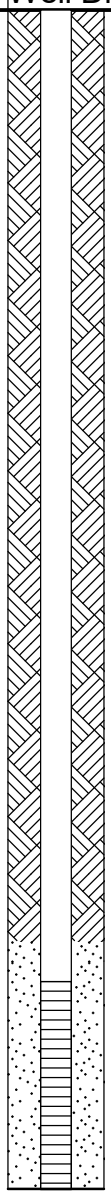
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/02/2022 **COMPLETED** 11/02/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234328.7 **NORTHING** 471447.2
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0091
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0091
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0092

AECOM

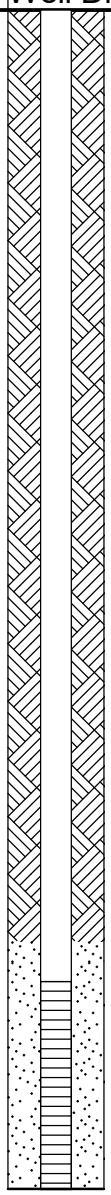
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/17/2022 **COMPLETED** 11/17/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234232.4 **NORTHING** 471572.4
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0092
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 45 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 45 ft bgs
Bottom: 46 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 46 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0092
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0093

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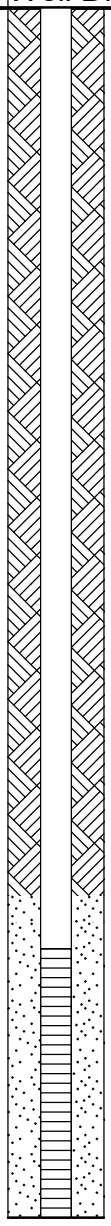
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/18/2022 **COMPLETED** 11/18/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234141 **NORTHING** 471419.4
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0093
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0093
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0094

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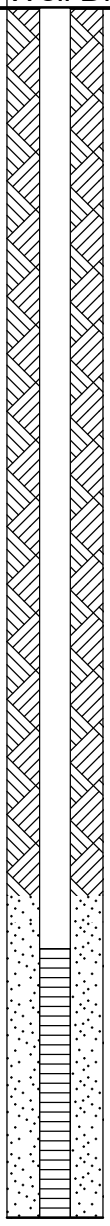
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/18/2022 **COMPLETED** 11/18/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234127.1 **NORTHING** 471761.9
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0094
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0094
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0095

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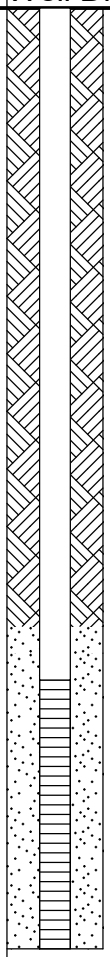
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/21/2022 **COMPLETED** 11/21/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234118.5 **NORTHING** 471759.6
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0095
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 24 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 24 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0095
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0096

AECOM

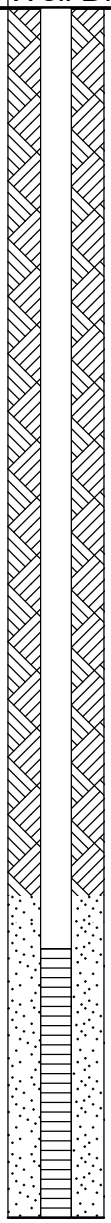
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/21/2022 **COMPLETED** 11/21/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234057.2 **NORTHING** 471736.6
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0096
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0096
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0097

AECOM

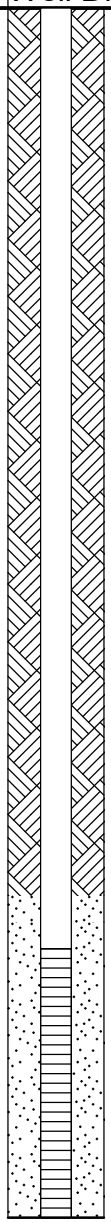
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/22/2022 **COMPLETED** 11/22/2022
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234023.4 **NORTHING** 471619.6
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0097
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 34 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 34 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

Well Screen
MLPV-MW0097
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0098

AECOM

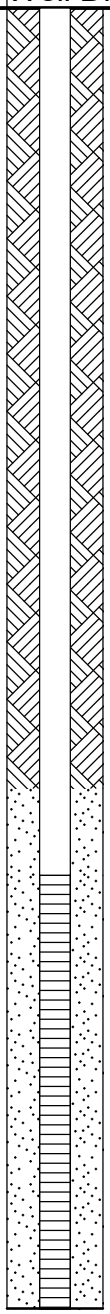
TOTAL DEPTH 30 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/16/2023 **COMPLETED** 01/16/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 233870.5 **NORTHING** 471351.3
TOTAL DEPTH 30 ft bgs
HOLE DIAMETER 0.33 in
LOGGED BY Patrick Bendl **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Well Diagram



Well Casing
MLPV-MW0098
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 20 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 18 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 18 ft bgs
Bottom: 20 ft bgs

Well Screen
MLPV-MW0098
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 20 ft bgs
Bottom: 30 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 20 ft bgs
Bottom: 30 ft bgs
20/30 prepacked

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0099

AECOM

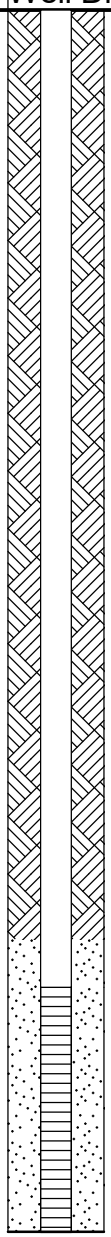
TOTAL DEPTH 50 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/16/2023 **COMPLETED** 01/16/2023
SURVEYING BY
DRILLING CONTRACTOR N/A
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 233956 **NORTHING** 471365
TOTAL DEPTH 50 ft bgs
HOLE DIAMETER 0.33 in
LOGGED BY Patrick Bendl **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50

Well Diagram



Well Casing
MLPV-MW0099
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 40 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 38 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 38 ft bgs
Bottom: 40 ft bgs

Well Screen
MLPV-MW0099
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 40 ft bgs
Bottom: 50 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 40 ft bgs
Bottom: 50 ft bgs
20/30 prepacked

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0100

AECOM

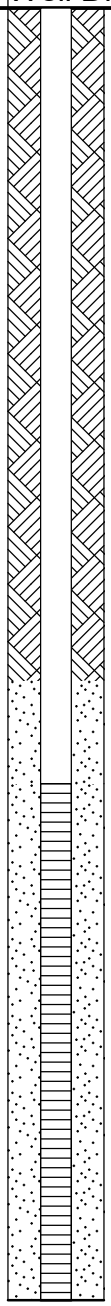
TOTAL DEPTH 25 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/17/2023 **COMPLETED** 01/17/2023
SURVEYING BY
DRILLING CONTRACTOR N/A
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 233705.2 **NORTHING** 471499.4
TOTAL DEPTH 25 ft bgs
HOLE DIAMETER in
LOGGED BY Patrick Bendl **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Well Diagram



Well Casing
MLPV-MW0100
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 15 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 13 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 13 ft bgs
Bottom: 15 ft bgs

Well Screen
MLPV-MW0100
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 15 ft bgs
Bottom: 25 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 15 ft bgs
Bottom: 25 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0101

AECOM

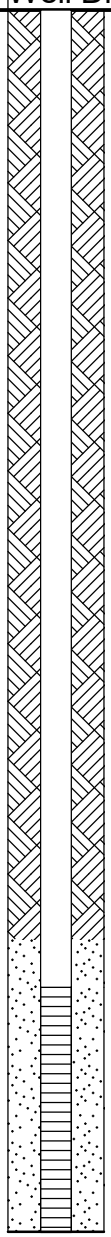
TOTAL DEPTH 50 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/19/2023 **COMPLETED** 01/19/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 233964.7 **NORTHING** 471228.5
TOTAL DEPTH 50 ft bgs
HOLE DIAMETER 0.33 in
LOGGED BY Patrick Bendl **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50

Well Diagram



Well Casing
MLPV-MW0101
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 40 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 38 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 38 ft bgs
Bottom: 40 ft bgs

Well Screen
MLPV-MW0101
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 40 ft bgs
Bottom: 50 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 40 ft bgs
Bottom: 50 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0102

AECOM

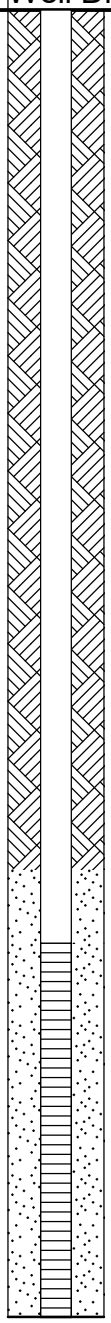
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/20/2023 **COMPLETED** 01/20/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 234274.4 **NORTHING** 471716.8
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER 0.025 in
LOGGED BY Patrick Bendl **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0102
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 23 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 23 ft bgs
Bottom: 25 ft bgs

Well Screen
MLPV-MW0102
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 25 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0103

AECOM

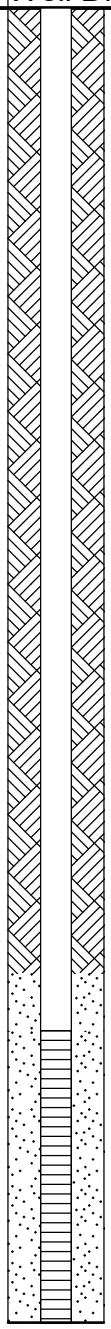
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/23/2023 **COMPLETED** 01/23/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 234264 **NORTHING** 471726.3
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0103
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 33 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 33 ft bgs
Bottom: 35 ft bgs

Well Screen
MLPV-MW0103
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

Filter Pack
Type: #0/30
Top: 35 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0104

AECOM

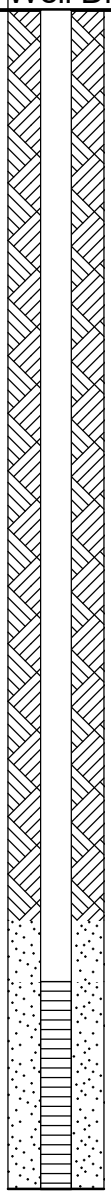
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/23/2023 **COMPLETED** 01/23/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 234273 **NORTHING** 471716.6
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0104
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 44 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 44 ft bgs
Bottom: 47 ft bgs

Well Screen
MLPV-MW0104
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

Filter Pack
Type: #0/30
Top: 47 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0105

AECOM

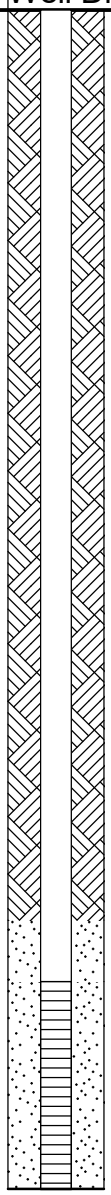
TOTAL DEPTH 57 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/24/2023 **COMPLETED** 01/24/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 234397.7 **NORTHING** 471642.8
TOTAL DEPTH 57 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45
50
55

Well Diagram



Well Casing
MLPV-MW0105
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 47 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 44 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 44 ft bgs
Bottom: 47 ft bgs

Well Screen
MLPV-MW0105
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

Filter Pack
Type: Fine Sand
Top: 47 ft bgs
Bottom: 57 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0106

AECOM

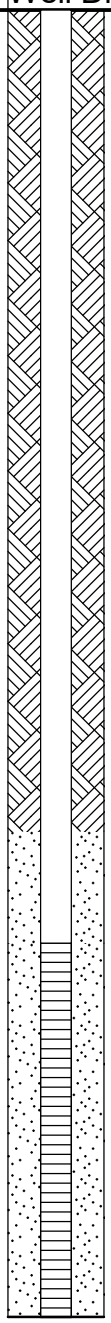
TOTAL DEPTH 35 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/24/2023 **COMPLETED** 01/24/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD DPT
EASTING 234336.8 **NORTHING** 471682.7
TOTAL DEPTH 35 ft bgs
HOLE DIAMETER in
LOGGED BY Brittany Follett **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35

Well Diagram



Well Casing
MLPV-MW0106
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 25 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 22 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 22 ft bgs
Bottom: 25 ft bgs

Well Screen
MLPV-MW0106
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 25 ft bgs
Bottom: 35 ft bgs

Filter Pack
Type: Fine Sand
Top: 25 ft bgs
Bottom: 35 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0107

AECOM

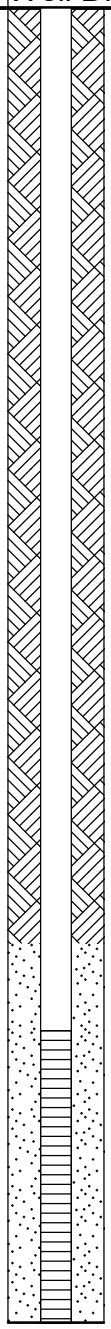
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/25/2023 **COMPLETED** 01/25/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Direct Push Technology
EASTING 234326.7 **NORTHING** 471687.1
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Caroline Bekins **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0107
Type: Schedule 40 PVC
Diameter: 2 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 32 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 32 ft bgs
Bottom: 35 ft bgs

Well Screen
MLPV-MW0107
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 35 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0108

AECOM

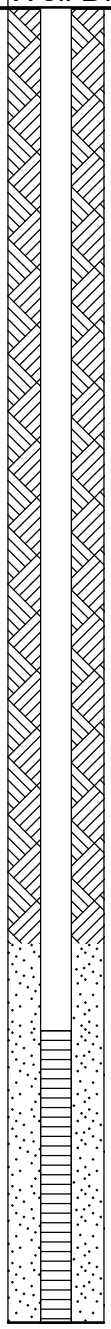
TOTAL DEPTH 45 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/25/2023 **COMPLETED** 01/25/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Direct Push Technology
EASTING 234368.3 **NORTHING** 471604.5
TOTAL DEPTH 45 ft bgs
HOLE DIAMETER in
LOGGED BY Caroline Bekins **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
5
10
15
20
25
30
35
40
45

Well Diagram



Well Casing
MLPV-MW0108
Type: Schedule 40 PVC
Diameter: 2 in
Top: 0 ft bgs
Bottom: 35 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 32 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 32 ft bgs
Bottom: 35 ft bgs

Well Screen
MLPV-MW0108
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 35 ft bgs
Bottom: 45 ft bgs
20/30 prepacked

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 6/8/23 14:52 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW 76-108\MLPV MW 76-110.GPJ

WELL NUMBER MLPV-MW0109

AECOM

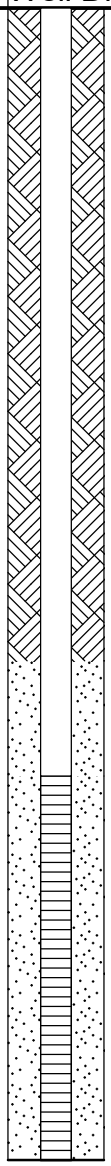
TOTAL DEPTH 30 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/26/2023 **COMPLETED** 01/26/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Direct push
EASTING 233685.6 **NORTHING** 471199.1
TOTAL DEPTH 30 ft bgs
HOLE DIAMETER 1 in
LOGGED BY Caroline Bekins **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Well Diagram



Well Casing
MLPV-MW0109
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 20 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 17 ft bgs
Type I/II

Sand
Type: Fine Sand
Top: 17 ft bgs
Bottom: 20 ft bgs

Well Screen
MLPV-MW0109
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 20 ft bgs
Bottom: 30 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 20 ft bgs
Bottom: 30 ft bgs
20/30 prepacked

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WELL NUMBER MLPV-MW0110

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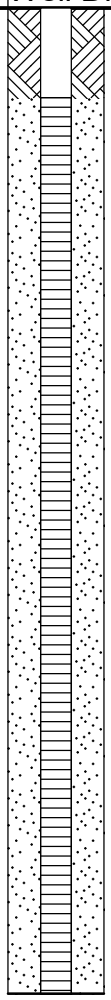
TOTAL DEPTH 11 FT BGS

CLIENT NASA - Kennedy Space Center
PROJECT NAME MLPV Well Installation
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 01/26/2023 **COMPLETED** 01/26/2023
SURVEYING BY
DRILLING CONTRACTOR EDS
TOC Elevation **Ground Elevation** N/A
DRILLING METHOD Direct push
EASTING 233775.4 **NORTHING** 471106.4
TOTAL DEPTH 11 ft bgs
HOLE DIAMETER 1 in
LOGGED BY Caroline Bekins **CHECKED BY** N/A
CASING TYPE Flushmount

DEPTH (ft)

0
1
2
3
4
5
6
7
8
9
10
11

Well Diagram



Well Casing
MLPV-MW0110
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 1 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 1 ft bgs
Type I/II

Well Screen
MLPV-MW0110
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 1 ft bgs
Bottom: 11 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 1 ft bgs
Bottom: 11 ft bgs
20/30 prepacked

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STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0076

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0077

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0078

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0079

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0080

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0081

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0082

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0083

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0084

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0085

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0086

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 25 ft. Cased Depth 15 ft. *Open Hole: From To ft. *Screen: From 15 To 25 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 15 ft. No. of Bags 1 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0087

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0088

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0089

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0090

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0091

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0092

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0093

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)
☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:
Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:
*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0094

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0095

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0096

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0097

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0098

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ DPT

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 30 ft. Cased Depth 20 ft. *Open Hole: From To ft. *Screen: From 20 To 30 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 20 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0099

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 50 ft. Cased Depth 40 ft. *Open Hole: From To ft. *Screen: From 40 To 50 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 40 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0100

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 25 ft. Cased Depth 15 ft. *Open Hole: From To ft. *Screen: From 15 To 25 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 15 ft. No. of Bags 1 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0101

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 50 ft. Cased Depth 40 ft. *Open Hole: From To ft. *Screen: From 40 To 50 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 40 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0102

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0103

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0104

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0105

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 57 ft. Cased Depth 47 ft. *Open Hole: From To ft. *Screen: From 47 To 57 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 47 ft. No. of Bags 4 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0106

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 35 ft. Cased Depth 25 ft. *Open Hole: From To ft. *Screen: From 25 To 35 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 25 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0107

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0108

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 45 ft. Cased Depth 35 ft. *Open Hole: From To ft. *Screen: From 35 To 45 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 35 ft. No. of Bags 3 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0109

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage

Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____

☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ft. After _____Hours at _____GPM

14. *Measuring Point (Describe) _____ Which is _____ft. _____Above _____Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 30 ft. Cased Depth 20 ft. *Open Hole: From To ft. *Screen: From 20 To 30 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 20 ft. No. of Bags 2 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____in. From _____ft. To _____ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ft. Intake Depth _____ft.

23. Chemical Analysis (When Required):
Iron _____ppm Sulfate _____ppm Chloride _____ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

STATE OF FLORIDA WELL COMPLETION REPORT

☐ Southwest
☐ Northwest
☐ St. Johns River
☐ South Florida
☐ Suwannee River
☐ DEP
☑ Delegated Authority (If Applicable) Brevard DOH

PLEASE, FILL OUT ALL APPLICABLE FIELDS
(*Denotes Required Fields Where Applicable)

Date Stamp

Official Use Only

1.*Permit Number MW- 193169-1 *CUP/WUP Number _____ *DID Number 533881 62-524 Delineation No. _____

2.*Number of permitted wells constructed, repaired, or abandoned 1 *Number of permitted wells not constructed, repaired, or abandoned _____

3.*Owner's Name United States of America 4.*Completion Date 12/01/2022 5. Florida Unique ID MW 0110

6. MLP/VAB (SWMU 056), KSC, FL 32899
*Well Location - Address, Road Name or Number, City, ZIP

7.*County Brevard *Section 18 Land Grant _____ *Township 22S *Range 37E

8. Latitude _____ Longitude _____

9. Data Obtained From: ☐ GPS ☐ Map ☐ Survey Datum: _____NAD 27 _____NAD 83 _____WGS 84

10.*Type of Work: ☑ Construction ☐ Repair ☐ Modification ☐ Abandonment

11.*Specify Intended Use(s) of Well(s)

☐ Domestic
☐ Bottled Water Supply
☐ Public Water Supply (Limited Use/DOH)
☐ Public Water Supply (Community or Non-Community/DEP)
☐ Class I Injection
☐ Landscape Irrigation
☐ Recreation Area Irrigation
☐ Agricultural Irrigation
☐ Livestock
☐ Nursery Irrigation
☐ Commercial/Industrial
☐ Golf Course Irrigation
☐ Site Investigations
☑ Monitoring
☐ Test
☐ Earth-Coupled Geothermal
☐ HVAC Supply
☐ HVAC Return

Class V Injection: ☐ Recharge ☐ Commercial/Industrial Disposal ☐ Aquifer Storage and Recovery ☐ Drainage
Remediation: ☐ Recovery ☐ Air Sparge ☐ Other (Describe) _____
☐ Other (Describe) _____

12. *Drill Method ☐ Auger ☐ Cable Tool ☐ Rotary ☐ Combination (Two or More Methods) ☐ Jetted ☑ Sonic
☐ Horizontal Drilling ☐ Hydraulic Point (Direct Push) ☐ Other _____

13.*Measured Static Water Level 4 ft. Measured Pumping Water Level _____ ft. After _____ Hours at _____ GPM

14. *Measuring Point (Describe) _____ Which is _____ ft. _____ Above _____ Below Land Surface *Flowing: ☐ Yes ☐ No

15.*Casing Material: ☐ Black Steel ☐ Galvanized ☑ PVC ☐ Stainless Steel ☐ Not Cased ☐ Other _____

16. *Total Well Depth 11 ft. Cased Depth 1 ft. *Open Hole: From To ft. *Screen: From 1 To 11 ft. Slot Size

17.*Abandonment: ☐ Other (Explain) _____

From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

18.*Surface Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

19.*Primary Casing Diameter and Depth:

Dia 1 in. From 0 ft. To 1 ft. No. of Bags 1 Seal Material (Check One): ☑ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

20.*Liner Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

21.*Telescope Casing Diameter and Depth:

Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____
Dia _____ in. From _____ ft. To _____ ft. No. of Bags _____ Seal Material (Check One): ☐ Neat Cement ☐ Bentonite ☐ Other _____

22. Pump Type (If Known):
☐ Centrifugal ☐ Jet ☐ Submersible ☐ Turbine
Horsepower _____ Pump Capacity (GPM) _____
Pump Depth _____ ft. Intake Depth _____ ft.

23. Chemical Analysis (When Required):
Iron _____ ppm Sulfate _____ ppm Chloride _____ ppm
☐ Laboratory Test ☐ Field Test Kit

24. Water Well Contractor:

*Contractor Name Carl Leonhardt *License Number 9521 E-mail Address car@edsenvironmental.com

*Contractor's Signature _____ *Driller's Name (Print or Type) Glen Pennington
(I certify that the information provided in this report is accurate and true.)

APPENDIX N

MONITORING WELL INSTALLATION AND RETROFITTING PHOTOLOG

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AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
1	10/24/22

Direction Photo Taken:

Southeast

Description:

View of completed MLPV-MW0076



Photo No.	**Date:**
2	10/24/22

Direction Photo Taken:

Southeast

Description:

View of completed MLPV-MW0077



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
3	10/25/22

Direction Photo Taken:

Northwest

Description:

View of completed MLPV-MW0078

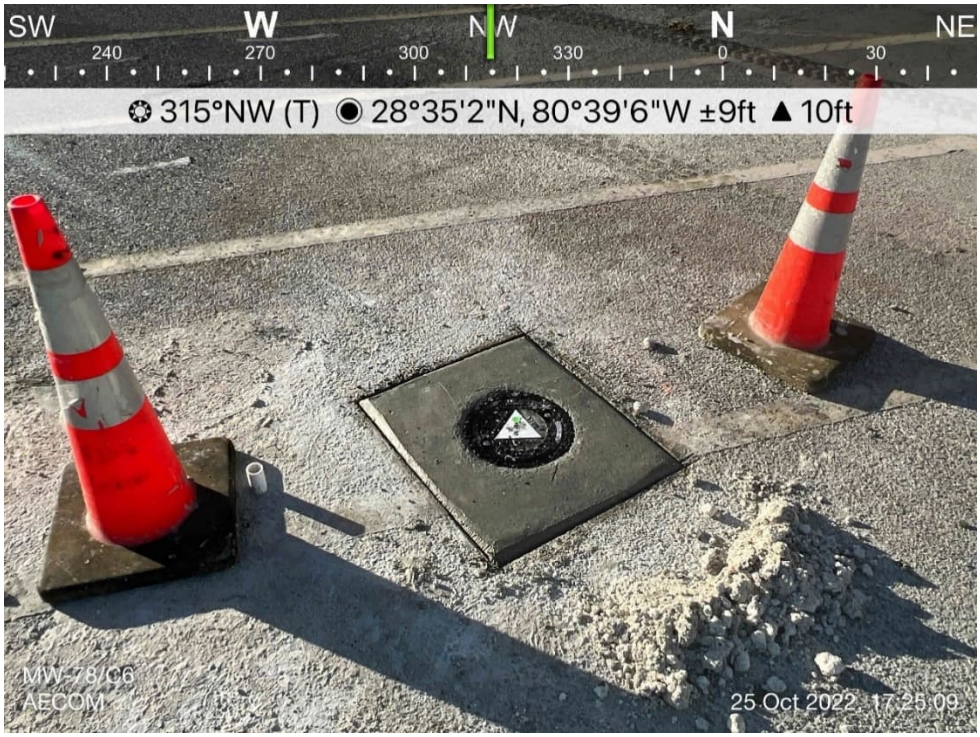


Photo No.	**Date:**
4	10/25/22

Direction Photo Taken:

Description:

View of completed MLPV-MW0079



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
5	10/26/22

Direction Photo Taken:

Southeast

Description:

View of completed MLPV-MW0080

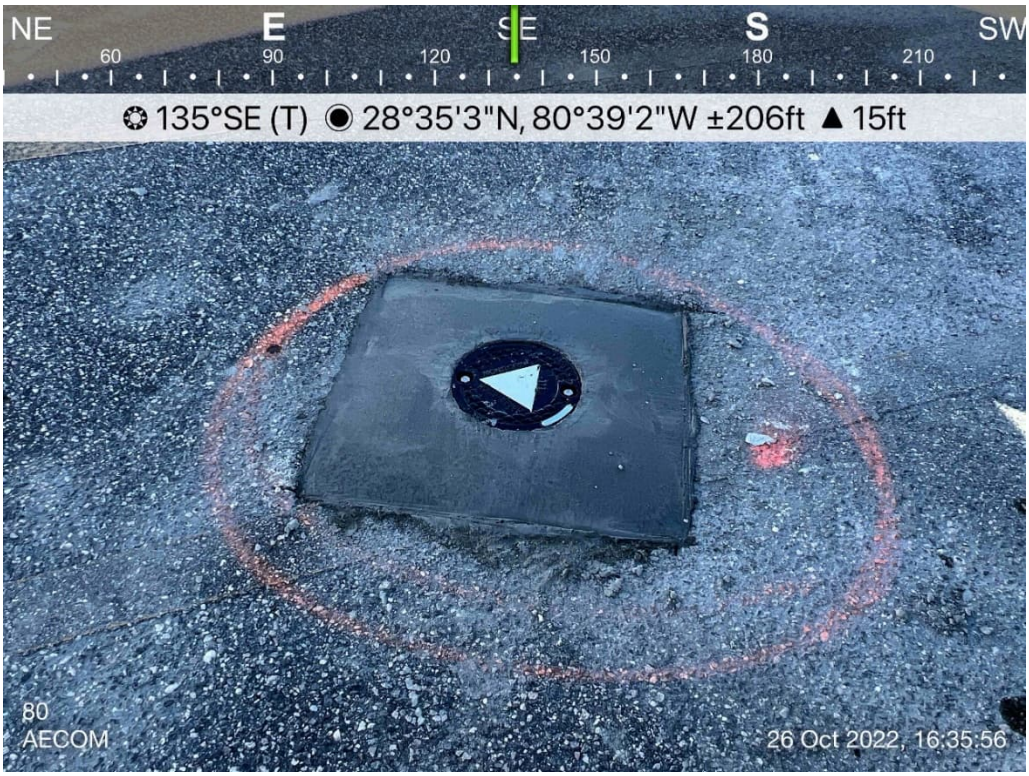


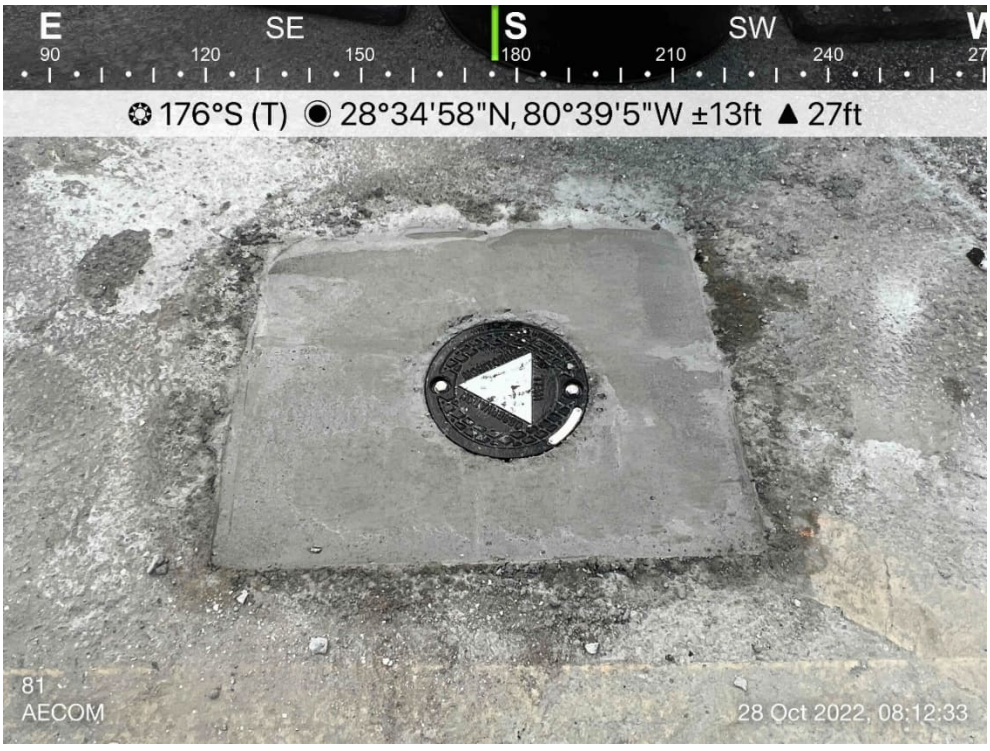
Photo No.	**Date:**
6	10/28/22

Direction Photo Taken:

South

Description:

View of MLPV-MW0081



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
7	10/28/22

Direction Photo Taken:

North

Description:

View of MLPV-MW0082



Photo No.	**Date:**
8	10/28/22

Direction Photo Taken:

South

Description:

View of MLPV-MW0083



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
9	10/28/22

Direction Photo Taken:

Southeast

Description:

View of MLPV-MW0084.

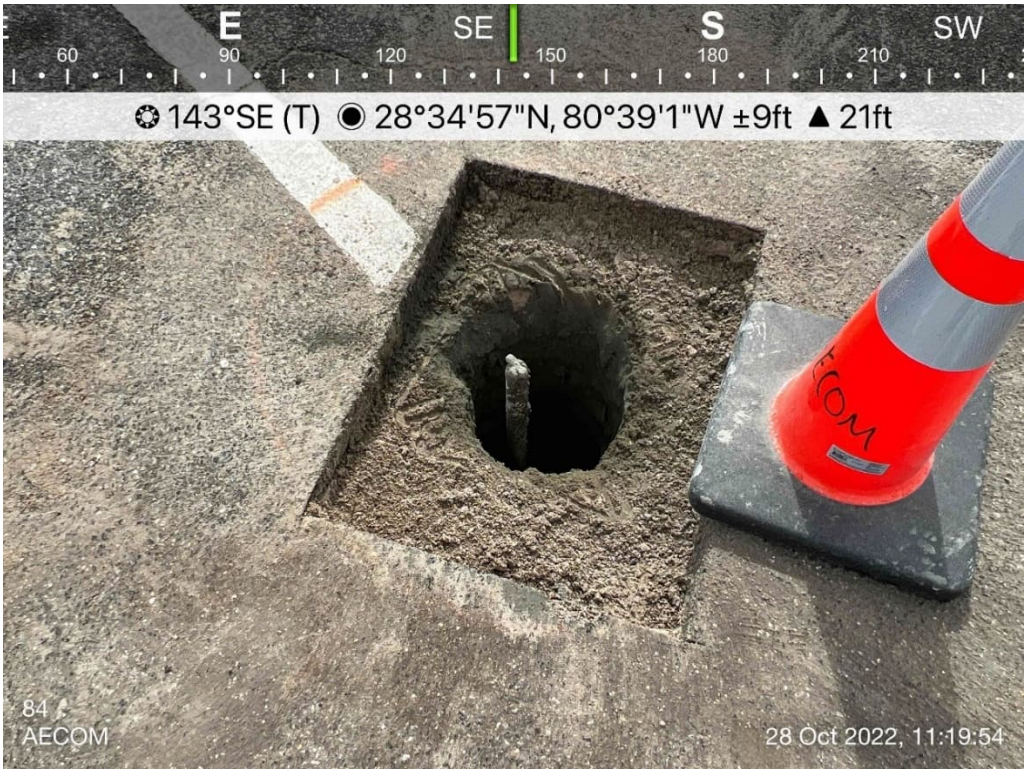


Photo No.	**Date:**
10	10/28/22

Direction Photo Taken:

North

Description:

View of MLPV-MW0085



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
11	10/31/22

Direction Photo Taken:

West

Description:

View of MLPV-MW0086



Photo No.	**Date:**
12	11/1/22

Direction Photo Taken:

Northwest

Description:

View of MLPV-MW0087



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
13	11/1/22

Direction Photo Taken:

West

Description:

View of MLPV-MW0088



Photo No.	**Date:**
14	11/2/22

Direction Photo Taken:

North

Description:

View of MLPV-MW0089



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
15	11/2/22

Direction Photo Taken:

North

Description:

View of MLPV-MW0090



Photo No.	**Date:**
16	11/2/22

Direction Photo Taken:

Southwest

Description:

View of MLPV-MW0091



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
17	1/25/23

Direction Photo Taken:

Northwest

Description:

View of MLPV-MW0092

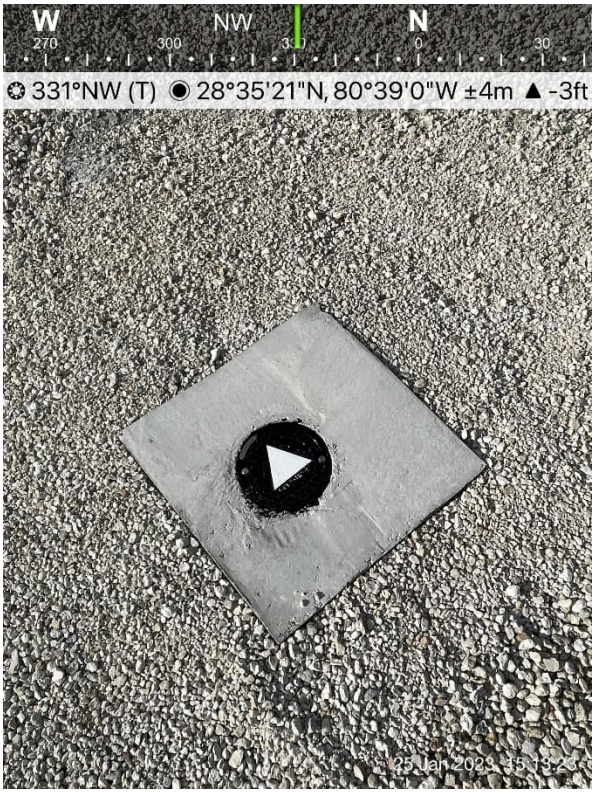


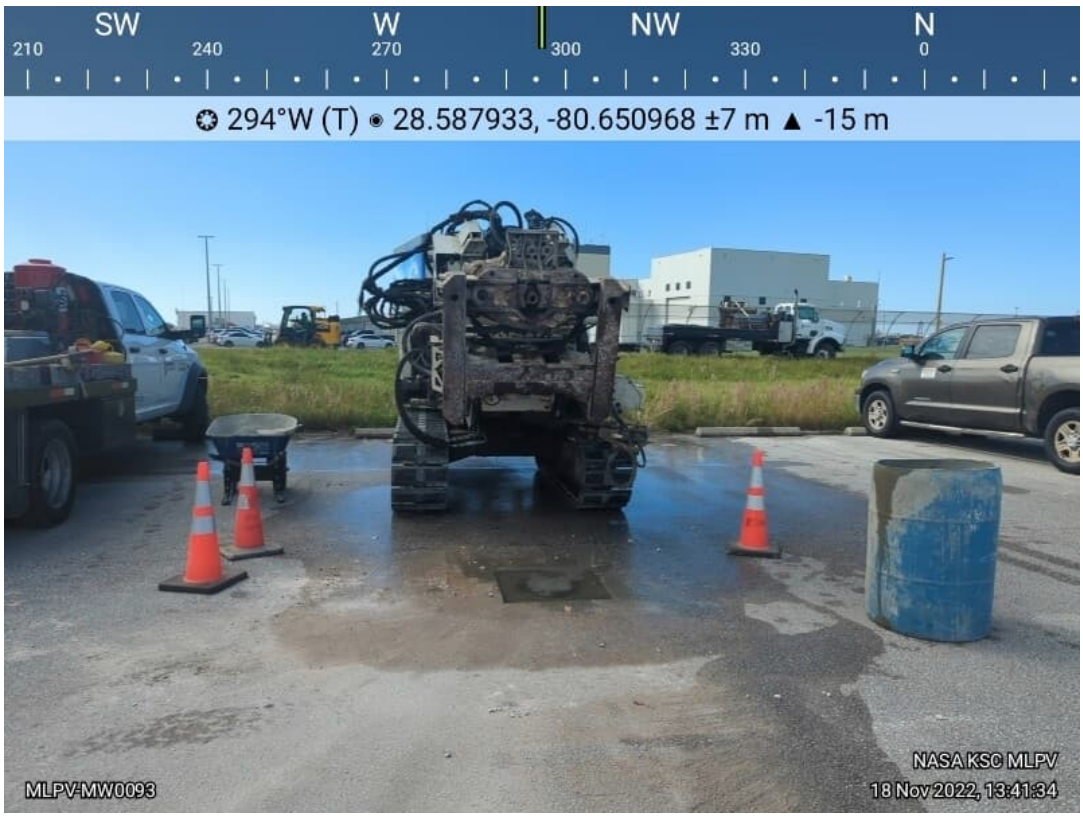
Photo No.	**Date:**
18	11/18/22

Direction Photo Taken:

Northwest

Description:

View of MLPV-MW0093



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
19	1/25/23

Direction Photo Taken:

North

Description:

View of MLPV-MW0094 and MLPV-MW0095

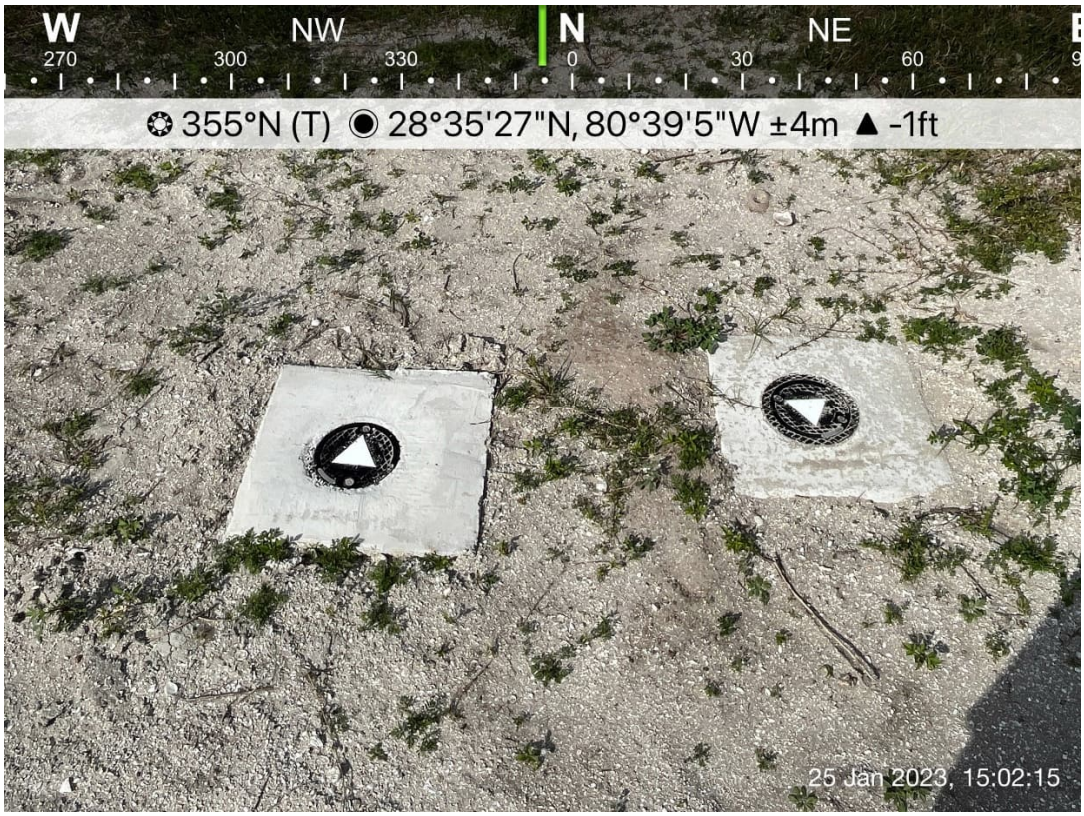


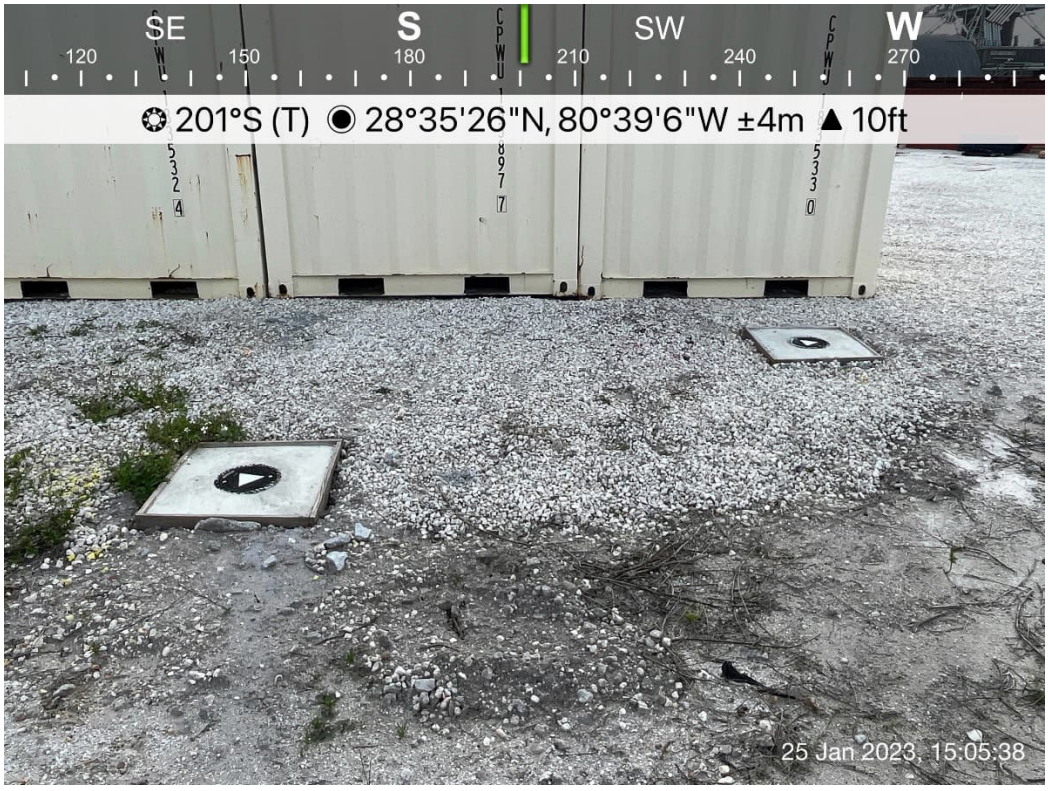
Photo No.	**Date:**
20	1/25/23

Direction Photo Taken:

South

Description:

View of MLPV-MW0096 and MLPV-IW0021R



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
21	1/25/23

Direction Photo Taken:

Northwest

Description:

View of MLPV-MW0097



Photo No.	**Date:**
22	1/16/23

Direction Photo Taken:

Northwest

Description:

View of MLPV-MW0098



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
23	1/16/23

Direction Photo Taken:

Southeast

Description:

View of MLPV-MW0099



Photo No.	**Date:**
24	1/17/23

Direction Photo Taken:

North

Description:

View of MLPV-MW0100



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
25	1/19/23

Direction Photo Taken:

Description:

View of MLPV-MW0101



Photo No.	**Date:**
26	1/23/23

Direction Photo Taken:

East

Description:

View of MLPV-MW0102, MLPV-MW0103, and MLPV-MW0104



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
27	1/24/23

Direction Photo Taken:

Northeast

Description:

View of MLPV-MW0105



Photo No.	**Date:**
28	1/24/23

Direction Photo Taken:

Northeast

Description:

View of MLPV-MW0105



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
29	1/24/23

Direction Photo Taken:

Southeast

Description:

View of MLPV-MW0106



Photo No.	**Date:**
30	1/25/23

Direction Photo Taken:

Northeast

Description:

View of MLPV-MW0107



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
31	1/25/23

Direction Photo Taken:

Southwest

Description:

View of MLPV-MW0108



Photo No.	**Date:**
32	1/26/23

Direction Photo Taken:

South

Description:

View of MLPV-MW0109



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
33	1/26/23

Direction Photo Taken:

West

Description:

View of MLPV-MW0110



Photo No.	**Date:**
34	1/17/2023

Direction Photo Taken:

Northwest

Description:

View of WCPS-IW0002SRR.



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
35	1/11/23

Direction Photo Taken:

West

Description:

View of MLPV-IW0007I post retrofitting.



Photo No.	**Date:**
36	1/10/23

Direction Photo Taken:

Northeast

Description:

View of MLPV-IW0009I and MLPV-IW0009D post retrofitting



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
37	1/11/22

Direction Photo Taken:

South

Description:

View of MLPV-IW0011I and MLPV-IW0037 post retrofitting.

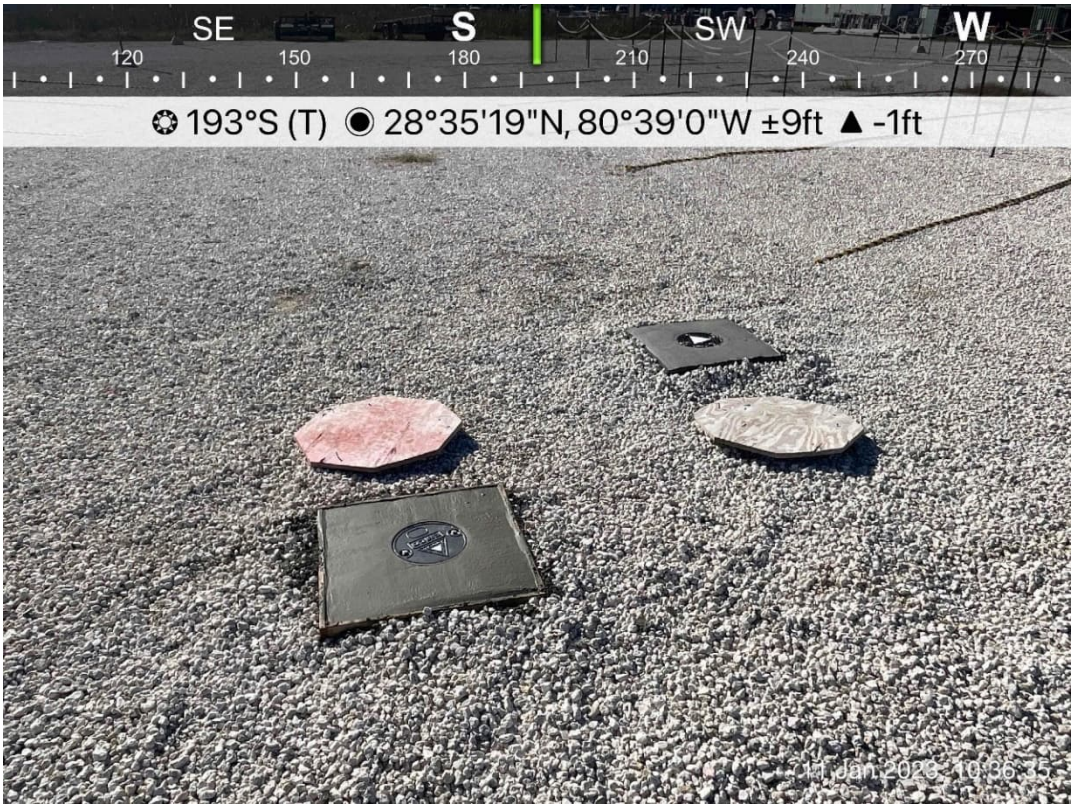


Photo No.	**Date:**
38	1/10/23

Direction Photo Taken:

Northeast

Description:

View of MLPV-IW0027I and MLPV-IW0027D post retrofitting



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
39	1/11/23

Direction Photo Taken:

South

Description:

View of MLPV-IW0034 and MLPV-IW0035 post retrofitting.

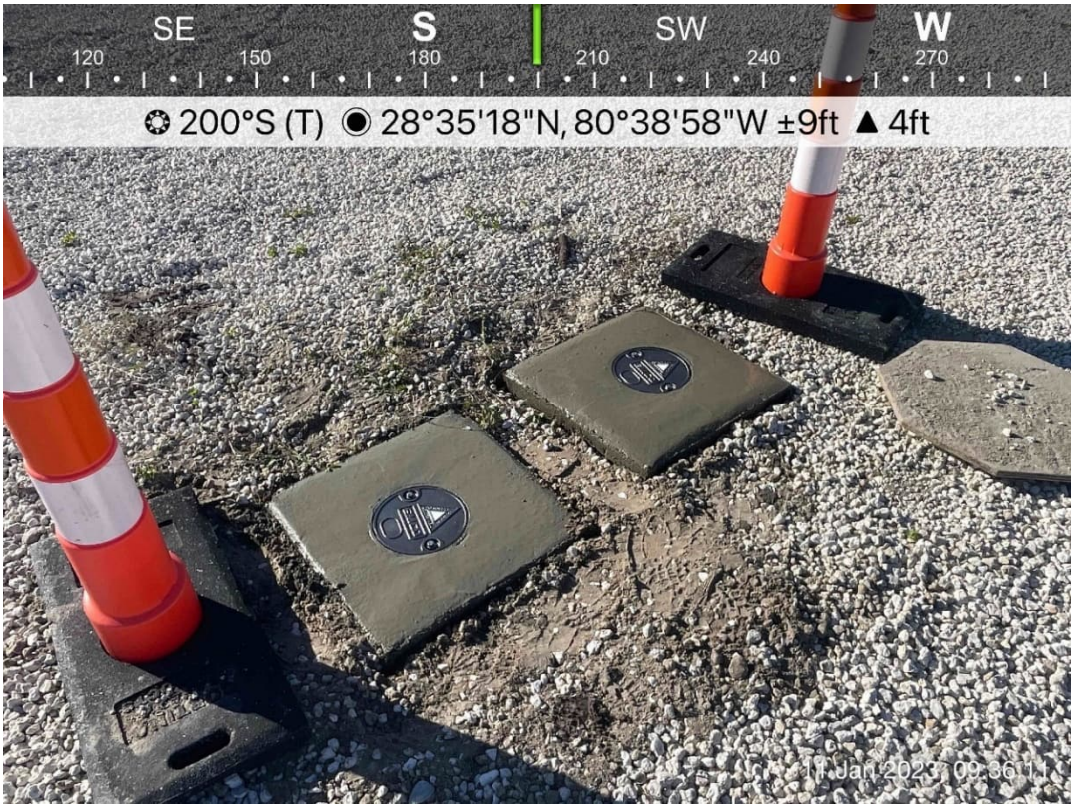


Photo No.	**Date:**
40	1/10/23

Direction Photo Taken:

South

Description:

View of MLPV-IW0040 and MLPV-IW0041 post retrofitting



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
41	1/11/23

Direction Photo Taken:

South

Description:

View of MLPV-IW0045 post retrofitting



Photo No.	**Date:**
42	1/11/23

Direction Photo Taken:

Description:

MLPV-IW0047

Left as-is to prevent damage by heavy equipment in construction area.



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
43	1/10/23

Direction Photo Taken:

South

Description:

View of MLPV-IW0057 post retrofitting



Photo No.	**Date:**
44	1/10/2023

Direction Photo Taken:

Description:

MLPV-IW0058

Left as-is to prevent damage by heavy equipment in construction area.



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
45	1/11/23

Direction Photo Taken:

South

Description:

View of MLPV-IW0061 and MLPV-IW0062 post retrofitting



Photo No.	**Date:**
46	1/11/23

Direction Photo Taken:

West

Description:

View of MLPV-IW0063 and MLPV-IW0064 post retrofitting



AECOM

PHOTOGRAPH LOG

Project: Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area, SWMU 056	**Site Location:** Kennedy Space Center, Merritt Island, Florida **FDEP Facility ID:** DOD_18_3072	**Event:** Monitoring Well Installation and Retrofitting

Photo No.	**Date:**
47	1/11/23

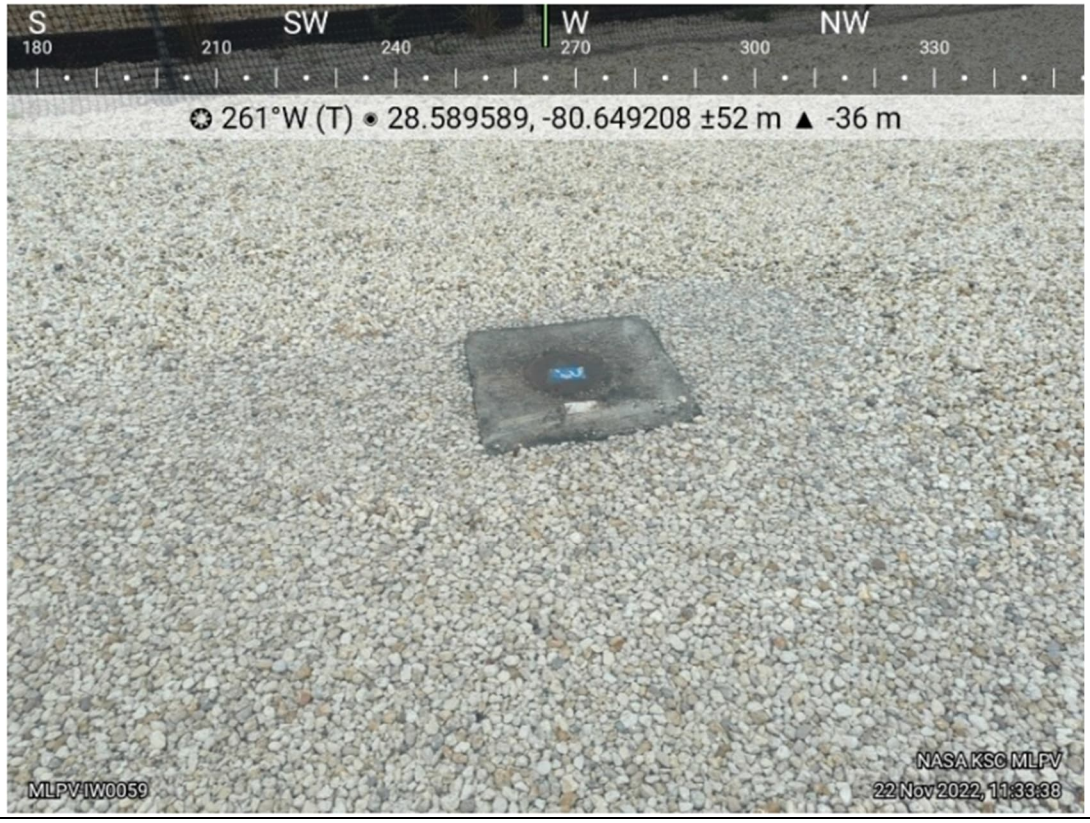
Direction Photo Taken:

South

Description:

MLPV-IW0059

Left as-is to prevent damage by heavy equipment in construction area.



APPENDIX O

FIELD NOTES – GROUNDWATER SAMPLING ACTIVITIES

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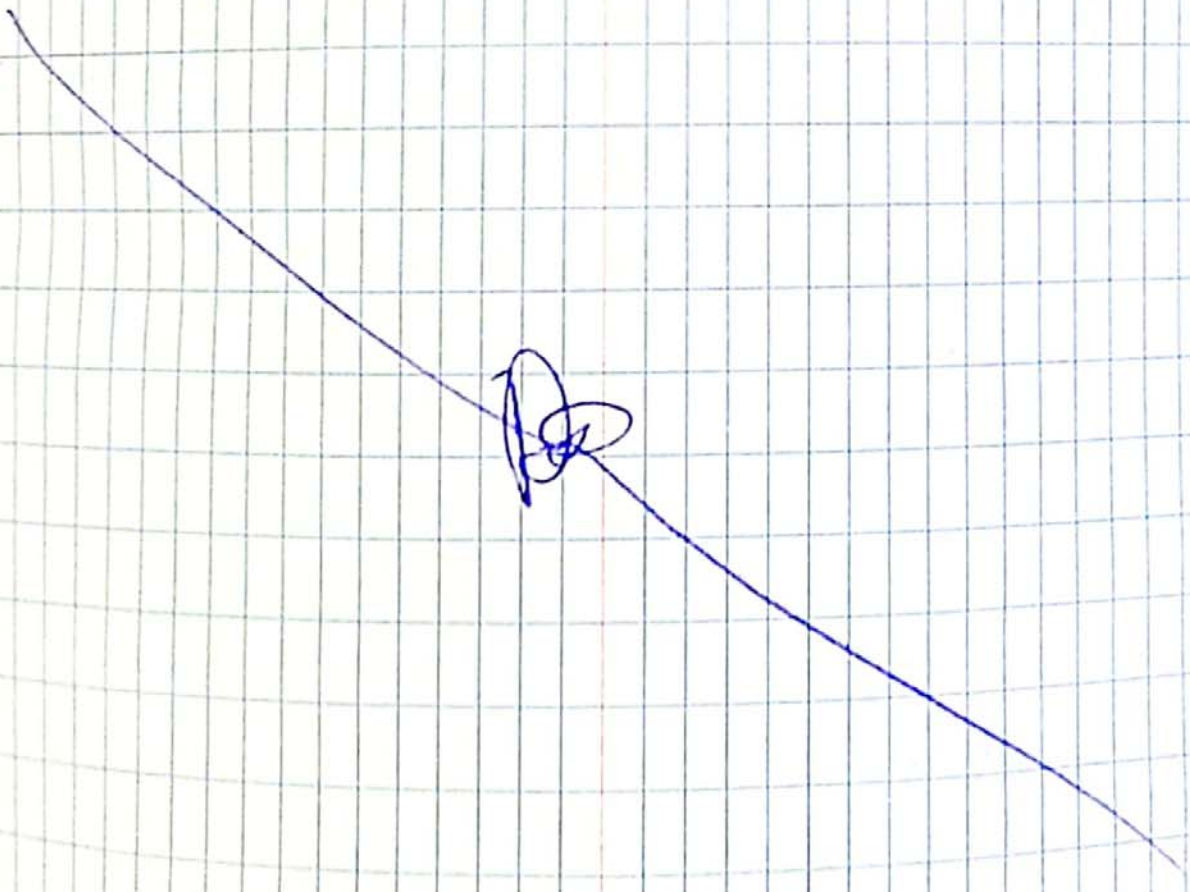
3/14/22 | KSC MLAV GW Sampling | p. 1 of 3 | DS/MP

0700- Dustin Slotan & Madan Paresotam at depot in Orlando to load trucks #2754 #604.
0730- Leave for site-
0830- Arrive onsite-
Weather: Sunny, Some clouds, 55°F.
0835- H&S meeting
-Call Matt Luthi with Bechtol to check in.
0840- Matt meets up with us to assist in locating wells.
- Found most of the wells.
-Some are still covered by gravel which Matt says they will try to uncover those wells today or tomorrow.
-See water level log for data collected.
1105- Begin sampling at Bio Sparge wells.
1400- Finished sampling for the day. Head to CCF to place drums & dump out purge water
1445- DS/MP offsite.

3/15/22 RSC MAPP p. 2 of 3 DS/MP

Gut Sampling

0800- Bush, Slater & Madan Parsotan onsite.
Weather: Sunny, cool 46°F.
0805- H&S meeting.
- Call Matt with Bechtol-
0815 - Matt meets us at gate on Launchee Rd.
- Begin Sampling at Remainder of BioSparge wells-
1400- Sampling complete for the day.
1410- Head to CCF to dump out water.
1445- Water dumped into drum -
1450- DS/MP offsite-



KSC MLPV GW Sampling

0800- Dustin Slater & Madison Parsafan onsite.
Weather: Mostly cloudy, 70°F.
0805- H&S meeting
0810- Check in with Matt (Bechtel) & let him know we're onsite.
0845 - Begin sampling wells in Hot Spot 2 area.
0855 - Matt comes over to site to see how things are going -
↳ Informs us again that they will not be able to uncover the buried wells.
1120 - Sampling complete.
1125 - Head to CCF to dump water -
- Purge water in drum ID = 220929
Approximately 35-40 gallons in it.
Clamshell ID = 220930
* Will sample IDW after coming back out to sample 8 wells at Hot Spot 2 that are covered.
1150- Offsite -
↳ Dustin heads to VPF to take photos.
1440- Arrive at depot -
- Pack cooler for pickup by ENCO.

DS

4/21/22 | KSC MLP-1 GW Sampling | p. 1 of 1 | DS

0730- Dustin Slater onsite.
Weather: Sunny, high 85°F.
- Check in with Matt Luthi (Bechtol)
- Locate & open wells.

DTW Readings

Well	DTW
IW0011I	2.33
IW0032	0.92
IW0033	0.61
IW0035	3.29
IW0037	2.55
IW0040	3.62
IW0044	1.05
IW0045	N/A - well bent couldn't get water level probe down it.

1335- Sampling complete. Head to CCF to dump water & collect IDW sample.
1400- Collect IDW-20220421-01
pH = 7.78
1430- DS offsite -

12/14/22 Nasa KSC - MLPV MP

0730 Madan Parsotan at Aecom Depot to load up truck #904 Ford-F150 with groundwater sampling equipment

0815 Leave Aecom Depot for Job site

0925 Arrive on site
Review H&S
Weather 70°F cloudy
Open wells for DTW
Calibrate equipment
DTW Readings

Well-ID	DTW
MW0011	2.46
MW0012	2.49
MW0013	2.01
MW0014	2.56

All wells sampled place on ice and will drop off at Eurofins Orlando, FL
All purge water place in 55 gallon # 227312
Container ID # 227312

1240 off site to drop samples at Eurofins Orlando, FL

APPENDIX P

GROUNDWATER SAMPLING LOGS AND CALIBRATION RECORDS

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GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0004-037.5-20220315 Sampler: Dustin Slater

Well ID: MLPV-ASMW0004 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.94
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	8:48			0	0.94									
3/15/2022	9:08	0.05	1	1	1.07	7.07	3229.0	0.12	7.54	23.10	-108.9	1.71		
3/15/2022	9:10	0.05	0.1	1.1	1.07	7.08	3293.3	0.10	6.99	23.09	-112.1	1.75		
3/15/2022	9:12	0.05	0.1	1.2	1.07	7.08	3156.1	0.09	7.77	23.12	-112.5	1.67		
3/15/2022	9:14	0.05	0.1	1.3	1.07	7.07	3278.4	0.09	13.12	23.17	-111.7	1.74		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:48	9:14	26	1.3	7.07	3278.4	0.09	13.12	23.17	-111.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0005-037.5-20220314 Sampler: Dustin Slater

Well ID: MLPV-ASMW0005 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.48
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	13:07			0	1.48									
3/14/2022	13:27	0.05	1	1	1.76	6.85	2914.5	0.11	4.54	23.56	14.4	1.53		
3/14/2022	13:29	0.05	0.1	1.1	1.76	6.85	2823.7	0.10	4.14	23.62	12.7	1.48		
3/14/2022	13:31	0.05	0.1	1.2	1.76	6.86	2922.3	0.10	4.32	23.69	12.4	1.54		
3/14/2022	13:33	0.05	0.1	1.3	1.76	6.86	2898.2	0.08	3.88	23.74	8.9	1.41		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:07	13:33	26	1.3	6.86	2898.2	0.08	3.88	23.74	8.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0006-037.5-20220314 Sampler: Dustin Slater

Well ID: MLPV-ASMW0006 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.73
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	11:43			0	0.73									
3/14/2022	12:03	0.05	1	1	1.12	6.77	3242.9	0.13	4.59	23.56	-43.3	1.72		
3/14/2022	12:05	0.05	0.1	1.1	1.12	6.78	3225.2	0.11	4.56	23.62	-52.5	1.60		
3/14/2022	12:07	0.05	0.1	1.2	1.12	6.80	3238.1	0.10	6.96	23.74	-57.1	1.72		
3/14/2022	12:09	0.05	0.1	1.3	1.12	6.80	3240.9	0.10	3.88	23.58	-61.4	1.72		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:43	12:09	26	1.3	6.80	3240.9	0.10	3.88	23.58	-61.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0006IR-030.5-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0006IR Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	1.77
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	9:30			0	1.77									
3/15/2022	9:50	0.05	1	1	1.89	7.29	1054.5	0.09	1.88	23.09	-244.8	0.53		
3/15/2022	9:52	0.05	0.1	1.1	1.89	7.28	1059.5	0.09	1.86	23.11	-245.3	0.53		
3/15/2022	9:54	0.05	0.1	1.2	1.89	7.29	1064.7	0.09	1.92	23.16	-245.7	0.53		
3/15/2022	9:56	0.05	0.1	1.3	1.89	7.28	1069.3	0.09	1.97	23.14	-246.4	0.54		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:30	9:56	26	1.3	7.28	1069.3	0.09	1.97	23.14	-246.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0028I-030.5-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0028I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	1.7
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	13:11			0	1.7									
3/15/2022	13:31	0.05	1	1	1.76	7.30	2525.5	0.08	2.48	25.44	-204.2	1.32		
3/15/2022	13:33	0.05	0.1	1.1	1.76	7.31	2574.4	0.07	2.44	25.57	-205.4	1.35		
3/15/2022	13:35	0.05	0.1	1.2	1.76	7.30	2585.5	0.08	2.40	25.37	-206.4	1.35		
3/15/2022	13:37	0.05	0.1	1.3	1.76	7.30	2579.7	0.08	3.42	25.50	-206.9	1.35		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:11	13:37	26	1.3	7.30	2579.7	0.08	3.42	25.50	-206.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0031-030.0-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0031 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.57
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	11:39			0	1.57									
3/15/2022	11:59	0.05	1	1	1.89	7.11	1648.1	0.10	13.07	25.56	-104.3	0.84		
3/15/2022	12:01	0.05	0.1	1.1	1.89	7.13	1591.2	0.09	10.26	25.62	-107.3	0.81		
3/15/2022	12:03	0.05	0.1	1.2	1.89	7.12	1581.2	0.09	7.20	25.69	-107.3	0.81		
3/15/2022	12:05	0.05	0.1	1.3	1.89	7.13	1580.7	0.09	8.93	25.69	-107.5	0.81		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:39	12:05	26	1.3	7.13	1580.7	0.09	8.93	25.69	-107.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0046-040.0-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0046 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.72
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	12:23			0	1.72									
3/15/2022	12:43	0.05	1	1	1.88	7.00	13236.3	0.14	5.28	25.32	-58.9	7.73		
3/15/2022	12:45	0.05	0.1	1.1	1.88	7.01	13186.0	0.14	2.64	25.35	-65.6	7.70		
3/15/2022	12:47	0.05	0.1	1.2	1.88	7.01	13078.9	0.15	2.50	25.35	-69.1	7.63		
3/15/2022	12:49	0.05	0.1	1.3	1.88	7.02	13156.3	0.16	2.55	25.39	-72.9	7.68		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:23	12:49	26	1.3	7.02	13156.3	0.16	2.55	25.39	-72.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0057-045.0-20220314 Sampler: Madan Parsotan

Well ID: MLPV-IW0057 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.85
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	13:15			0	N/A									
3/14/2022	13:35	0.05	1	1	N/A	7.22	6180.6	0.10	17.91	23.58	-201.7	3.41		
3/14/2022	13:37	0.05	0.1	1.1	N/A	7.21	6041.0	0.07	17.81	23.56	-205.9	3.33		
3/14/2022	13:39	0.05	0.1	1.2	N/A	7.21	6197.9	0.07	17.75	23.57	-210.0	3.42		
3/14/2022	13:41	0.05	0.1	1.3	N/A	7.21	6084.6	0.06	17.69	23.57	-215.0	3.35		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:15	13:41	26	1.3	7.21	6084.6	0.06	17.69	23.57	-215.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0058-047.5-20220314 Sampler: Madan Parsotan

Well ID: MLPV-IW0058 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.32
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	12:30			0	4.32									
3/14/2022	12:50	0.05	1	1	N/A	7.10	4573.1	0.06	18.78	23.80	-187.0	2.47		
3/14/2022	12:52	0.05	0.1	1.1	N/A	7.10	4496.4	0.06	18.62	23.89	-188.2	2.43		
3/14/2022	12:54	0.05	0.1	1.2	N/A	7.11	4527.1	0.06	18.55	23.81	-190.6	2.45		
3/14/2022	12:56	0.05	0.1	1.3	N/A	7.11	4449.7	0.06	18.47	23.86	-192.4	2.40		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:30	12:56	26	1.3	7.11	4449.7	0.06	18.47	23.86	-192.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0059-047.5-20220314 Sampler: Madan Parsotan

Well ID: MLPV-IW0059 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.85
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	11:30			0	4.85									
3/14/2022	11:50	0.05	1	1	N/A	7.11	2905.2	0.07	6.53	24.44	-179.1	1.53		
3/14/2022	11:52	0.05	0.1	1.1	N/A	7.11	2793.4	0.07	6.32	24.34	-182.9	1.47		
3/14/2022	11:54	0.05	0.1	1.2	N/A	7.12	2912.2	0.07	6.26	24.25	-185.9	1.53		
3/14/2022	11:56	0.05	0.1	1.3	N/A	7.11	3024.3	0.07	6.19	24.22	-188.1	1.60		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:30	11:56	26	1.3	7.11	3024.3	0.07	6.19	24.22	-188.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0060-045.0-20220314 Sampler: Dustin Slater

Well ID: MLPV-IW0060 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.75
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2022	12:22			0	0.75									
3/14/2022	12:42	0.05	1	1	N/A	6.94	5864.9	0.10	6.49	23.68	-127.5	3.22		
3/14/2022	12:44	0.05	0.1	1.1	N/A	6.94	5396.8	0.09	2.71	23.68	-127.6	2.95		
3/14/2022	12:46	0.05	0.1	1.2	N/A	6.94	5432.1	0.10	3.56	23.64	-127.1	2.71		
3/14/2022	12:48	0.05	0.1	1.3	N/A	6.94	5592.2	0.09	2.99	23.57	-127.8	3.06		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:22	12:48	26	1.3	6.94	5592.2	0.09	2.99	23.57	-127.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0061-037.5-20220315 Sampler: Madan Parsotan

Well ID: MLPV-IW0061 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.74
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	8:58			0	4.74									
3/15/2022	9:18	0.05	1	1	N/A	7.41	2189.9	0.10	5.88	24.10	-258.9	1.14		
3/15/2022	9:20	0.05	0.1	1.1	N/A	7.41	2188.7	0.10	4.57	24.12	-261.1	1.13		
3/15/2022	9:22	0.05	0.1	1.2	N/A	7.41	2186.9	0.10	4.39	24.15	-261.7	1.13		
3/15/2022	9:24	0.05	0.1	1.3	N/A	7.40	2192.1	0.12	2.94	24.23	-264.1	1.14		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:58	9:24	26	1.3	7.40	2192.1	0.12	2.94	24.23	-264.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0062-042.5-20220315 Sampler: Madan Parsotan

Well ID: MLPV-IW0062 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.32
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	9:50			0.1	4.81									
3/15/2022	10:10	0.05	1.1	1.1	N/A	7.23	8942.3	0.08	12.92	24.36	-222.2	5.07		
3/15/2022	10:12	0.05	0.1	1.2	N/A	7.23	8805.5	0.10	12.81	24.41	-166.9	4.98		
3/15/2022	10:14	0.05	0.1	1.3	N/A	7.23	8778.4	0.09	12.72	24.40	-170.2	4.97		
3/15/2022	10:16	0.05	0.1	1.4	N/A	7.23	8771.6	0.08	12.62	24.44	-179.6	4.96		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:50	10:16	26	1.4	7.23	8771.6	0.08	12.62	24.44	-179.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0063-037.5-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0063 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.71
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	10:11			0	2.71									
3/15/2022	10:31	0.05	1	1	N/A	7.08	4056.0	0.06	3.66	24.89	-71.5	2.18		
3/15/2022	10:33	0.05	0.1	1.1	N/A	7.07	3803.8	0.06	3.04	24.94	-72.4	2.03		
3/15/2022	10:35	0.05	0.1	1.2	N/A	7.07	3868.9	0.06	8.91	24.99	-72.6	0.43		
3/15/2022	10:37	0.05	0.1	1.3	N/A	7.07	3842.5	0.06	6.85	25.03	-72.5	0.37		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:11	10:37	26	1.3	7.07	3842.5	0.06	6.85	25.03	-72.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0064-042.5-20220315 Sampler: Dustin Slater

Well ID: MLPV-IW0064 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.55
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	10:56			0	2.55									
3/15/2022	11:16	0.05	1	1	N/A	6.79	10083.0	0.06	10.03	24.96	-75.9	5.77		
3/15/2022	11:18	0.05	0.1	1.1	N/A	6.81	11887.6	0.04	5.82	24.96	-84.2	6.95		
3/15/2022	11:20	0.05	0.1	1.2	N/A	6.81	11833.0	0.04	5.73	24.99	-84.9	6.66		
3/15/2022	11:22	0.05	0.1	1.3	N/A	6.82	11380.8	0.04	8.92	24.94	-86.2	6.57		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:56	11:22	26	1.3	6.82	11380.8	0.04	8.92	24.94	-86.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0034-035.0-20220315 Sampler: Madan Parsotan

Well ID: MLPV-IW0034 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.66
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	10:40			0	2.66									
3/15/2022	11:00	0.05	1	1	N/A	7.21	797.9	0.09	10.66	24.43	-193.2	0.40		
3/15/2022	11:02	0.05	0.1	1.1	N/A	7.21	806.5	0.09	10.59	24.46	-193.1	0.40		
3/15/2022	11:04	0.05	0.1	1.2	N/A	7.21	802.2	0.08	10.51	24.45	-193.2	0.40		
3/15/2022	11:06	0.05	0.1	1.3	N/A	7.20	829.1	0.08	10.42	24.49	-192.8	0.41		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:40	11:06	26	1.3	7.20	829.1	0.08	10.42	24.49	-192.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0036-042.5-20220316 Sampler: Madan Parsotan

Well ID: MLPV-IW0036 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.71
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	9:41			0	N/A									
3/16/2022	10:01	0.05	1	1	N/A	7.23	2273.7	0.10	2.77	24.66	-304.9	1.18		
3/16/2022	10:03	0.05	0.1	1.1	N/A	7.23	2280.6	0.09	2.61	24.71	-305.3	1.19		
3/16/2022	10:05	0.05	0.1	1.2	N/A	7.23	2288.9	0.08	1.52	24.71	-304.8	1.19		
3/16/2022	10:07	0.05	0.1	1.3	N/A	7.23	2296.4	0.17	2.74	24.86	-306.2	1.19		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:41	10:07	26	1.3	7.23	2296.4	0.17	2.74	24.86	-306.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0038-035.0-20220316 Sampler: Dustin Slater

Well ID: MLPV-IW0038 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.84
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	8:45			0	1.84									
3/16/2022	9:05	0.05	1	1	N/A	6.99	978.5	0.27	1.95	23.80	-16.3	0.49		
3/16/2022	9:07	0.05	0.1	1.1	N/A	7.00	984.8	0.29	1.92	23.82	-15.4	0.49		
3/16/2022	9:09	0.05	0.1	1.2	N/A	7.00	979.2	0.31	1.93	23.84	-14.5	0.49		
3/16/2022	9:11	0.05	0.1	1.3	N/A	6.99	976.2	0.32	1.92	23.87	-12.9	0.49		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:45	9:11	26	1.3	6.99	976.2	0.32	1.92	23.87	-12.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0039-045.0-20220316 Sampler: Dustin Slater

Well ID: MLPV-IW0039 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.75
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	9:24			0	1.75									
3/16/2022	9:44	0.05	1	1	N/A	6.99	4044.5	0.12	3.80	23.95	-25.9	2.17		
3/16/2022	9:46	0.05	0.1	1.1	N/A	6.99	4060.3	0.11	3.12	23.92	-26.0	2.18		
3/16/2022	9:48	0.05	0.1	1.2	N/A	6.99	4118.6	0.12	2.34	23.92	-26.1	2.21		
3/16/2022	9:50	0.05	0.1	1.3	N/A	6.98	4112.8	0.12	2.28	23.91	-25.6	2.76		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:24	9:50	26	1.3	6.98	4112.8	0.12	2.28	23.91	-25.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0041-045.0-20220315 Sampler: Madan Parsotan

Well ID: MLPV-IW0041 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.06
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	12:19			0	3.06									
3/15/2022	12:39	0.05	1	1	N/A	7.05	4207.9	0.05	12.66	25.40	-208.1	2.27		
3/15/2022	12:41	0.05	0.1	1.1	N/A	7.05	4297.7	0.05	12.51	25.54	-209.7	2.32		
3/15/2022	12:43	0.05	0.1	1.2	N/A	7.05	4262.2	0.04	12.44	25.55	-211.0	2.30		
3/15/2022	12:45	0.05	0.1	1.3	N/A	7.06	4285.6	0.04	12.38	25.51	-211.4	2.31		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:19	12:45	26	1.3	7.06	4285.6	0.04	12.38	25.51	-211.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0042-035.0-20220316 Sampler: Dustin Slater

Well ID: MLPV-IW0042 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.27
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	10:20			0	1.27									
3/16/2022	10:40	0.05	1	1	N/A	6.98	509.1	0.12	14.97	24.09	-106.6	0.25		
3/16/2022	10:42	0.05	0.1	1.1	N/A	6.98	538.1	0.12	9.52	23.94	-109.0	0.26		
3/16/2022	10:44	0.05	0.1	1.2	N/A	6.99	526.9	0.11	7.72	23.93	-109.6	0.26		
3/16/2022	10:46	0.05	0.1	1.3	N/A	6.99	520.2	0.11	11.91	23.90	-110.2	0.25		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:20	10:46	26	1.3	6.99	520.2	0.11	11.91	23.90	-110.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-IW0043-045.0-20220316 Sampler: Madan Parsotan

Well ID: MLPV-IW0043 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.31
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	10:40			0	N/A									
3/16/2022	11:00	0.05	1	1	N/A	7.14	3861.4	0.07	7.78	24.21	-182.9	2.07		
3/16/2022	11:02	0.05	0.1	1.1	N/A	7.13	3942.3	0.07	7.62	24.24	-184.3	2.11		
3/16/2022	11:04	0.05	0.1	1.2	N/A	7.13	3896.9	0.06	7.55	24.35	-185.1	2.09		
3/16/2022	11:06	0.05	0.1	1.3	N/A	7.13	3863.1	0.06	7.42	24.33	-185.5	2.07		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:40	11:06	26	1.3	7.13	3863.1	0.06	7.42	24.33	-185.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-SAMW0004D-047.5-20220316 Sampler: Madan Parsotan

Well ID: MLPV-SAMW0004D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.38
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2022	8:57			0	3.38									
3/16/2022	9:17	0.05	1	1	3.41	7.18	6512.7	0.26	2.73	23.88	-311.1	3.61		
3/16/2022	9:19	0.05	0.1	1.1	3.41	7.17	6500.4	0.22	2.54	23.92	-314.2	3.60		
3/16/2022	9:21	0.05	0.1	1.2	3.41	7.17	6489.2	0.12	8.12	23.95	-316.4	3.59		
3/16/2022	9:23	0.05	0.1	1.3	3.41	7.17	6481.0	0.11	0	23.97	-318.0	3.59		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:57	9:23	26	1.3	7.17	6481.0	0.11	0	23.97	-318.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2

Project No: 60615493

Sample ID: MLPV-SAMW0004I-037.5-20220315 Sampler: Madan Parsotan

Well ID: MLPV-SAMW0004I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.42
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2022	13:17			0	3.42									
3/15/2022	13:37	0.05	1	1	3.46	7.13	980.7	0.08	1.09	24.92	-306.8	0.49		
3/15/2022	13:39	0.05	0.1	1.1	3.46	7.14	981.0	0.08	1.41	24.94	-305.9	0.49		
3/15/2022	13:41	0.05	0.1	1.2	3.46	7.14	984.2	0.07	1.60	25.01	-300.4	0.49		
3/15/2022	13:43	0.05	0.1	1.3	3.46	7.14	984.2	0.06	1.22	24.98	-300.0	0.49		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:17	13:43	26	1.3	7.14	984.2	0.06	1.22	24.98	-300.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0011I-037.5-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0011I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	2.33
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	13:01			0	2.33									
4/21/2022	13:21	0.05	1	1	2.45	6.37	282.7	2.22	4.36	25.58	-18.4	0.14		
4/21/2022	13:23	0.05	0.1	1.1	2.45	6.36	281.4	2.22	4.42	25.34	-14.6	0.14		
4/21/2022	13:25	0.05	0.1	1.2	2.45	6.33	281.8	2.22	4.72	25.30	-12.3	0.14		
4/21/2022	13:27	0.05	0.1	1.3	2.45	6.32	281.2	2.22	2.63	25.36	-12.0	0.14		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:01	13:27	26	1.3	6.32	281.2	2.22	2.63	25.36	-12.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0032-035.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0032 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.92
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	9:46			0	0.92									
4/21/2022	10:06	0.05	1	1	N/A	6.67	878.4	0.08	11.49	25.14	-232.1	0.44		
4/21/2022	10:08	0.05	0.1	1.1	N/A	6.69	827.3	0.08	9.98	25.16	-232.1	0.41		
4/21/2022	10:10	0.05	0.1	1.2	N/A	6.70	823.2	0.08	5.54	25.16	-232.6	0.41		
4/21/2022	10:12	0.05	0.1	1.3	N/A	6.71	821.4	0.08	5.46	25.16	-233.1	0.53		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:46	10:12	26	1.3	6.71	821.4	0.08	5.46	25.16	-233.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0033-045.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0033 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.62
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	10:20			0	0.61									
4/21/2022	10:40	0.05	0.1	0.1	N/A	6.88	6699.8	0.08	6.08	24.72	-238.4	3.72		
4/21/2022	10:42	0.05	0.1	0.2	N/A	6.89	6545.0	0.08	4.85	24.82	-239.3	3.63		
4/21/2022	10:44	0.05	0.1	0.3	N/A	6.89	6571.4	0.08	6.33	24.83	-239.3	3.64		
4/21/2022	10:46	0.05	0.1	0.4	N/A	6.89	6486.7	0.07	5.23	24.86	-239.2	3.59		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:20	10:46	26	0.4	6.89	6486.7	0.07	5.23	24.86	-239.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0035-045.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0035 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.29
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	8:46			0	3.29									
4/21/2022	9:06	0.05	1	1	N/A	6.91	3076.6	0.09	13.39	24.66	-201.2	1.63		
4/21/2022	9:08	0.05	0.1	1.1	N/A	6.91	3092.1	0.09	16.68	24.65	-201.1	1.63		
4/21/2022	9:10	0.05	0.1	1.2	N/A	6.91	3044.0	0.09	9.09	24.63	-201.8	1.61		
4/21/2022	9:12	0.05	0.1	1.3	N/A	6.91	3040.2	0.09	12.34	24.66	-202.1	1.60		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:46	9:12	26	1.3	6.91	3040.2	0.09	12.34	24.66	-202.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0037-045.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0037 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.55
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	12:17			0	2.55									
4/21/2022	12:37	0.05	1	1	N/A	6.94	501.6	0.09	3.04	25.16	-226.2	0.24		
4/21/2022	12:39	0.05	0.1	1.1	N/A	6.94	514.5	0.09	5.93	25.38	-227.2	0.25		
4/21/2022	12:41	0.05	0.1	1.2	N/A	6.94	520.5	0.08	8.76	25.37	-227.1	0.28		
4/21/2022	12:43	0.05	0.1	1.3	N/A	6.95	527.7	0.08	17.53	25.39	-227.4	0.31		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:17	12:43	26	1.3	6.95	527.7	0.08	17.53	25.39	-227.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0040-035.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0040 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.62
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	8:18			0	3.62									
4/21/2022	8:32	0.05	0.75	0.75	N/A	7.08	835.8	0.10	17.66	23.28	-214.8	0.41		
4/21/2022	8:34	0.05	0.1	0.85	N/A	7.12	814.5	0.10	17.56	23.40	-215.5	0.40		
4/21/2022	8:36	0.05	0.1	0.95	N/A	7.11	812.8	0.10	12.94	23.43	-214.9	0.40		
4/21/2022	8:38	0.05	0.1	1.05	N/A	7.10	795.1	0.09	16.85	23.44	-214.1	0.39		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:18	8:38	20	1.05	7.10	795.1	0.09	16.85	23.44	-214.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0044-045.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0044 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.05
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	11:33			0	1.05									
4/21/2022	11:53	0.05	1	1	N/A	6.72	3271.0	0.11	17.94	25.14	-240.4	1.73		
4/21/2022	11:55	0.05	0.1	1.1	N/A	6.77	3471.0	0.09	6.62	25.29	-234.1	1.85		
4/21/2022	11:57	0.05	0.1	1.2	N/A	6.78	3429.2	0.08	2.48	25.30	-234.1	1.82		
4/21/2022	11:59	0.05	0.1	1.3	N/A	6.79	3475.3	0.08	4.33	25.27	-234.0	1.85		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:33	11:59	26	1.3	6.79	3475.3	0.08	4.33	25.27	-234.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)

Project No: 60615493

Sample ID: MLPV-IW0045-045.0-20220421 Sampler: Dustin Slater

Well ID: MLPV-IW0045 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
4/21/2022	10:52			0	N/A									
4/21/2022	11:12	0.05	1	1	N/A	6.86	2139.5	0.07	8.08	26.00	-304.4	1.11		
4/21/2022	11:14	0.05	0.1	1.1	N/A	6.86	1986.9	0.07	3.29	26.13	-305.5	1.02		
4/21/2022	11:16	0.05	0.1	1.2	N/A	6.87	1994.5	0.07	3.16	26.13	-305.8	0.97		
4/21/2022	11:18	0.05	0.1	1.3	N/A	6.87	1932.7	0.07	5.56	26.14	-305.6	1.66		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:52	11:18	26	1.3	6.87	1932.7	0.07	5.56	26.14	-305.6

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/14/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	2/7/2022

Calibration Details

Slope	1.046329
Offset	0.00 mg/L

Calibration point 100%

Concentration	9.69 mg/L
Pre Measurement	99.92 %Sat
Post Measurement	100.00 %Sat
Temperature	15.14 °C
Barometric Pressure	1,022.3 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/14/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.965
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,713.9 µS/cm
Specific Conductivity	8,125.9 µS/cm

Post Measurement

Actual Conductivity	7,594.4 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/14/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-20.6 mV
Temperature	22.35 °C

Pre Measurement

pH	7.03 pH
pH mV	-20.5 mV

Post Measurement

pH	7.00 pH
pH mV	-20.4 mV

Slope and Offset 1

Slope	-58.63 mV/pH
Offset	-20.6 mV

ORP

ORP Solution	Quick-Cal
Offset	54.3 mV
Temperature	22.35 °C
Pre Measurement	237.4 mV
Post Measurement	227.5 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/14/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	3/14/2022

Calibration Details

Slope	1.129382
Offset	0.00 mg/L

Calibration point 100%

Concentration	8.49 mg/L
Pre Measurement	92.62 %Sat
Post Measurement	100.00 %Sat
Temperature	21.99 °C
Barometric Pressure	1,109.1 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/14/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.965
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,713.9 µS/cm
Specific Conductivity	8,125.9 µS/cm

Post Measurement

Actual Conductivity	7,594.4 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/14/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-20.6 mV
Temperature	22.35 °C

Pre Measurement

pH	7.03 pH
pH mV	-20.5 mV

Post Measurement

pH	7.00 pH
pH mV	-20.4 mV

Slope and Offset 1

Slope	-58.63 mV/pH
Offset	-20.6 mV

ORP

ORP Solution	Quick-Cal
Offset	54.3 mV
Temperature	22.35 °C
Pre Measurement	237.4 mV
Post Measurement	227.5 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	518550
Created	3/14/2022

Sensor	**RDO**
Serial Number	508880
Last Calibrated	12/9/2021

Calibration Details

Slope	1.038443
Offset	0.00 mg/L

Calibration point 100%

Concentration	6.89 mg/L
Pre Measurement	100.21 %Sat
Post Measurement	100.00 %Sat
Temperature	25.90 °C
Barometric Pressure	896.21 mbar

Sensor	**Conductivity**
Serial Number	775877
Last Calibrated	3/14/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.975
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,016.8 µS/cm
Specific Conductivity	7,454.7 µS/cm

Post Measurement

Actual Conductivity	7,530.1 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	758735
Last Calibrated	3/14/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-17.0 mV
Temperature	21.92 °C

Pre Measurement

pH	7.12 pH
pH mV	-16.9 mV

Post Measurement

pH	7.00 pH
pH mV	-16.9 mV

Slope and Offset 1

Slope	-58.55 mV/pH
Offset	-17.0 mV

ORP

ORP Solution	Quick-Cal
Offset	-69.7 mV
Temperature	21.92 °C
Pre Measurement	329.6 mV
Post Measurement	228.2 mV

Sensor	**Turbidity**
Serial Number	786838
Last Calibrated	12/8/2021

Calibration Details

Slope	12.15755
Offset	-29.32 NTU

Calibration Point 1

Pre Measurement	2.83 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	64.63 NTU
Post Measurement	100.00 NTU

Sensor	**Barometric Pressure**
Serial Number	518550
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/15/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	3/14/2022

Calibration Details

Slope	1.129382
Offset	0.00 mg/L

Calibration point 100%

Concentration	8.49 mg/L
Pre Measurement	92.62 %Sat
Post Measurement	100.00 %Sat
Temperature	21.99 °C
Barometric Pressure	1,109.1 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/15/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.976
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	6,776.6 µS/cm
Specific Conductivity	7,908.9 µS/cm

Post Measurement

Actual Conductivity	6,854.7 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/15/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.02 pH
pH mV	-23.2 mV
Temperature	17.50 °C

Pre Measurement

pH	7.05 pH
pH mV	-23.2 mV

Post Measurement

pH	7.02 pH
pH mV	-22.6 mV

Slope and Offset 1

Slope	-57.67 mV/pH
Offset	-22.0 mV

ORP

ORP Solution	Quick-Cal
Offset	55.1 mV
Temperature	17.50 °C
Pre Measurement	234.1 mV
Post Measurement	234.8 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/15/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	3/15/2022

Calibration Details

Slope	1.046117
Offset	0.00 mg/L

Calibration point 100%

Concentration	8.99 mg/L
Pre Measurement	107.95 %Sat
Post Measurement	100.00 %Sat
Temperature	18.87 °C
Barometric Pressure	1,024.9 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/15/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.976
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	6,776.6 µS/cm
Specific Conductivity	7,908.9 µS/cm

Post Measurement

Actual Conductivity	6,854.7 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/15/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.02 pH
pH mV	-23.2 mV
Temperature	17.50 °C

Pre Measurement

pH	7.05 pH
pH mV	-23.2 mV

Post Measurement

pH	7.02 pH
pH mV	-22.6 mV

Slope and Offset 1

Slope	-57.67 mV/pH
Offset	-22.0 mV

ORP

ORP Solution	Quick-Cal
Offset	55.1 mV
Temperature	17.50 °C
Pre Measurement	234.1 mV
Post Measurement	234.8 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	518550
Created	3/15/2022

Sensor	**RDO**
Serial Number	508880
Last Calibrated	12/9/2021

Calibration Details

Slope	1.038443
Offset	0.00 mg/L

Calibration point 100%

Concentration	6.89 mg/L
Pre Measurement	100.21 %Sat
Post Measurement	100.00 %Sat
Temperature	25.90 °C
Barometric Pressure	896.21 mbar

Sensor	**Conductivity**
Serial Number	775877
Last Calibrated	3/15/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.966
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,165.8 µS/cm
Specific Conductivity	8,077.5 µS/cm

Post Measurement

Actual Conductivity	7,097.1 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	758735
Last Calibrated	3/15/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.02 pH
pH mV	-18.6 mV
Temperature	19.09 °C

Pre Measurement

pH	7.03 pH
pH mV	-18.6 mV

Post Measurement

pH	7.02 pH
pH mV	-18.2 mV

Slope and Offset 1

Slope	-57.99 mV/pH
Offset	-17.4 mV

ORP

ORP Solution	Quick-Cal
Offset	-59.9 mV
Temperature	19.09 °C
Pre Measurement	222.2 mV
Post Measurement	232.4 mV

Sensor	**Turbidity**
Serial Number	786838
Last Calibrated	12/8/2021

Calibration Details

Slope	12.15755
Offset	-29.32 NTU

Calibration Point 1

Pre Measurement	2.83 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	64.63 NTU
Post Measurement	100.00 NTU

Sensor	**Barometric Pressure**
Serial Number	518550
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/16/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	3/15/2022

Calibration Details

Slope	1.046117
Offset	0.00 mg/L

Calibration point 100%

Concentration	8.99 mg/L
Pre Measurement	107.95 %Sat
Post Measurement	100.00 %Sat
Temperature	18.87 °C
Barometric Pressure	1,024.9 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/16/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.972
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,196.4 µS/cm
Specific Conductivity	8,029.2 µS/cm

Post Measurement

Actual Conductivity	7,170.2 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/16/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.02 pH
pH mV	-24.7 mV
Temperature	19.57 °C

Pre Measurement

pH	7.05 pH
pH mV	-24.8 mV

Post Measurement

pH	7.02 pH
pH mV	-24.3 mV

Slope and Offset 1

Slope	-58.08 mV/pH
Offset	-23.6 mV

ORP

ORP Solution	Quick-Cal
Offset	57.6 mV
Temperature	19.57 °C
Pre Measurement	229.1 mV
Post Measurement	231.7 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	606696
Created	3/16/2022

Sensor	**RDO**
Serial Number	658928
Last Calibrated	3/16/2022

Calibration Details

Slope	1.050211
Offset	0.00 mg/L

Calibration point 100%

Concentration	8.74 mg/L
Pre Measurement	99.57 %Sat
Post Measurement	100.00 %Sat
Temperature	20.10 °C
Barometric Pressure	1,024.9 mbar

Sensor	**Conductivity**
Serial Number	672308
Last Calibrated	3/16/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.972
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,196.4 µS/cm
Specific Conductivity	8,029.2 µS/cm

Post Measurement

Actual Conductivity	7,170.2 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	704529
Last Calibrated	3/16/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.02 pH
pH mV	-24.7 mV
Temperature	19.57 °C

Pre Measurement

pH	7.05 pH
pH mV	-24.8 mV

Post Measurement

pH	7.02 pH
pH mV	-24.3 mV

Slope and Offset 1

Slope	-58.08 mV/pH
Offset	-23.6 mV

ORP

ORP Solution	Quick-Cal
Offset	57.6 mV
Temperature	19.57 °C
Pre Measurement	229.1 mV
Post Measurement	231.7 mV

Sensor	**Turbidity**
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope	1.173604
Offset	-0.02 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	**Barometric Pressure**
Serial Number	606696
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	518550
Created	3/16/2022

Sensor	**RDO**
Serial Number	508880
Last Calibrated	12/9/2021

Calibration Details

Slope	1.038443
Offset	0.00 mg/L

Calibration point 100%

Concentration	6.89 mg/L
Pre Measurement	100.21 %Sat
Post Measurement	100.00 %Sat
Temperature	25.90 °C
Barometric Pressure	896.21 mbar

Sensor	**Conductivity**
Serial Number	775877
Last Calibrated	3/16/2022

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.962
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,349.1 µS/cm
Specific Conductivity	8,034.5 µS/cm

Post Measurement

Actual Conductivity	7,317.5 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor	**pH/ORP**
Serial Number	758735
Last Calibrated	3/16/2022

Calibration Details

Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-20.4 mV
Temperature	20.53 °C

Pre Measurement

pH	7.05 pH
pH mV	-20.4 mV

Post Measurement

pH	7.00 pH
pH mV	-20.1 mV

Slope and Offset 1

Slope	-58.27 mV/pH
Offset	-20.4 mV

ORP

ORP Solution	Quick-Cal
Offset	-58.4 mV
Temperature	20.53 °C
Pre Measurement	229.6 mV
Post Measurement	230.3 mV

Sensor	**Turbidity**
Serial Number	786838
Last Calibrated	12/8/2021

Calibration Details

Slope	12.15755
Offset	-29.32 NTU

Calibration Point 1

Pre Measurement	2.83 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	64.63 NTU
Post Measurement	100.00 NTU

Sensor	**Barometric Pressure**
Serial Number	518550
Last Calibrated	Factory Defaults

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 3

Project No: 60615493

Sample ID: VABRA-MW0011-027.5-20221214 Sampler: Caroline Bekins

Well ID: VABRA-MW0011 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.46
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
12/14/2022	10:05	0.05	1	1	N/A	8.39	1061	0.21	5.62	24.92	-310.5		Clear	Sewer
12/14/2022	10:07	0.05	0.1	1.1	N/A	8.39	1061	0.19	5.57	24.93	-312.7		Clear	Sewer
12/14/2022	10:09	0.05	0.1	1.2	N/A	8.39	1060	0.18	5.49	24.94	-311.9		Clear	Sewer
12/14/2022	10:11	0.05	0.1	1.3	N/A	8.39	1060	0.17	5.41	24.94	-312.5		Clear	Sewer

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:05	10:11	6	1.3	8.39	1060	0.17	5.41	24.94	-312.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 3

Project No: 60615493

Sample ID: VABRA-MW0012-020.0-20221214 Sampler: Caroline Bekins

Well ID: VABRA-MW0012 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.49
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	25.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
12/14/2022	10:40	0.05	1	1	N/A	8.3	950	0.29	5.29	25.43	-315.2		Clear	None
12/14/2022	10:42	0.05	0.1	1.1	N/A	8.3	950	0.27	5.21	25.43	-314.1		Clear	None
12/14/2022	10:44	0.05	0.1	1.2	N/A	8.3	950	0.26	5.18	25.42	-314.5		Clear	None
12/14/2022	10:46	0.05	0.1	1.3	N/A	8.29	951	0.25	5.09	25.41	-314.2		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:40	10:46	6	1.3	8.29	951	0.25	5.09	25.41	-314.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 3

Project No: 60615493

Sample ID: VABRA-MW0013-022.5-20221214 Sampler: Caroline Bekins

Well ID: VABRA-MW0013 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.01
Top of Screen (ft-BTOR):	20	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
12/14/2022	11:25	0.05	1	1	N/A	8.22	1087	0.46	5.62	25.4	-305.1		Clear	None
12/14/2022	11:27	0.05	0.1	1.1	N/A	8.22	1087	0.43	5.54	25.4	-304.2		Clear	None
12/14/2022	11:29	0.05	0.1	1.2	N/A	8.21	1087	0.41	5.49	25.5	-303.1		Clear	None
12/14/2022	11:31	0.05	0.1	1.3	N/A	8.21	1086	0.39	5.36	25.5	-302.7		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:25	11:31	6	1.3	8.21	1086	0.39	5.36	25.5	-302.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 3

Project No: 60615493

Sample ID: VABRA-MW0014-027.5-20221214 Sampler: Caroline Bekins

Well ID: VABRA-MW0014 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.58
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	30	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
12/14/2022	12:04	0.05	1	1	N/A	8.28	1120	0.41	6.74	24.98	-318.8		Clear	None
12/14/2022	12:06	0.05	0.1	1.1	N/A	8.28	1120	0.4	6.67	24.98	-320.6		Clear	None
12/14/2022	12:08	0.05	0.1	1.3	N/A	8.28	1121	0.39	6.61	24.99	-321.2		Clear	None
12/14/2022	12:10	0.05	0.1	1.2	N/A	8.28	1121	0.37	6.54	25.01	-322.7		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:04	12:10	6	1.2	8.28	1121	0.37	6.54	25.01	-322.7

DEP-SOP-001/01: Form FD 9000-8 (June 20, 2001)

Field Instrument Calibration Records

INSTRUMENT HACH 2100P # 2 Serial # 021000028051

PARAMETER: ***Turbidity***

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard A GELEX 0-10 NTU (+/- 10%)

Standard B GELEX 10-100 NTU (+/- 6.5%)

Standard C GELEX 100-1000 NTU (+/- 5%)

DATE (mm/dd/yy)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS
12/14/22	0938	A	10	9.98		NO	INITIAL	MP
"	"	B	20	19.95		"	"	"
"	"	C	100	100.05		"	"	"
		A				NO		
"	"	B				"	"	"
"	"	C				"	"	"
		A				NO		
		B				"		
		C				"		
		A				NO		
		B				"		
		C				"		
		A				NO		
		B				"		
		C				"		
		A				NO		
		B				"		
		C				"		

DEP-SOP-001/01: Form FD 9000-8 (June 20, 2001)

Field Instrument Calibration Records

INSTRUMENT ~~Oakton 510 Series~~ # Rental Serial # 06K1082AM
YSI 556 MPS

PARAMETER: *ORP* **Requirements:** +/- 10mV

STANDARDS: *[Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]*

Standard: *MFG* ORP standard 200mV *Lot* 2GE643 *Expires* 02/23 ~~2025~~

DATE (mm/dd/yy)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS
12/14/22	0935	Temp	25°C	25°C	-	YES	Initial	MP
"	"	ORP	200mV	201 mV		"	"	"
		Temp			-			
"	"	ORP				"	"	"
		Temp						
		ORP						
		Temp						
		ORP						
		Temp						
		ORP						
		Temp						
		ORP						
		Temp						
		ORP						
		Temp						
		ORP						
		Temp						
		ORP						

MARC YSI 556 MPS
SN# 06K1082AM

Boldly "X" this box if there is qualified data on this page.

Form FD9000-8 **CALIBRATION LOG (FDEP SOP FT 1000-FT 1500, FD 1000-FD 4000)** *11-10-05*

Project/Site: Nasa KSC - MLP U Date: 12/14/22 Meter # Rental

Temperature (Quarterly) *For Date of Last Temperature Verification see* _____ *in log book* _____

Dissolved Oxygen	**DEP SOP FT 1500**	Initials	Date	Time	Probe Charge	Probe Gain	mg/L	Temp °c	% DO	Saturation mg/L (from chart)	Pass or Fail
											Acceptance Criteria: +/- 0.3mg/l
(CAL) ICV CCV		MP	12/14/22	0930			8.81	21.5°	100%	8.82	(P) F
CAL ICV CCV											P F
CAL (ICV) CCV		↓	12/14/22	0935			8.75	21.2°C	100%	8.77	(P) F
CAL ICV CCV											P F
CAL ICV CCV											P F
CAL ICV CCV											P F
CAL ICV CCV											P F

Specific Conductance	**DEP SOP FT 1200**	Initials	Date	Time	Standard µmhos/cm	Exp. Date	Lot #	Bottle #	Cell Constant	Reading µmhos/cm	Pass or Fail
											Acceptance Criteria: +/- 5%
(CAL) ICV CCV		MP	12/14/22	0930	1413	5/23	2GE642			1413	(P) F
CAL ICV CCV		↓	↓								(P) F
CAL (ICV) CCV				0935	1413	5/23	2GE642			1415	(P) F
CAL ICV CCV											P F
CAL ICV CCV											P F
CAL ICV CCV											P F
CAL ICV CCV											P F

pH	**DEP SOP FT 1100**	Initials	Date	Time	Standard SU	Exp. Date	Lot #	Bottle #	Slope	Reading SU	Pass or Fail
											Acceptance Criteria: +/- 0.2 SU
(CAL) ICV CCV		MP	12/14/22	0930	7.00	5/24	2GE579			7.00	(P) F
(CAL) ICV CCV		↓	↓	↓	4.00	4/24	2GP849			4.01	(P) F
(CAL) ICV CCV					10.00	5/24	2GE170			10.02	(P) F
CAL ICV CCV											P F
CAL (ICV) CCV		MP	12/14/22	0935	7.00	5/24	2GE579			6.99	(P) F
CAL (ICV) CCV		↓	↓	↓	4.00	4/24	2GP849			4.00	(P) F
CAL (ICV) CCV					10.00	5/24	2GE170			10.01	(P) F
CAL ICV CCV											P F
CAL ICV CCV											P F

Maintenance: Weekly pH Slope: _____ Specific Conductance Probe Cleaned? Yes No Dissolved Oxygen Membrane Changed: Yes No

Notes:

Perform only in Calibrate Mode: **CAL** - Calibrate -
Perform only in Run Mode: **ICV** - Initial Calibration Verification
Perform only in Run Mode: **CCV** - Continuing Calibration Verification

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0004-037.5-20230308 Sampler: Madan Parsotan

Well ID: MLPV-ASMW0004 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.41
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.2	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	14:10	0.05	1	1	1.61	7.53	2449	2.03	6.9	25.3	7.5		Clear	None
3/8/2023	14:12	0.05	0.1	1.1	1.61	7.53	2449	1.93	6.82	25.3	7.8		Clear	None
3/8/2023	14:14	0.05	0.1	1.2	1.61	7.52	2448	1.89	6.75	25.3	8.2		Clear	None
3/8/2023	14:16	0.05	0.1	1.2	N/A	7.52	2447	1.75	6.67	25.2	8.5		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:10	14:16	6	1.2	7.52	2447	1.75	6.67	25.2	8.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0005-037.5-20230309 Sampler: Madan Parsotan

Well ID: MLPV-ASMW0005 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.1
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.2	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	10:51	0.05	1	1	2.24	7.42	2561	5.01	2.89	24	71.7	1.35	Clear	None
3/9/2023	10:53	0.05	0.1	1.1	2.24	7.42	2561	5.03	2.78	24	72.5	1.35	Clear	None
3/9/2023	10:55	0.05	0.1	1.2	2.24	7.42	2562	5.04	2.71	24	73.6	1.35	Clear	None
3/9/2023	10:57	0.05	0.1	1.3	2.24	7.41	2563	5.02	2.64	24	74.4	1.35	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:51	10:57	6	1.3	7.41	2563	5.02	2.64	24	74.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-ASMW0006-037.5-20230309 Sampler: Madan Parsotan

Well ID: MLPV-ASMW0006 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.38
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.2	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	10:08	0.05	1	1	1.72	7.25	3441	0.41	1.91	24	-86	1.84	Clear	None
3/9/2023	10:10	0.05	0.1	1.1	1.72	7.25	3441	0.39	1.88	24	-85.8	1.85	Clear	None
3/9/2023	10:12	0.05	0.1	1.2	1.72	7.24	3442	0.38	1.77	24	-85.7	1.85	Clear	None
3/9/2023	10:14	0.05	0.1	1.3	1.72	7.24	3444	0.4	1.71	24	-85.2	1.87	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:08	10:14	6	1.3	7.24	3444	0.4	1.71	24	-85.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0006IR-030.5-20230308 Sampler: Madan Parsotan

Well ID: MLPV-IW0006IR Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	1.48
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	13:30	0.05	1	1	1.51	7.67	1282	8.76	8.82	25.3	34.7	0.63	Clear	None
3/8/2023	13:32	0.05	0.1	1.1	1.51	7.67	1282	8.79	8.75	25.3	35.2	0.63	Clear	None
3/8/2023	13:34	0.05	0.1	1.2	1.51	7.66	1280	8.81	8.62	25.3	36.4	0.63	Clear	None
3/8/2023	13:36	0.05	0.1	1.3	1.51	7.66	1280	8.96	8.59	25.3	37.7	0.63	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:30	13:36	6	1.3	7.66	1280	8.96	8.59	25.3	37.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0028I-030.5-20230315 Sampler: Devin Kehoe

Well ID: MLPV-IW0028I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	2.25
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	12:55			0	N/A								Clear	None
3/15/2023	12:58	0.08	0.24	0.24	2.25	6.94	945.5	0.43	4.53	20.48	-295.9	0.42	Clear	None
3/15/2023	13:01	0.05	0.15	0.39	2.25	6.96	928.9	0.32	3.91	20.45	-316.3	0.46	Clear	None
3/15/2023	13:04	0.05	0.15	0.54	2.26	6.98	973.2	0.30	3.57	20.45	-324.4	0.49	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:55	13:04	9	0.54	6.98	973.2	0.30	3.57	20.45	-324.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0031-030.0-20230308 Sampler: Madan Parsotan

Well ID: MLPV-IW0031 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.05
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	11:17	0.05	1	1	2.08	7.75	1609	0.41	1.57	24.8	-166.4	0.81	Clear	None
3/8/2023	11:19	0.05	0.1	1.1	2.08	7.75	1609	0.37	1.49	24.8	-167.2	0.81	Clear	None
3/8/2023	11:21	0.05	0.1	1.2	2.08	7.76	1610	0.35	1.41	24.8	-168.4	0.81	Clear	None
3/8/2023	11:23	0.05	0.1	1.3	2.08	7.76	1611	0.33	1.37	24.8	-168.9	0.81	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:17	11:23	6	1.3	7.76	1611	0.33	1.37	24.8	-168.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0046-040.0-20230308 Sampler: Madan Parsotan

Well ID: MLPV-IW0046 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.95
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	10:37	0.05	1	1	2.97	7.93	1136	0.81	1.8	25.8	-255.6	0.55	Clear	None
3/8/2023	10:39	0.05	0.1	1.1	2.97	7.93	1136	0.77	1.72	25.8	-256.1	0.55	Clear	None
3/8/2023	10:41	0.05	0.1	1.2	2.97	7.91	1135	0.72	1.61	25.8	-257.2	0.55	Clear	None
3/8/2023	10:43	0.05	0.1	1.3	2.97	7.92	1136	0.69	1.53	25.7	-257.7	0.55	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:37	10:43	6	1.3	7.92	1136	0.69	1.53	25.7	-257.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event:	Kennedy Space Center MLPV LTM
Site Name:	Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project No:	60615493

Sample ID:	MLPV-IW0057-045.0-20230308	Sampler:	Christopher Setrin
Well ID:	MLPV-IW0057	Well Type:	Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.53
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	14:12	0.05	0.15	0.15	N/A	8.27	149.3	5.34	65.57	24.51	-120.8	0.07	Clear	None
3/8/2023	14:15	0.05	0.15	0.30	N/A	8.26	150.0	5.15	61.90	24.49	-118.5	0.07	Clear	None
3/8/2023	14:18	0.05	0.15	0.45	N/A	8.25	156.8	4.80	59.56	24.46	-118.9	0.07	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:12	14:18	6	0.45	8.25	156.8	4.80	59.56	24.46	-118.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0058-047.5-20230309 Sampler: Christopher Setrin

Well ID: MLPV-IW0058 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.92
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	8:57	0.05	0.15	0.15	N/A	6.95	3756.9	0.22	293.16	23.05	50.2	1.89	Clear	None
3/9/2023	9:00	0.05	0.15	0.30	N/A	6.94	3672.4	0.21	289.03	23.09	49.6	1.90	Clear	None
3/9/2023	9:03	0.05	0.15	0.45	N/A	6.94	3620.0	0.21	288.71	23.12	49.1	1.93	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:57	9:03	6	0.45	6.94	3620.0	0.21	288.71	23.12	49.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0059-047.5-20230309 Sampler: Christopher Setrin

Well ID: MLPV-IW0059 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.51
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	9:44	0.05	0.15	0.15	N/A	7.02	1704.5	0.16	69.45	24.20	-155.7	0.87	Clear	None
3/9/2023	9:47	0.05	0.15	0.30	N/A	7.01	1691.5	0.16	64.07	24.09	-155.5	0.87	Clear	None
3/9/2023	9:50	0.05	0.15	0.45	N/A	7.02	1690.2	0.17	62.75	24.17	-155.6	0.86	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:44	9:50	6	0.45	7.02	1690.2	0.17	62.75	24.17	-155.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0060-045.0-20230309 Sampler: Madan Parsotan

Well ID: MLPV-IW0060 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.48
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	9:30	0.05	1	1	N/A	7.41	6784	0.39	5.41	24	-80.2	3.82	Clear	None
3/9/2023	9:32	0.05	0.1	1.1	N/A	7.41	6785	0.37	5.36	24	-81.4	3.81	Clear	None
3/9/2023	9:34	0.05	0.1	1.2	N/A	7.4	6782	0.34	5.28	23.9	-82.7	3.79	Clear	None
3/9/2023	9:36	0.05	0.1	1.3	N/A	7.41	6781	0.3	5.12	24	-83.4	3.79	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:30	9:36	6	1.3	7.41	6781	0.3	5.12	24	-83.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0061-040.0-20230308 Sampler: Christopher Setrin

Well ID: MLPV-IW0061 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.12
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:48	0.05	0.15	0.15	N/A	7.76	7.8	7.93	0	27.84	-277.9	0.00	Clear	None
3/8/2023	12:51	0.05	0.15	0.30	N/A	7.75	7.8	7.90	0	27.82	-271.9	0.00	Clear	None
3/8/2023	12:54	0.05	0.15	0.45	N/A	7.78	7.7	7.88	0	27.80	-269.3	0.00	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:48	12:54	6	0.45	7.78	7.7	7.88	0	27.80	-269.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0062-042.5-20230308 Sampler: Christopher Setrin

Well ID: MLPV-IW0062 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.21
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	42.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:15	0.05	0.15	0.15	N/A	7.34	6384.9	0.19	18.19	25.24	-274.4	3.69	Clear	None
3/8/2023	12:18	0.05	0.15	0.30	N/A	7.34	6521.6	0.18	17.72	25.19	-276.5	3.81	Clear	None
3/8/2023	12:21	0.05	0.15	0.45	N/A	7.33	6607.5	0.17	16.68	25.12	-279.6	3.66	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:15	12:21	6	0.45	7.33	6607.5	0.17	16.68	25.12	-279.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0063-037.5-20230308 Sampler: Madan Parsotan

Well ID: MLPV-IW0063 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.14
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:40	0.05	1	1	N/A	7.61	4453	0.63	14.76	25.9	-103.1	2.33	Clear	None
3/8/2023	12:42	0.05	0.1	1.1	N/A	7.61	4453	0.6	14.62	25.9	-103.7	2.33	Clear	None
3/8/2023	12:44	0.05	0.1	1.2	N/A	7.61	4452	0.58	14.51	25.8	-103.9	2.33	Clear	None
3/8/2023	12:46	0.05	0.1	1.3	N/A	7.6	4452	0.57	14.44	25.8	-104.2	2.32	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:40	12:46	6	1.3	7.6	4452	0.57	14.44	25.8	-104.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area

Project No: 60615493

Sample ID: MLPV-IW0064-042.5-20230308 Sampler: Madan Parsotan

Well ID: MLPV-IW0064 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.05
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45.25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:01	0.05	1	1	N/A	7.53	11173	1.51	2.72	25.4	-111.1	6.29	Clear	None
3/8/2023	12:03	0.05	0.1	1.1	N/A	7.52	11175	1	2.61	25.4	-110.3	6.29	Clear	None
3/8/2023	12:05	0.05	0.1	1.2	N/A	7.51	11176	0.99	2.52	25.4	-110.7	6.29	Clear	None
3/8/2023	12:07	0.05	0.1	1.3	N/A	7.51	11178	0.97	2.41	25.4	-109.4	6.29	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:01	12:07	6	1.3	7.51	11178	0.97	2.41	25.4	-109.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0011I-037.5-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0011I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.28
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	13:38			0	N/A								Clear	None
3/9/2023	13:51	0.04	0.5	0.5	5.31	6.92	215.9	5.56	1.95	23.99	-33.0	0.10	Clear	None
3/9/2023	13:54	0.04	0.12	0.62	5.31	6.87	214.6	5.56	1.93	24.05	-28.4	0.10	Clear	None
3/9/2023	13:57	0.04	0.12	0.74	5.31	6.83	218.6	5.49	2.05	24.06	-24.4	0.10	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:38	13:57	19	0.74	6.83	218.6	5.49	2.05	24.06	-24.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0032-035.5-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0032 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.28
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	13:32			0	1.28								Clear	None
3/14/2023	13:52	0.05	1	1	N/A	7.21	521	0.17	4.23	23	-116.1	0.27	Clear	None
3/14/2023	13:54	0.05	0.1	1.1	N/A	7.2	549	0.16	3.9	23	-116.8	0.28	Clear	None
3/14/2023	13:56	0.05	0.1	1.2	N/A	7.2	556	0.15	3.21	23	-117	0.3	Clear	None
3/14/2023	13:58	0.05	0.1	1.3	N/A	7.2	562	0.15	2.97	23	-117.9	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:32	13:58	26	1.3	7.2	562	0.15	2.97	23	-117.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0033-045.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0033 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.2
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	14:04			0	1.2								Clear	None
3/14/2023	14:24	0.05	1	1	N/A	7.13	6045	0.03	19.3	23.2	-121.9	3.42	Clear	None
3/14/2023	14:26	0.05	0.1	1.1	N/A	7.13	6022	0.02	14.5	23.1	-122	3.39	Clear	None
3/14/2023	14:28	0.05	0.1	1.2	N/A	7.14	6068	0.02	11.9	23.3	-123.2	3.4	Clear	None
3/14/2023	14:30	0.05	0.1	1.3	N/A	7.13	6046	0.01	12.7	23.4	-124.2	3.41	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:04	14:30	26	1.3	7.13	6046	0.01	12.7	23.4	-124.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0034-035.0-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0034 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	10:45	0.04		0	N/A								Clear	None
3/9/2023	10:58	0.04	0.5	0.5	N/A	7.14	617.8	0.12	18.7	23.95	-231.6	0.30	Clear	None
3/9/2023	11:01	0.04	0.12	0.62	N/A	7.14	620.5	0.11	15.3	23.95	-230.9	0.30	Clear	None
3/9/2023	11:04	0.04	0.12	0.74	N/A	7.16	623.7	0.10	12.4	23.97	-232.0	0.28	Clear	None
3/9/2023	11:07	0.04	0.12	0.86	N/A	7.17	625.1	0.10	11.3	23.96	-231.9	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:45	11:07	22	0.86	7.17	625.1	0.10	11.3	23.96	-231.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0035-045.0-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0035 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.35
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:32			0	N/A								Clear	None
3/9/2023	11:45	0.04	0.5	0.5	N/A	7.13	2604.5	0.13	5.3	24.17	-166.9	1.36	Clear	None
3/9/2023	11:48	0.04	0.12	0.62	N/A	7.15	2826.9	0.11	4.68	24.24	-170.5	1.49	Clear	None
3/9/2023	11:51	0.04	0.12	0.74	N/A	7.15	2923.6	0.11	4.89	24.30	-173.6	1.54	Clear	None
3/9/2023	11:54	0.04	0.12	0.74	N/A	7.17	2932.2	0.11	3.46	24.2	-175.6	1.54	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:32	11:54	22	0.74	7.17	2932.2	0.11	3.46	24.2	-175.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0036-037.5-20230313 Sampler: Madan Parsotan

Well ID: MLPV-IW0036 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.77
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	10:10	0.05		0	4.77								Clear	None
3/13/2023	10:30	0.05	1	1	4.81	7.27	2191.8	0.12	2.50	25.79	-235.0	1.14	Clear	None
3/13/2023	10:32	0.05	1.1	2.1	4.81	7.27	2192.7	0.11	2.39	25.89	-238.6	1.14	Clear	None
3/13/2023	10:34	0.05	1.3	4.6	4.81	7.26	2195.6	0.08	2.11	25.91	-254.1	1.14	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:10	10:34	24	4.6	7.26	2195.6	0.08	2.11	25.91	-254.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0037-045.0-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0037 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.23
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	14:06			0	N/A								Clear	None
3/9/2023	14:18	0.04	0.5	0.5	N/A	7.00	5139.7	0.14	7.44	24.40	-152.7	2.80	Clear	None
3/9/2023	14:21	0.04	0.12	0.62	N/A	7.05	5318.9	0.11	5.62	24.35	-163.9	2.91	Clear	None
3/9/2023	14:24	0.04	0.12	0.74	N/A	7.09	5253.9	0.10	4.08	24.39	-169.6	2.87	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:06	14:24	18	0.74	7.09	5253.9	0.10	4.08	24.39	-169.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0038-035.0-20230310 Sampler: Devin Kehoe

Well ID: MLPV-IW0038 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.5
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	8:34			0	N/A								Clear	None
3/10/2023	8:39	0.05	0.25	0.25	N/A	7.14	268.3	0.38	1.66	23.64	125.6	0.13	Clear	None
3/10/2023	8:43	0.05	0.33	0.58	N/A	7.05	2620.7	0.23	13.31	23.14	27.1	1.37	Clear	None
3/10/2023	8:46	0.05	0.5	1.08	N/A	7.13	4180.2	0.18	6.01	23.51	-96.5	2.25	Clear	None
3/10/2023	8:50	0.05	0.75	1.83	N/A	7.14	4295.7	0.15	1.8	23.59	-120.1	2.31	Clear	None
3/10/2023	8:54	0.05	1	2.83	2.77	7.14	4113.9	0.13	1.7	23.6	-139.1	2.21	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:34	8:54	20	2.83	7.14	4113.9	0.13	1.7	23.6	-139.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0039-045.0-20230310 Sampler: Brittany Follett

Well ID: MLPV-IW0039 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	8:25			0	N/A								Clear	None
3/10/2023	8:38	0.04	0.5	0.5	N/A	7.17	839.6	0.15	1.87	23.40	-144.3	0.42	Clear	None
3/10/2023	8:42	0.04	0.12	0.62	N/A	7.19	808.6	0.14	1.52	23.64	-152.6	0.4	Clear	None
3/10/2023	8:45	0.04	0.12	0.74	N/A	7.17	816.2	0.12	1.55	23.71	-149.3	0.40	Clear	None
3/10/2023	8:48	0.04	0.12	0.86	N/A	7.18	808.3	0.12	1.55	23.72	-147.1	0.4	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:25	8:48	23	0.86	7.18	808.3	0.12	1.55	23.72	-147.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0040-035.0-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0040 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.76
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	12:30			0	N/A								Clear	None
3/9/2023	12:43	0.04	0.5	0.5	N/A	7.36	758.3	0.13	14.18	26.75	-209.1	0.38	Clear	None
3/9/2023	12:46	0.04	0.12	0.62	N/A	7.36	775.6	0.11	8.02	26.75	-213.2	0.38	Clear	None
3/9/2023	12:49	0.04	0.12	0.74	N/A	7.38	779.5	0.10	6.29	26.75	-214.5	0.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:30	12:49	19	0.74	7.38	779.5	0.10	6.29	26.75	-214.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0041-045.0-20230309 Sampler: Brittany Follett

Well ID: MLPV-IW0041 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.89
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	12:59			0	N/A								Clear	None
3/9/2023	13:14	0.03	0.09	0.09	N/A	7.29	4279.7	0.08	6.06	26.78	-223.3	2.48	Clear	None
3/9/2023	13:17	0.03	0.09	0.18	N/A	7.29	4205.9	0.08	1.96	26.63	-225.0	2.26	Clear	None
3/9/2023	13:20	0.03	0.09	0.18	N/A	7.30	4213.5	0.07	1.92	26.65	-225.0	2.27	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:59	13:20	21	0.18	7.30	4213.5	0.07	1.92	26.65	-225.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0042-036.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0042 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.33
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	9:00			0	2.33								Clear	None
3/14/2023	9:20	0.05	1	1	N/A	7.17	490	0.19	0.83	21.4	-73.1	0.26	Clear	None
3/14/2023	9:22	0.05	0.1	1.1	N/A	7.18	489	0.18	0.8	21.3	-72.9	0.26	Clear	None
3/14/2023	9:24	0.05	0.1	1.2	N/A	7.18	489	0.18	0.66	21.3	-72.8	0.26	Clear	None
3/14/2023	9:26	0.05	0.1	1.3	N/A	7.18	490	0.19	0.59	21.3	-72.6	0.26	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:00	9:26	26	1.3	7.18	490	0.19	0.59	21.3	-72.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0043-045.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0043 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.3
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	9:32			0	2.3								Clear	None
3/14/2023	9:52	0.05	1	1	N/A	7.15	4631	0.15	0.63	22	-92.3	2.63	Clear	None
3/14/2023	9:54	0.05	0.1	1.1	N/A	7.16	4629	0.14	0.64	22	-92.3	2.62	Clear	None
3/14/2023	9:56	0.05	0.1	1.2	N/A	7.16	4628	0.15	0.57	21.9	-92.2	2.62	Clear	None
3/14/2023	9:58	0.05	0.1	1.3	N/A	7.16	4626	0.14	0.54	21.9	-92.2	2.61	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:32	9:58	26	1.3	7.16	4626	0.14	0.54	21.9	-92.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0044-045.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0044 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	1.4
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	16:27			0	N/A								Clear	None
3/14/2023	16:47	0.05	1	1	N/A	7.18	6261	0.33	3.5	22.9	-86.4	3.56	Clear	None
3/14/2023	16:49	0.05	0.1	1.1	N/A	7.15	6239	0.13	2.76	23	-86.6	3.55	Clear	None
3/14/2023	16:51	0.05	0.1	1.2	N/A	7.14	6235	0.11	2.54	22.9	-86.7	3.55	Clear	None
3/14/2023	16:53	0.05	0.1	1.3	N/A	7.15	6228	0.1	3.31	22.8	-86.8	3.55	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:27	16:53	26	1.3	7.15	6228	0.1	3.31	22.8	-86.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-IW0045-045.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0045 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	2.3
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	12:49			0	2.3								Clear	None
3/14/2023	13:09	0.05	1	1	2.33	6.97	3306	0.02	4.45	24.2	-119.8	1.76	Clear	None
3/14/2023	13:11	0.05	0.1	1.1	4.33	6.96	3325	0.03	6.4	24.3	-121.7	1.76	Clear	None
3/14/2023	13:13	0.05	0.1	1.2	4.33	6.97	3322	0.03	5.78	24.3	-120.7	1.76	Clear	None
3/14/2023	13:15	0.05	0.1	1.3	4.33	6.97	3314	0.02	4.98	24.2	-119.8	1.76	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:49	13:15	26	1.3	6.97	3314	0.02	4.98	24.2	-119.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-SAMW0004D-047.5-20230313 Sampler: Madan Parsotan

Well ID: MLPV-SAMW0004D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.41
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	11:34	0.05		0	4.41								Clear	None
3/13/2023	11:54	0.05	1	1	4.52	7.16	5995.8	0.12	19.01	26.04	-311.3	3.30	Clear	None
3/13/2023	11:56	0.05	1.1	2.1	4.52	7.16	5974.7	0.10	19.01	26.02	-311.7	3.29	Clear	None
3/13/2023	11:58	0.05	1.2	3.3	4.52	7.17	5844.9	0.11	19.01	26.04	-312.7	3.21	Clear	None
3/13/2023	12:00	0.05	1.3	4.6	4.52	7.16	5838.7	0.11	19.01	26.06	-312.8	3.21	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:34	12:00	26	4.6	7.16	5838.7	0.11	19.01	26.06	-312.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hotspot 2

Project No: 60615493

Sample ID: MLPV-SAMW0004I-037.5-20230313 Sampler: Madan Parsotan

Well ID: MLPV-SAMW0004I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.75
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	10:54			0	4.75								Clear	None
3/13/2023	11:14	0.05	1	1	4.77	7.16	571.9	0.15	3.27	26.43	-255.0	0.28	Clear	None
3/13/2023	11:16	0.05	1.1	2.1	4.77	7.17	572.0	0.13	3.49	26.47	-261.5	0.28	Clear	None
3/13/2023	11:18	0.05	1.2	3.3	4.77	7.17	571.4	0.13	4.25	26.57	-261.8	0.28	Clear	None
3/13/2023	11:20	0.05	1.3	4.6	4.77	7.17	571.0	0.11	7.74	26.60	-261.7	0.28	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:54	11:20	26	4.6	7.17	571.0	0.11	7.74	26.60	-261.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0001D-052.5-20230309 Sampler: Madan Parsotan

Well ID: MLPV-IW0001D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	3.98
Top of Screen (ft-BTOR):	50	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	55	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	55.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	8:39	0.05	1	1	4.27	7.92	7980	0.51	4.75	23.3	-166.4	4.58	Clear	None
3/9/2023	8:41	0.05	0.1	1.1	4.27	7.92	7980	0.49	4.67	23.3	-167.3	4.58	Clear	None
3/9/2023	8:43	0.05	0.1	1.2	4.27	7.9	7981	0.47	4.59	23.3	-167.5	4.59	Clear	None
3/9/2023	8:45	0.05	0.1	1.3	4.27	7.89	7982	0.46	4.5	23.2	-167.9	4.59	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:39	8:45	6	1.3	7.89	7982	0.46	4.5	23.2	-167.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0002IR-030.5-20230308 Sampler: Christopher Setrin

Well ID: MLPV-IW0002IR Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.81
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	11:20	0.05	0.15	0.15	N/A	7.34	848.8	0.17	0	26.42	-337.3	0.42	Clear	None
3/8/2023	11:23	0.05	0.15	0.30	N/A	7.34	830.3	0.13	0	26.41	-359.3	0.41	Clear	None
3/8/2023	11:26	0.05	0.15	0.45	N/A	7.34	824.2	0.11	0	26.46	-372.5	0.41	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:20	11:26	6	0.45	7.34	824.2	0.11	0	26.46	-372.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0009D-047.5-20230313 Sampler: Madan Parsotan

Well ID: MLPV-IW0009D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	3.28
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	13:06	0.05		0	3.28								Clear	None
3/13/2023	13:26	0.05	1	1	3.31	7.20	8383.8	0.29	5.96	22.31	-141.0	4.73	Clear	None
3/13/2023	13:28	0.05	1.2	3.3	3.31	7.21	8185.5	0.23	8.08	22.25	-137.1	4.60	Clear	None
3/13/2023	13:30	0.05	1.3	4.6	3.31	7.22	8153.3	0.22	10.95	22.35	-137.2	4.58	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:06	13:30	24	4.6	7.22	8153.3	0.22	10.95	22.35	-137.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0009I-030.5-20230314 Sampler: Devin Kehoe

Well ID: MLPV-IW0009I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	3.21
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	16:39			0	N/A								Clear	None
3/14/2023	16:42	0.05	0.15	0.15	3.22	7.87	222.6	5.19	10.32	22.38	-36.6	0.11	Clear	None
3/14/2023	16:45	0.05	0.15	0.30	3.23	7.78	192.8	5.13	7.83	21.77	-22.5	0.09	Clear	None
3/14/2023	16:52	0.05	0.25	0.55	3.24	7.77	189.9	6.55	16.96	20.86	-9.4	0.09	Clear	None
3/14/2023	16:54	0.05	0.1	0.65	3.23	7.73	172.2	5.07	11.32	21.59	-10.9	0.08	Clear	None
3/14/2023	16:56	0.05	0.1	0.75	3.24	7.72	170.3	4.99	10.07	21.58	-14.7	0.08	Clear	None
3/14/2023	16:58	0.05	0.1	0.85	3.24	7.70	178.0	4.96	9.23	21.87	-15.8	0.07	Clear	None
3/14/2023	17:00	0.05	0.1	0.95	3.23	7.70	171.4	4.94	9.13	21.57	-22.5	0.08	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:39	17:00	21	0.95	7.70	171.4	4.94	9.13	21.57	-22.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0012D-045.5-20230314 Sampler: Devin Kehoe

Well ID: MLPV-IW0012D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.32
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	12:12			0	N/A								Clear	None
3/14/2023	12:15	0.05	0.15	0.15	4.55	7.37	375.5	1.51	1.90	23.41	-116.1	0.18	Clear	None
3/14/2023	12:19	0.05	0.2	0.35	4.61	7.08	724.8	0.33	1.84	23.99	-114.1	0.36	Clear	None
3/14/2023	12:22	0.05	0.15	0.50	4.63	7.07	1179.1	0.25	1.91	23.96	-124.0	0.59	Clear	None
3/14/2023	12:25	0.05	0.15	0.65	4.64	7.13	1164.4	0.20	1.97	24.17	-134.6	0.90	Clear	None
3/14/2023	12:29	0.05	0.2	0.85	4.66	7.29	2447.5	0.17	1.94	24.29	-170.1	1.28	Clear	None
3/14/2023	12:32	0.05	0.15	1.00	4.67	7.34	2421.3	0.12	1.92	24.19	-282.0	1.65	Clear	None
3/14/2023	12:35	0.05	0.15	1.15	4.67	7.35	2420.5	0.14	1.96	24.61	-254.7	4.93	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:12	12:35	23	1.15	7.35	2420.5	0.14	1.96	24.61	-254.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0014I-037.5-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0014I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.1
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.3	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	11:10			0	4.1								Clear	None
3/14/2023	11:30	0.05	1	1	4.12	7.05	169.6	0.45	10.9	26.5	17.3	0.08	Clear	None
3/14/2023	11:32	0.05	0.1	1.1	4.12	7.08	172.9	0.41	9.76	26.5	16.7	0.08	Clear	None
3/14/2023	11:34	0.05	0.1	1.2	4.12	7.09	175.2	0.39	8.54	26.6	16.1	0.09	Clear	None
3/14/2023	11:36	0.05	0.1	1.3	4.12	7.1	180.3	0.37	8.13	26.5	15.3	0.09	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:10	11:36	26	1.3	7.1	180.3	0.37	8.13	26.5	15.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0017I-037.5-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0017I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.92
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40.5	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	17:08			0	4.92								Clear	None
3/14/2023	17:28	0.05	1	1	4.96	7.66	364.4	1.66	2.32	22.9	-23.2	0.08	Clear	None
3/14/2023	17:30	0.05	0.1	1.1	4.96	7.66	365.9	0.94	1.75	22.6	-37.8	0.19	Clear	None
3/14/2023	17:32	0.05	0.1	1.2	4.96	7.57	368.9	0.82	1.14	22.6	-46.9	0.22	Clear	None
3/14/2023	17:34	0.05	0.1	1.3	4.96	7.53	370.1	0.65	1.12	22.6	-49.4	0.23	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
17:08	17:34	26	1.3	7.53	370.1	0.65	1.12	22.6	-49.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0018D-052.5-20230315 Sampler: Caroline Bekins

Well ID: MLPV-IW0018D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	7.64
Top of Screen (ft-BTOR):	50	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	55	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	55.5	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	13:03	0.05	0.55	0.55	7.64	7.38	5989	0.32	1.63	18.1	-79.8	3.81	Clear	None
3/15/2023	13:06	0.05	0.15	0.70	7.64	7.37	6186	0.29	1.59	18.9	-95.4	3.89	Clear	None
3/15/2023	13:09	0.05	0.15	0.85	7.64	7.38	6190	0.27	1.62	19.1	-97.4	3.89	Clear	None
3/15/2023	13:12	0.05	0.15	1.00	7.64	7.38	6175	0.27	1.62	19.2	-98.6	3.89	Clear	None
3/15/2023	13:15	0.05	0.15	1.15	7.64	7.38	6179	0.26	1.58	19.3	-98.6	3.89	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:03	13:15	12	1.15	7.38	6179	0.26	1.58	19.3	-98.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0020D-047.0-20230321 Sampler: Patrick Bendl

Well ID: MLPV-IW0020D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	7.3
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/21/2023	12:56	0.05	0	0	7.3								Clear	None
3/21/2023	13:06	0.05	0.5	0.5	7.32	7.07	2213.5	0.12	2.56	23.2	-117.6	3.94	Clear	None
3/21/2023	13:09	0.05	0.15	0.65	7.33	7.08	2243.7	0.11	1.89	23.3	-148.3	3.96	Clear	None
3/21/2023	13:12	0.05	0.15	0.80	7.34	7.08	2249.7	0.12	1.87	23.3	-152.4	3.94	Clear	None
3/21/2023	13:15	0.05	0.15	0.95	7.35	7.07	2243.2	0.11	2.11	23.3	-153.2	3.95	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:56	13:15	19	0.95	7.07	2243.2	0.11	2.11	23.3	-153.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0022D-050.5-20230315 Sampler: Caroline Bekins

Well ID: MLPV-IW0022D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	6.98
Top of Screen (ft-BTOR):	48	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	53	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	53	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	12:07	0.05	0.6	0.6	6.99	7.38	6419	5.23	4.77	26.5	-119.3	3.61	Clear	None
3/15/2023	12:10	0.05	0.15	0.75	6.99	7.34	6435	5.7	5.13	26.5	-105.3	3.62	Clear	None
3/15/2023	12:13	0.05	0.15	0.90	6.99	7.35	6420.3	5.68	5.1	26.6	-101.3	3.62	Clear	None
3/15/2023	12:16	0.05	0.15	1.05	6.99	7.35	6422.6	5.7	5.2	26.6	-101.7	3.62	Clear	None
3/15/2023	12:19	0.05	0.15	1.20	6.99	7.36	6423.8	5.65	5.1	26.6	-100.2	3.61	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:07	12:19	12	1.20	7.36	6423.8	5.65	5.1	26.6	-100.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0027I-030.5-20230309 Sampler: Madan Parsotan

Well ID: MLPV-IW0027I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	2.58
Top of Screen (ft-BTOR):	28	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	33	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	33	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:30	0.05	1	1	2.64	7.68	1548	8.96	4.61	24.6	94.9	0.78	Clear	None
3/9/2023	11:32	0.05	0.1	1.1	2.64	7.68	1548	8.99	4.56	24.6	95.2	0.78	Clear	None
3/9/2023	11:34	0.05	0.1	1.2	2.64	7.67	1547	9.1	4.47	24.6	96.1	0.78	Clear	None
3/9/2023	11:36	0.05	0.1	1.3	2.64	7.65	1545	9.15	4.4	24.6	97.7	0.78	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:30	11:36	6	1.3	7.65	1545	9.15	4.4	24.6	97.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0029D-044.5-20230315 Sampler: Devin Kehoe

Well ID: MLPV-IW0029D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.6
Top of Screen (ft-BTOR):	42	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	47	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	47	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	14:37			0	N/A								Clear	None
3/15/2023	14:40	0.05	0.15	0.15	5.64	7.30	4567.3	1.36	3.13	22.94	-80.9	2.47	Clear	None
3/15/2023	14:43	0.05	0.15	0.30	5.65	7.38	6087.5	0.44	2.73	23.38	-156.8	3.36	Clear	None
3/15/2023	14:46	0.05	0.15	0.45	5.64	7.37	6452.9	0.33	2.72	23.63	-192.8	3.57	Clear	None
3/15/2023	14:49	0.05	0.15	0.60	5.66	7.37	6670.9	0.30	2.73	23.77	-208.5	3.70	Clear	None
3/15/2023	14:52	0.05	0.15	0.75	5.66	7.37	6811.9	0.23	2.85	23.68	-220.5	3.78	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:37	14:52	15	0.75	7.37	6811.9	0.23	2.85	23.68	-220.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0047-037.5-20230309 Sampler: Christopher Setrin

Well ID: MLPV-IW0047 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.08
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	10:24	0.05	0.15	0.15	N/A	7.17	1279.0	0.45	15.86	24.85	-227.9	0.71	Clear	None
3/9/2023	10:27	0.05	0.15	0.30	N/A	7.16	1335.1	0.43	11.03	24.83	-229.1	0.68	Clear	None
3/9/2023	10:30	0.05	0.15	0.45	N/A	7.16	1307.6	0.42	10.70	24.81	-229.0	0.66	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:24	10:30	6	0.45	7.16	1307.6	0.42	10.70	24.81	-229.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0049-043.0-20230315 Sampler: Caroline Bekins

Well ID: MLPV-IW0049 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.75
Top of Screen (ft-BTOR):	38	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	48	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	48	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	11:25	0.05	0.5	0.5	6.77	7.31	7215	4.84	4.06	26.3	-101.6	4.53	Clear	None
3/15/2023	11:28	0.05	0.5	1.0	6.77	7.29	7220	4.02	2.06	26.3	-99	4.51	Clear	None
3/15/2023	11:31	0.05	0.15	1.15	6.77	7.29	7223	4	1.56	26.4	-99.7	4.52	Clear	None
3/15/2023	11:34	0.05	0.15	1.30	6.77	7.28	7225	4.01	1.55	26.3	-99.3	4.52	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:25	11:34	9	1.30	7.28	7225	4.01	1.55	26.3	-99.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0050-045.0-20230309 Sampler: Caroline Bekins

Well ID: MLPV-IW0050 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.71
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	12:49	0.05	0.5	0.5	5.71	7.13	786.2	0.21	3.3	26.44	-271.4	0.39	Clear	None
3/9/2023	12:52	0.05	0.15	0.65	5.71	7.1	789.5	0.19	3.3	26.46	-269.6	0.39	Clear	None
3/9/2023	12:55	0.05	0.15	0.80	5.71	7.09	791.8	0.21	2.6	26.46	-273.1	0.39	Clear	None
3/9/2023	12:58	0.05	0.15	0.95	5.71	7.09	793.6	0.2	2.2	26.45	-275.7	0.39	Clear	None
3/9/2023	13:01	0.05	0.15	1.10	5.7	7.1	792.9	0.2	2.18	26.45	-276.4	0.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:49	13:01	12	1.10	7.1	792.9	0.2	2.18	26.45	-276.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0051-050.0-20230309 Sampler: Megan Dunkle

Well ID: MLPV-IW0051 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.91
Top of Screen (ft-BTOR):	45	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	55	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	55	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	10:25			0	4.94	7.10	5978.4	0.47	16.01	26.17	-211.8	3.29	Clear	None
3/9/2023	10:28			0	4.94	7.10	5913.5	0.25	15.21	26.49	-201.6	3.25	Clear	None
3/9/2023	10:30			0	4.94	7.10	5875.5	0.4	10.70	26.53	-197.6	3.23	Clear	None
3/9/2023	10:32			0	4.94	7.10	5841.8	0.19	10.87	26.61	-195.5	3.21	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:25	10:32	7	0	7.10	5841.8	0.19	10.87	26.61	-195.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0052-045.0-20230314 Sampler: Dustin Slater

Well ID: MLPV-IW0052 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.28
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	10:30			0	6.28								Clear	None
3/14/2023	10:50	0.05	1	1	6.3	7.38	1791	0.13	15.6	23.9	-100.6	0.93	Clear	None
3/14/2023	10:52	0.05	0.1	1.1	6.3	7.39	1791	0.14	13.8	23.9	-100.9	0.93	Clear	None
3/14/2023	10:54	0.05	0.1	1.2	6.3	7.39	1793	0.12	11.7	24	-101.1	0.93	Clear	None
3/14/2023	10:56	0.05	0.1	1.3	6.3	7.39	1794	0.12	12.2	24.1	-101.3	0.93	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:30	10:56	26	1.3	7.39	1794	0.12	12.2	24.1	-101.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0053-040.0-20230313 Sampler: Madan Parsotan

Well ID: MLPV-IW0053 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.38
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	14:10	0.05		0	3.38								Clear	None
3/13/2023	14:30	0.05	1	1	3.49	7.58	665.8	0.23	9.61	22.88	-316.3	0.31	Clear	None
3/13/2023	14:32	0.05	1.1	2.1	3.49	7.58	665.2	0.23	4.35	22.88	-321.7	0.31	Clear	None
3/13/2023	14:34	0.05	1.2	3.3	3.49	7.58	665.8	0.21	3.76	22.95	-326.2	0.31	Clear	None
3/13/2023	14:36	0.05	1.3	4.6	3.49	7.58	665.8	0.18	2.26	22.96	-334.9	0.30	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:10	14:36	26	4.6	7.58	665.8	0.18	2.26	22.96	-334.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0054-045.0-20230315 Sampler: Devin Kehoe

Well ID: MLPV-IW0054 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.94
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	10:39			0	N/A								Clear	None
3/15/2023	10:42	0.05	0.15	0.15	5.96	7.71	307.6	1.35	3.39	23.36	-73.5	0.15	Clear	None
3/15/2023	10:45	0.05	0.15	0.30	5.96	7.53	325.5	0.42	3.00	23.89	-208.2	0.16	Clear	None
3/15/2023	10:49	0.05	0.2	0.50	5.97	7.43	545.6	0.29	25.31	23.85	-329.3	0.27	Clear	None
3/15/2023	10:52	0.05	0.15	0.65	5.97	7.44	566.3	0.23	29.05	23.89	-351.9	0.28	Clear	None
3/15/2023	10:55	0.05	0.15	0.80	5.97	7.43	571.6	0.18	29.23	24.18	-366.0	0.28	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:39	10:55	16	0.80	7.43	571.6	0.18	29.23	24.18	-366.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0055-045.5-20230314 Sampler: Devin Kehoe

Well ID: MLPV-IW0055 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.42
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	50	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	9:04			0	N/A								Clear	None
3/14/2023	9:08	0.05	0.15	0.15	6.43	7.02	255.8	1.89	5.42	24.50	-42.7	0.12	Clear	None
3/14/2023	9:11	0.05	0.15	0.30	6.42	6.97	653.8	0.50	1.77	24.32	-335.6	0.32	Clear	None
3/14/2023	9:14	0.05	0.15	0.45	6.43	7.03	671.7	0.37	2.73	24.45	-356.9	0.33	Clear	None
3/14/2023	9:17	0.05	0.15	0.60	6.43	7.09	682.4	0.38	2.26	24.39	-374.9	0.34	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:04	9:17	13	0.60	7.09	682.4	0.38	2.26	24.39	-374.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-IW0056-035.0-20230316 Sampler: Caroline Bekins

Well ID: MLPV-IW0056 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.61
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2023	12:35	0.05	0.5	0.5	6.61	7.26	753	0.23	36.4	23.6	-255.9	0.38	Clear	None
3/16/2023	12:38	0.05	0.15	0.65	6.61	7.25	759	0.33	18.1	23.6	-261.3	0.38	Clear	None
3/16/2023	12:41	0.05	0.15	0.95	6.62	7.21	775	0.31	16.7	24.1	-280.3	0.39	Clear	None
3/16/2023	12:44	0.05	0.15	1.10	6.62	7.2	776	0.33	13	24	-280.9	0.39	Clear	None
3/16/2023	12:47	0.05	0.15	1.25	6.62	7.2	776	0.33	13.01	24	-280.7	0.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:35	12:47	12	1.25	7.2	776	0.33	13.01	24	-280.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0076-052.0-20230308 Sampler: Caroline Bekins

Well ID: MLPV-MW0076 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.78
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:06	0.05	0.65	0.65	5.8	7.45	6992	1.28	1.02	27.81	-212.7	3.94	Clear	None
3/8/2023	12:09	0.05	0.15	0.80	5.8	7.47	6921.3	0.31	1.02	27.92	-220.3	3.94	Clear	None
3/8/2023	12:12	0.05	0.15	0.95	5.8	7.46	7000.5	0.31	1.03	27.92	-222.3	3.95	Clear	None
3/8/2023	12:15	0.05	0.15	1.10	5.8	7.46	7001.5	0.31	1.02	27.91	-223.5	3.95	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:06	12:15	9	1.10	7.46	7001.5	0.31	1.02	27.91	-223.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0077-030.0-20230308 Sampler: Megan Dunkle

Well ID: MLPV-MW0077 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.5
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	13:21	0.13	0.5	0.5	5.5	7.54	0.8	0.14	1.99	28.92	-444.1		Clear	None
3/8/2023	13:23	0.13	0.25	0.75	5.5	7.56	0.8	0.13	1.89	28.86	-437.9		Clear	None
3/8/2023	13:25	0.13	0.25	1.00	5.5	7.57	0.7	0.12	2.86	28.69	-439		Clear	None
3/8/2023	13:27	0.13	0.25	1.25	5.5	7.58	0.8	0.1	2.23	28.77	-440.7		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:21	13:27	6	1.25	7.58	0.8	0.1	2.23	28.77	-440.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0078-030.0-20230308 Sampler: Caroline Bekins

Well ID: MLPV-MW0078 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.5
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:54	0.05	0.5	0.5	5.5	7.39	925.2	0.69	6.55	28.58	-274.5	0.49	Clear	None
3/8/2023	12:57	0.05	0.15	0.65	5.5	7.38	925	0.64	6.54	28.62	-275.9	0.49	Clear	None
3/8/2023	13:00	0.05	0.15	0.80	5.5	7.38	924.5	0.61	6.49	28.62	-278.6	0.48	Clear	None
3/8/2023	13:03	0.05	0.15	0.95	5.5	7.38	923.8	0.61	6.42	28.61	-279.6	0.49	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:54	13:03	9	0.95	7.38	923.8	0.61	6.42	28.61	-279.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0079-030.0-20230308 Sampler: Caroline Bekins

Well ID: MLPV-MW0079 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.65
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	11:20	0.05	1	1	5.68	7.7	874.9	0.34	0.04	28.51	-267.6	0.47	Clear	None
3/8/2023	11:23	0.05	0.15	1.15	5.68	7.67	915.1	0.35	0.02	28.51	-268.7	0.48	Clear	None
3/8/2023	11:26	0.05	0.15	1.30	5.68	7.67	914.5	0.36	0.01	28.51	-271.5	0.48	Clear	None
3/8/2023	11:29	0.05	0.15	1.45	5.68	7.67	915.3	0.36	0.01	28.51	-274.3	0.48	Clear	None
3/8/2023	11:31	0.05	0.15	1.60	5.68	7.66	915.5	0.36	0.01	28.51	-274.4	0.48	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:20	11:31	11	1.60	7.66	915.5	0.36	0.01	28.51	-274.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0080-052.0-20230308 Sampler: Megan Dunkle

Well ID: MLPV-MW0080 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.71
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	12:21	0.14	0.5	0.5	5.71	7.28	8.1	0.13	47.3	29.2	-297.1		Clear	None
3/8/2023	12:23	0.14	0.25	0.75	5.71	7.21	8.4	0.14	25.01	29.2	-293.4		Clear	None
3/8/2023	12:25	0.06	0.15	0.90	5.71	7.27	8.2	0.13	7.92	29.17	-291.5		Clear	None
3/8/2023	12:27	0.06	0.15	1.05	5.71	7.28	8.1	0.12	5.34	29.2	-294.7		Clear	None
3/8/2023	12:29	0.06	0.15	1.20	5.71	7.29	7.9	0.12	2.86	29.09	-292.5		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:21	12:29	8	1.20	7.29	7.9	0.12	2.86	29.09	-292.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0081-030.0-20230309 Sampler: Caroline Bekins

Well ID: MLPV-MW0081 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.64
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:35	0.05	0.5	0.5	5.64	7.13	1326.1	0.31	0.53	29.04	-311.4	0.67	Clear	None
3/9/2023	11:38	0.05	0.15	0.65	5.64	7.14	1327.9	0.26	0.65	29.03	-349.9	0.67	Clear	None
3/9/2023	11:41	0.05	0.15	0.80	5.64	7.15	1330.9	0.25	0.6	29.03	-352.2	0.67	Clear	None
3/9/2023	11:42	0.05	0.15	0.95	5.64	7.14	1329.6	0.25	0.58	29.03	-353.5	0.67	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:35	11:42	7	0.95	7.14	1329.6	0.25	0.58	29.03	-353.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0082-040.0-20230308 Sampler: Megan Dunkle

Well ID: MLPV-MW0082 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.65
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	13:56	0.08	0.5	0.5	5.6	7.6	1.8	0.06	62.72	28.66	-363		Clear	None
3/8/2023	13:58	0.08	0.16	0.66	5.6	7.56	1.8	0.04	30.81	28.62	-342.2		Clear	None
3/8/2023	14:00	0.08	0.16	0.82	5.6	7.57	1.8	0.04	28.05	28.6	-338.9		Clear	None
3/8/2023	14:02	0.08	0.16	0.98	5.6	7.58	1.8	0.04	27.14	28.64	-340.1		Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:56	14:02	6	0.98	7.58	1.8	0.04	27.14	28.64	-340.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0083-052.0-20230308 Sampler: Caroline Bekins

Well ID: MLPV-MW0083 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.75
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	13:25	0.05	0.75	0.75	5.77	8.11	8387.2	0.34	43.99	28.14	-289.6	5.03	Clear	None
3/8/2023	13:28	0.05	0.15	0.90	5.77	7.94	9220.8	0.34	31.94	28.12	-274	5.14	Clear	None
3/8/2023	13:31	0.05	0.15	1.05	5.77	7.66	9419.2	0.34	32.94	28.13	-271.1	5.21	Clear	None
3/8/2023	13:33	0.05	0.15	1.20	5.77	7.61	9418.6	0.34	30.12	28.13	-268.2	5.14	Clear	None
3/8/2023	13:36	0.05	0.15	1.35	5.77	7.61	9419.3	0.34	30.15	28.13	-269.7	5.14	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:25	13:36	11	1.35	7.61	9419.3	0.34	30.15	28.13	-269.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0084-052.0-20230309 Sampler: Megan Dunkle

Well ID: MLPV-MW0084 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	6.18
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	9:34			0	6.2	7.40	7242.7	0.03	136.61	27.52	-266.1	4.04	Clear	None
3/9/2023	9:35			0	6.2	7.37	7206.2	0.02	33.99	27.71	-268.1	4.02	Clear	None
3/9/2023	9:37			0	6.2	7.37	7127.7	0.02	10.79	27.51	-273.5	3.97	Clear	None
3/9/2023	9:39			0	6.2	7.37	7073.4	0.02	8.98	27.33	-274.7	3.94	Clear	None
3/9/2023	9:41			0	6.2	7.37	7017.9	0.02	6.88	27.21	-278.0	3.91	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:34	9:41	7	0	7.37	7017.9	0.02	6.88	27.21	-278.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0085-052.0-20230309 Sampler: Megan Dunkle

Well ID: MLPV-MW0085 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.41
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:04			0	N/A	7.30	4132.3	0.13	34.85	28.28	-217.7	2.22	Clear	None
3/9/2023	11:06			0	5.45	7.30	4095.4	0.11	20.87	28.17	-221.9	2.2	Clear	None
3/9/2023	11:08			0	5.45	7.29	4077.4	0.08	20.85	28.13	-226.6	2.19	Clear	None
3/9/2023	11:10			0	5.45	7.30	4055.5	0.07	14.93	28.11	-230.6	2.18	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:04	11:10	6	0	7.30	4055.5	0.07	14.93	28.11	-230.6

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0086-020.0-20230314 Sampler: Devin Kehoe

Well ID: MLPV-MW0086 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.59
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	15:46			0	N/A								Clear	None
3/14/2023	15:50	0.05	0.2	0.2	4.6	6.88	627.0	0.47	2.67	23.56	-208.4	0.31	Clear	None
3/14/2023	15:53	0.05	0.15	0.35	4.6	6.88	604.1	0.44	10.92	23.74	-228.7	0.30	Clear	None
3/14/2023	15:56	0.05	0.15	0.50	4.62	6.89	589.1	0.47	15.52	23.61	-246.8	0.29	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:46	15:56	10	0.50	6.89	589.1	0.47	15.52	23.61	-246.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0087-052.5-20230313 Sampler: Devin Kehoe

Well ID: MLPV-MW0087 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.86
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	12:13			0	N/A								Clear	None
3/13/2023	12:16	0.05	0.15	0.15	5.03	8.22	2585.1	0.59	5.62	26.53	-362.6	1.35	Clear	None
3/13/2023	12:19	0.05	0.15	0.30	5.03	7.37	4315.6	0.32	5.53	26.25	-311.3	2.33	Clear	None
3/13/2023	12:22	0.05	0.15	0.45	5.01	7.28	4220.6	0.26	5.55	26.12	-285.3	2.27	Clear	None
3/13/2023	12:25	0.05	0.15	0.60	5.04	7.27	4473.5	0.23	6.74	25.96	-275.5	2.42	Clear	None
3/13/2023	12:28	0.05	0.15	0.75	5.03	7.26	3806.2	0.22	7.04	25.57	-271.6	2.04	Clear	None
3/13/2023	12:31	0.05	0.15	0.90	5.03	7.26	3780.6	0.21	7.76	25.60	-267.9	2.02	Clear	None
3/13/2023	12:34	0.05	0.15	1.05	5.04	7.27	3781.1	0.20	8.31	25.36	-266.7	1.41	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:13	12:34	21	1.05	7.27	3781.1	0.20	8.31	25.36	-266.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0088-040.0-20230314 Sampler: Devin Kehoe

Well ID: MLPV-MW0088 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.26
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	10:22			0	N/A								Clear	None
3/14/2023	10:25	0.05	0.15	0.15	4.3	9.58	492.2	0.54	29.32	23.17	-426.5	0.24	Clear	None
3/14/2023	10:34	0.05	0.45	0.60	4.32	7.30	703.6	0.13	33.93	23.16	-354.6	0.35	Clear	None
3/14/2023	10:36	0.05	0.15	0.75	4.33	7.29	745.8	0.12	30.12	23.22	-366.2	0.37	Clear	None
3/14/2023	10:38	0.05	0.1	0.85	4.32	7.32	818.4	0.12	30.01	23.08	-354.4	0.41	Clear	None
3/14/2023	10:41	0.05	0.15	1.00	4.32	7.32	817.1	0.11	34.81	23.10	-355.0	0.42	Clear	None
3/14/2023	10:44	0.05	0.15	1.15	4.32	7.35	844.8	0.11	34.84	23.22	-374.5	0.42	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:22	10:44	22	1.15	7.35	844.8	0.11	34.84	23.22	-374.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0089-040.0-20230313 Sampler: Devin Kehoe

Well ID: MLPV-MW0089 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.97
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	14:07			0	N/A								Clear	None
3/13/2023	14:10	0.05	0.15	0.15	5.97	8.74	413.3	0.88	4.69	22.70	-301.8	0.2	Clear	None
3/13/2023	14:13	0.05	0.15	0.30	5.99	8.04	466.2	0.31	4.66	22.92	-308.7	0.23	Clear	None
3/13/2023	14:16	0.05	0.15	0.45	6	7.93	513.3	0.23	4.72	22.88	-303.8	0.25	Clear	None
3/13/2023	14:19	0.05	0.15	0.60	6.02	7.87	602.2	0.22	4.67	22.71	-298.3	0.30	Clear	None
3/13/2023	14:22	0.05	0.15	0.75	6.04	7.84	603.5	0.21	4.65	22.82	-295.8	0.32	Clear	None
3/13/2023	14:25	0.05	0.15	0.90	6.05	7.83	603.9	0.19	4.75	22.82	-299.3	0.34	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:07	14:25	18	0.90	7.83	603.9	0.19	4.75	22.82	-299.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0090-052.5-20230314 Sampler: Devin Kehoe

Well ID: MLPV-MW0090 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.93
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	9:45			0	N/A								Clear	None
3/14/2023	9:48	0.05	0.15	0.15	5.06	8.18	4103.1	1.85	1.91	24.03	-360.1	2.20	Clear	None
3/14/2023	9:51	0.05	0.15	0.30	5.08	7.36	4717.8	0.34	1.98	24.35	-289.0	2.56	Clear	None
3/14/2023	9:54	0.05	0.15	0.45	5.08	7.23	5311.2	0.27	2.00	24.42	-278.5	2.90	Clear	None
3/14/2023	9:57	0.05	0.15	0.60	5.07	7.18	5490.7	0.23	2.06	24.46	-275.8	3.01	Clear	None
3/14/2023	10:00	0.05	0.15	0.75	5.08	7.16	5557.2	0.20	2.13	24.44	-276.3	3.05	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:45	10:00	15	0.75	7.16	5557.2	0.20	2.13	24.44	-276.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0091-052.5-20230309 Sampler: Brittany Follett

Well ID: MLPV-MW0091 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.43
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	16:01			0	N/A								Clear	None
3/9/2023	16:13	0.04	0.5	0.5	5.47	8.27	3013.2	0.14	5.44	26.22	-271.2	1.59	Clear	None
3/9/2023	16:16	0.04	0.12	0.62	5.47	7.73	3776.5	0.12	6.91	26.18	-243.0	2.02	Clear	None
3/9/2023	16:19	0.04	0.12	0.74	5.47	7.61	4160.1	0.13	7.55	26.05	-236.1	2.24	Clear	None
3/9/2023	16:21	0.04	0.12	0.86	5.47	7.60	4212.7	0.14	8.88	26.03	-235.7	2.27	Clear	None
3/9/2023	16:24	0.04	0.12	0.98	5.47	7.60	4181.2	0.15	8.06	26.02	-235.7	2.25	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:01	16:24	23	0.98	7.60	4181.2	0.15	8.06	26.02	-235.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0092-052.5-20230309 Sampler: Brittany Follett

Well ID: MLPV-MW0092 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.56
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	15:19			0	N/A								Clear	None
3/9/2023	15:33	0.04	0.5	0.5	4.77	7.59	5030.2	0.12	2.04	24.58	-306.4	2.74	Clear	None
3/9/2023	15:36	0.04	0.12	0.62	4.77	7.56	5150.1	0.11	1.91	24.59	-296.4	2.81	Clear	None
3/9/2023	15:39	0.04	0.12	0.74	4.77	7.54	5165.5	0.10	2.27	24.58	-290.3	2.82	Clear	None
3/9/2023	15:43	0.04	0.12	0.86	4.77	7.53	5188.2	0.10	2.42	24.66	-282.0	2.83	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:19	15:43	24	0.86	7.53	5188.2	0.10	2.42	24.66	-282.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0093-040.0-20230315 Sampler: Devin Kehoe

Well ID: MLPV-MW0093 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.51
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/15/2023	9:55			0	N/A								Clear	None
3/15/2023	9:58	0.05	0.15	0.15	4.54	9.91	546.7	0.73	5.17	23.42	-322.7	0.27	Clear	None
3/15/2023	10:02	0.05	0.2	0.35	4.55	8.47	558.9	0.28	3.85	23.83	-337.2	0.27	Clear	None
3/15/2023	10:05	0.05	0.15	0.50	4.54	8.41	580.0	0.22	4.50	23.88	-342.8	0.28	Clear	None
3/15/2023	10:08	0.05	0.15	0.65	4.55	8.42	1138.3	0.18	4.57	23.87	-346.7	0.52	Clear	None
3/15/2023	10:10	0.05	0.1	0.75	4.55	8.42	1183.2	0.17	3.42	23.80	-348.8	0.60	Clear	None
3/15/2023	10:12	0.05	0.1	0.85	4.54	8.45	1192.6	0.16	5.18	23.87	-351.5	0.65	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:55	10:12	17	0.85	8.45	1192.6	0.16	5.18	23.87	-351.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0094-040.0-20230308 Sampler: Madan Parsotan

Well ID: MLPV-MW0094 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.68
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs
Well Diameter (in.):		Static Water Level (ft-BTOR):	5.78
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	9:57	0.05	1	1	5.81	7.71	9268	0.91	1.91	25.5	-55.4	5.12	Clear	None
3/8/2023	9:59	0.05	0.1	1.1	5.81	7.71	9267	0.85	1.88	25.5	-55	5.12	Clear	None
3/8/2023	10:01	0.05	0.1	1.2	5.81	7.71	9266	0.83	1.81	25.5	-54.4	5.12	Clear	None
3/8/2023	10:03	0.05	0.1	1.3	5.81	7.72	9265	0.8	1.7	25.4	-54.1	5.12	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:57	10:03	6	1.3	7.72	9265	0.8	1.7	25.4	-54.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0095-030.0-20230308 Sampler: Madan Parsotan

Well ID: MLPV-MW0095 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.68
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	9:10	0.05	1	1	5.69	7.68	648	0.69	1.89	25.5	-274.7	0.31	Clear	None
3/8/2023	9:12	0.05	0.1	1.1	5.69	7.68	648	0.65	1.81	25.5	-273.2	0.31	Clear	None
3/8/2023	9:14	0.05	0.1	1.2	5.69	7.68	649	0.63	1.77	25.6	-273.5	0.31	Clear	None
3/8/2023	9:16	0.05	0.1	1.3	5.69	7.68	649	0.6	1.73	25.5	-273.1	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:10	9:16	6	1.3	7.68	649	0.6	1.73	25.5	-273.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0096-040.0-20230308 Sampler: Christopher Setrin

Well ID: MLPV-MW0096 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.97
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	10:41	0.05	0.15	0.15	N/A	7.83	7937.4	0.31	161.05	26.58	-253.8	4.47	Clear	None
3/8/2023	10:44	0.05	0.15	0.30	N/A	7.79	8018.7	0.31	160.92	26.63	-306.5	4.51	Clear	None
3/8/2023	10:47	0.05	0.15	0.45	N/A	7.77	8009.7	0.29	160.42	26.52	-306.9	4.50	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:41	10:47	6	0.45	7.77	8009.7	0.29	160.42	26.52	-306.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0097-037.5-20230309 Sampler: Brittany Follett

Well ID: MLPV-MW0097 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.98
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	9:39			0	N/A								Clear	None
3/9/2023	9:54	0.03	0.5	0.5	6.01	8.43	2530.4	0.29	2.26	24.95	-288.4	1.32	Clear	None
3/9/2023	9:57	0.03	0.09	0.59	6.01	8.28	2713.6	0.22	2.29	24.93	-267.0	1.42	Clear	None
3/9/2023	10:00	0.03	0.09	0.68	6.01	8.18	2766.0	0.15	2.24	24.99	-285.8	1.45	Clear	None
3/9/2023	10:03	0.03		0.68	N/A	8.15	2746.8	0.11	2.10	24.93	-294.7	1.55	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:39	10:03	24	0.68	8.15	2746.8	0.11	2.10	24.93	-294.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0098-025.0-20230313 Sampler: Devin Kehoe

Well ID: MLPV-MW0098 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.57
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	30	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	10:13			0	N/A								Clear	None
3/13/2023	10:16	0.05	0.15	0.15	5.6	6.94	0.1	8.27	4.61	24.53	100.5	0	Clear	None
3/13/2023	10:19	0.05	0.15	0.30	5.62	6.89	0.1	7.93	4.70	25.29	92.4	0	Clear	None
3/13/2023	10:22	0.05	0.15	0.45	5.63	6.87	0.1	7.72	4.64	25.66	83.9	0	Clear	None
3/13/2023	10:25	0.05	0.15	0.60	5.63	6.86	0.1	7.47	4.75	26.14	76.1	0	Clear	None
3/13/2023	10:28	0.05	0.15	0.75	5.63	6.92	0.1	7.23	4.77	26.56	77.6	0	Clear	None
3/13/2023	10:32	0.05	0.15	0.90	5.63	6.87	0.1	6.90	4.78	26.50	82.3	0	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:13	10:32	19	0.90	6.87	0.1	6.90	4.78	26.50	82.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0099-045.0-20230313 Sampler: Devin Kehoe

Well ID: MLPV-MW0099 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.18
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/13/2023	11:01			0	N/A								Clear	None
3/13/2023	11:05	0.05	0.15	0.15	5.22	7.43	833.8	0.84	37.69	25.58	-257.0	0.41	Clear	None
3/13/2023	11:10	0.05	0.25	0.40	5.23	7.52	940.4	0.27	19.82	25.70	-326.2	0.47	Clear	None
3/13/2023	11:13	0.05	0.15	0.55	5.23	7.51	954.5	0.24	31.15	25.67	-341.4	0.48	Clear	None
3/13/2023	11:16	0.05	0.15	0.70	5.23	7.54	987.7	0.21	14.1	25.69	-353.2	0.49	Clear	None
3/13/2023	11:19	0.05	0.15	0.85	5.23	7.54	1191.0	0.19	19.3	25.81	-361.3	0.60	Clear	None
3/13/2023	11:22	0.05	0.15	1.00	5.23	7.53	1187.7	0.18	14.58	25.80	-365.5	0.89	Clear	None
3/13/2023	11:24	0.05	0.1	1.10	5.23	7.55	1190.5	0.17	9.15	25.78	-369.9	0.98	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:01	11:24	23	1.10	7.55	1190.5	0.17	9.15	25.78	-369.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0100-020.0-20230309 Sampler: Christopher Setrin

Well ID: MLPV-MW0100 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.07
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	12:32	0.05	0.15	0.15	N/A	6.76	742.2	0.16	7.83	24.83	-362.7	0.37	Clear	None
3/9/2023	12:35	0.05	0.15	0.30	N/A	6.77	720.3	0.14	6.75	24.78	-373.9	0.35	Clear	None
3/9/2023	12:38	0.05	0.15	0.45	N/A	6.77	716.7	0.13	3.28	24.84	-376.3	0.35	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:32	12:38	6	0.45	6.77	716.7	0.13	3.28	24.84	-376.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0101-045.0-20230309 Sampler: Megan Dunkle

Well ID: MLPV-MW0101 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	7.22
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	13:41			0	7.25	7.30	890.7	0.07	31.14	26.21	-399.9	0.44	Clear	None
3/9/2023	13:43			0	7.25	7.32	900.2	0.04	27.59	26.11	-404.2	0.45	Clear	None
3/9/2023	13:45			0	7.25	7.32	908.7	0.04	17.88	26.13	-407.9	0.45	Clear	None
3/9/2023	13:47			0	7.25	7.35	917.2	0.03	11.98	26.1	-411.1	0.46	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:41	13:47	6	0	7.35	917.2	0.03	11.98	26.1	-411.1

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0102-030.0-20230310 Sampler: Brittany Follett

Well ID: MLPV-MW0102 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	1.25
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	11:39			0	N/A								Clear	None
3/10/2023	11:51	0.04	0.5	0.5	1.31	7.40	2227.6	0.12	19.4	24.63	-202.6	1.16	Clear	None
3/10/2023	11:54	0.04	0.12	0.62	1.31	7.40	2234.5	0.12	20.3	24.51	-199.1	0.88	Clear	None
3/10/2023	11:57	0.04	0.12	0.74	1.31	7.38	2326.0	0.12	21.2	24.52	-202.5	1.21	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:39	11:57	18	0.74	7.38	2326.0	0.12	21.2	24.52	-202.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0103-040.0-20230310 Sampler: Brittany Follett

Well ID: MLPV-MW0103 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	0.86
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	12:19			0	N/A								Clear	None
3/10/2023	12:31	0.04	0.5	0.5	0.86	7.48	6104.8	0.11	12.6	25.13	-215.7	3.37	Clear	None
3/10/2023	12:34	0.04	0.12	0.62	0.86	7.45	6184.7	0.09	10.78	25.22	-219.0	3.41	Clear	None
3/10/2023	12:37	0.04	0.12	0.74	0.86	7.44	6119.9	0.08	9.5	25.27	-214.7	3.38	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:19	12:37	18	0.74	7.44	6119.9	0.08	9.5	25.27	-214.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0104-052.5-20230310 Sampler: Devin Kehoe

Well ID: MLPV-MW0104 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	0.35
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	12:24			0	N/A								Clear	None
3/10/2023	12:27	0.05	0.15	0.15	0.99	7.50	3453.5	0.33	29.04	24.41	-282.8	1.84	Clear	None
3/10/2023	12:31	0.05	0.15	0.30	1.1	7.51	3569.7	0.16	10.84	24.42	-311.9	1.90	Clear	None
3/10/2023	12:34	0.05	0.15	0.45	1.08	7.52	3588.3	0.13	9.43	24.44	-324.9	1.91	Clear	None
3/10/2023	12:38	0.05	0.15	0.60	1.07	7.55	3638.5	0.10	25.18	24.51	-349.3	1.94	Clear	None
3/10/2023	12:41	0.05	0.15	0.75	1.08	7.57	3637.1	0.09	21.48	24.50	-370.2	1.94	Clear	None
3/10/2023	12:45	0.05	0.15	0.90	1.09	7.60	3641.7	0.09	20.28	24.55	-380.8	1.94	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:24	12:45	21	0.90	7.60	3641.7	0.09	20.28	24.55	-380.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0105-052.5-20230310 Sampler: Brittany Follett

Well ID: MLPV-MW0105 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	1.51
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	57	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	10:44			0	N/A								Clear	None
3/10/2023	10:56	0.04	0.5	0.5	2.27	7.60	4863.3	0.15	31.9	24.37	-194.1	2.64	Clear	None
3/10/2023	10:59	0.04	0.12	0.62	2.27	7.60	4932.0	0.14	40.8	24.28	-193.4	2.68	Clear	None
3/10/2023	11:02	0.04	0.12	0.74	2.27	7.61	4992.6	0.13	43	24.22	-194.9	2.72	Clear	None
3/10/2023	11:05	0.04	0.12	0.86	2.27	7.61	5011.8	0.12	42.5	24.23	-191.7	2.73	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:44	11:05	21	0.86	7.61	5011.8	0.12	42.5	24.23	-191.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0106-030.0-20230310 Sampler: Devin Kehoe

Well ID: MLPV-MW0106 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	2.27
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	11:29			0	N/A								Clear	None
3/10/2023	11:34	0.08	0.25	0.25	2.4	7.21	1651.3	2.39	16.85	25.32	-242.2	0.84	Clear	None
3/10/2023	11:37	0.07	0.2	0.45	2.42	7.26	1642.3	0.16	85.83	24.68	-263.1	0.84	Clear	None
3/10/2023	11:40	0.07	0.2	0.65	2.43	7.26	1639.9	0.11	66.49	24.83	-270.0	0.84	Clear	None
3/10/2023	11:43	0.07	0.2	0.85	2.43	7.26	1658.0	0.10	64.48	24.74	-273.9	0.85	Clear	None
3/10/2023	11:46	0.07	0.2	1.05	2.44	7.26	1654.8	0.09	66.13	24.84	-276.3	0.85	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:29	11:46	17	1.05	7.26	1654.8	0.09	66.13	24.84	-276.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0107-040.0-20230310 Sampler: Devin Kehoe

Well ID: MLPV-MW0107 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	2.1
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	10:50			0	N/A								Clear	None
3/10/2023	10:53	0.08	0.25	0.25	2.11	7.15	2355.2	0.19	62.73	24.58	-227.6	1.23	Clear	None
3/10/2023	10:56	0.083	0.25	0.50	2.14	7.14	2203.5	0.22	60.16	24.52	-242.8	1.14	Clear	None
3/10/2023	10:59	0.08	0.25	0.75	2.16	7.15	2136.1	0.16	60.76	24.54	-248.5	1.11	Clear	None
3/10/2023	11:02	0.08	0.25	1.00	2.16	7.15	2044.2	0.14	62.97	24.53	-254.3	1.06	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:50	11:02	12	1.00	7.15	2044.2	0.14	62.97	24.53	-254.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0108-037.5-20230309 Sampler: Brittany Follett

Well ID: MLPV-MW0108 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	3.71
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	8:35			0	N/A								Clear	None
3/9/2023	8:45	0.05	0.5	0.5	3.74	7.40	694.3	0.43	154.77	23.56	-280.9	0.34	Clear	None
3/9/2023	8:55	0.05	0.5	1.0	3.74	7.43	1058.2	0.14	70.08	23.81	-299.9	0.53	Clear	None
3/9/2023	9:05	0.05	0.5	1.5	3.74	7.40	1386.7	0.12	41.94	23.85	-309.4	0.65	Clear	None
3/9/2023	9:08	0.05	0.15	1.65	3.74	7.39	1366.3	0.12	40.40	23.88	-311.0	0.69	Clear	None
3/9/2023	9:11	0.05		1.65	N/A	7.39	1416.1	0.11	45.71	23.93	-314.4	0.72	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
8:35	9:11	36	1.65	7.39	1416.1	0.11	45.71	23.93	-314.4

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-MW0109-025.0-20230309 Sampler: Christopher Setrin

Well ID: MLPV-MW0109 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.06
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	15:29	0.05	0.15	0.15	N/A	7.09	613.3	0.18	3.79	28.08	-381.8	0.33	Clear	None
3/9/2023	15:32	0.05	0.15	0.30	N/A	7.09	584.2	0.18	3.73	28.20	-382.2	0.31	Clear	None
3/9/2023	15:35	0.05	0.15	0.45	N/A	7.10	575.7	0.17	3.27	28.20	-382.9	0.29	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:29	15:35	6	0.45	7.10	575.7	0.17	3.27	28.20	-382.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event:	Kennedy Space Center MLPV LTM
Site Name:	Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP
Project No:	60615493

Sample ID:	MLPV-MW0110-035.0-20230309	Sampler:	Christopher Setrin
Well ID:	MLPV-MW0110	Well Type:	Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	2.96
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	16:05	0.05	0.15	0.15	N/A	6.72	502.2	0.21	6.33	25.95	-325.8	0.25	Clear	None
3/9/2023	16:08	0.05	0.15	0.30	N/A	6.72	498.4	0.20	6.32	25.91	-327.5	0.24	Clear	None
3/9/2023	16:11	0.05	0.15	0.45	N/A	6.71	493.8	0.20	6.31	25.91	-328.3	0.24	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:05	16:11	6	0.45	6.71	493.8	0.20	6.31	25.91	-328.3

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-SAMW0001-043.0-20230314 Sampler: Devin Kehoe

Well ID: MLPV-SAMW0001 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	3.91
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	11:23			0	N/A								Clear	None
3/14/2023	11:26	0.05	0.15	0.15	4.8	7.73	3555.2	0.37	36.23	24.96	-287.7	1.89	Clear	None
3/14/2023	11:30	0.05	0.2	0.35	4.71	7.70	3525.9	0.18	35.41	25.12	-290.1	1.88	Clear	None
3/14/2023	11:33	0.05	0.15	0.50	4.72	7.59	3368.1	0.16	31.14	24.94	-276.1	1.79	Clear	None
3/14/2023	11:36	0.05	0.15	0.65	4.74	7.45	3541.6	0.19	20.14	24.96	-263.5	1.89	Clear	None
3/14/2023	11:39	0.05	0.15	0.80	4.71	7.28	3187.7	0.14	14.92	25.05	-254.2	1.69	Clear	None
3/14/2023	11:44	0.05	0.25	1.05	4.7	7.17	3161.8	0.14	15.47	25.13	-248.9	1.95	Clear	None
3/14/2023	11:47	0.05	0.15	1.20	4.71	7.14	3168.4	0.13	13.50	25.07	-247.9	1.90	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:23	11:47	24	1.20	7.14	3168.4	0.13	13.50	25.07	-247.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-SAMW0003-045.0-20230316 Sampler: Devin Kehoe

Well ID: MLPV-SAMW0003 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.51
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/16/2023	10:10			0	N/A								Clear	None
3/16/2023	10:14	0.05	0.2	0.2	N/A	6.96	4597.5	0.46	66.06	24.54	-181.0	2.49	Clear	None
3/16/2023	10:17	0.05	0.15	0.35	N/A	6.96	4981.6	0.28	56.62	25.01	-203.9	2.71	Clear	None
3/16/2023	10:20	0.05	0.15	0.50	N/A	6.96	4964.7	0.26	19.15	24.23	-213.8	2.7	Clear	None
3/16/2023	10:23	0.05	0.15	0.65	N/A	6.96	5009.7	0.32	8.98	24.21	-224.2	2.73	Clear	None
3/16/2023	10:26	0.05	0.15	0.80	4.51	6.97	4999.9	0.30	6.99	24.21	-234.8	2.72	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:10	10:26	16	0.80	6.97	4999.9	0.30	6.99	24.21	-234.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: MLPV-VAB-IW0005D-054.5-20230309 Sampler: Megan Dunkle

Well ID: MLPV-VAB-IW0005D Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.63
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	12:55			0	4.65	7.11	2448.5	0.26	8.99	26.11	149.9	1.28	Clear	None
3/9/2023	12:57			0	4.65	7.13	2773.2	0.19	38.12	26.3	153.0	1.46	Clear	None
3/9/2023	12:59			0	4.65	7.17	2960.8	0.15	78.15	26.82	-155.5	1.56	Clear	None
3/9/2023	13:01			0	4.65	7.18	3078.4	0.17	4.92	26.32	-159.2	1.63	Clear	None
3/9/2023	13:03			0	4.65	7.19	3126.2	0.16	5.40	26.01	-159.5	1.65	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:55	13:03	8	0	7.19	3126.2	0.16	5.40	26.01	-159.5

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: PRES-IW0009-045.0-20230309 Sampler: Megan Dunkle

Well ID: PRES-IW0009 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.21
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	50	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:47			0	4.23	7.19	2691.6	7.94	5.39	25.49	-168.5	1.41	Clear	None
3/9/2023	11:49			0	4.23	7.19	2718.9	7.84	4.75	25.43	-171.2	1.43	Clear	None
3/9/2023	11:53			0	4.23	7.25	2695.9	7.75	12.29	25.8	-152.8	1.41	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:47	11:53	6	0	7.25	2695.9	7.75	12.29	25.8	-152.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: SATV-IW0009I-024.5-20230308 Sampler: Megan Dunkle

Well ID: SATV-IW0009I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.56
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	27	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/8/2023	11:06	0.14	1	1	5.6	7.38	1.0	0.12	15.06	29.5			Clear	None
3/8/2023	11:08	0.14	0.28	1.28	5.6	7.37	1.0	0.1	12.46	29.49			Clear	None
3/8/2023	11:10	0.14	0.28	1.56	5.6	7.35	1.0	0.1	8.97	29.52			Clear	None
3/8/2023	11:12	0.14	0.28	1.84	5.6	7.34	1.0	0.1	8.43	29.51			Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:06	11:12	6	1.84	7.34	1.0	0.1	8.43	29.51	

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: VABU-IW0001I-025.0-20230310 Sampler: Caroline Bekins

Well ID: VABU-IW0001I Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	7.02
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/10/2023	10:30	0.05	0.65	0.65	7.01	7.19	630.0	0.36	3.69	25.79	-254.8	0.31	Clear	None
3/10/2023	10:33	0.05	0.15	0.80	7.01	7.28	631.8	0.32	0.67	25.98	-270.2	0.31	Clear	None
3/10/2023	10:36	0.05	0.15	0.95	7.01	7.32	633.1	0.31	0.53	25.98	-278.8	0.31	Clear	None
3/10/2023	10:39	0.05	0.15	1.10	7.01	7.33	633.6	0.32	0.53	25.98	-280.3	0.31	Clear	None
3/10/2023	10:42	0.05	0.15	1.25	7	7.35	636.3	0.32	0.52	25.99	-281.7	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:30	10:42	12	1.25	7.35	636.3	0.32	0.52	25.99	-281.7

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: WCPS-IW0001SR-007.5-20230309 Sampler: Christopher Setrin

Well ID: WCPS-IW0001SR Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	3.41
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	12.5	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	13:11	0.05	0.15	0.15	N/A	7.15	553.6	2.27	4.22	24.36	-351.0	0.27	Clear	None
3/9/2023	13:14	0.05	0.15	0.30	N/A	7.13	551.3	2.24	4.18	24.36	-354.2	0.27	Clear	None
3/9/2023	13:17	0.05	0.15	0.45	N/A	7.12	550.0	2.19	3.98	24.36	-356.2	0.27	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:11	13:17	6	0.45	7.12	550.0	2.19	3.98	24.36	-356.2

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: WCPS-IW0002SRR-008.0-20230309 Sampler: Christopher Setrin

Well ID: WCPS-IW0002SRR Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	4.78
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):		Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	11:53	0.05	0.15	0.15	N/A	7.20	674.3	0.95	3.77	24.80	-179.0	0.33	Clear	None
3/9/2023	11:57	0.05	0.15	0.30	N/A	7.19	671.4	0.95	2.97	24.81	-182.1	0.33	Clear	None
3/9/2023	11:59	0.05	0.15	0.45	N/A	7.11	666.5	0.95	2.44	24.74	-185.9	0.33	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:53	11:59	6	0.45	7.11	666.5	0.95	2.44	24.74	-185.9

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: WCPS-IW0005S-007.0-20230309 Sampler: Christopher Setrin

Well ID: WCPS-IW0005S Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	3.92
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	12	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	14:32	0.05	0.15	0.15	N/A	7.33	526.0	2.58	7.02	25.91	-259.7	0.26	Clear	None
3/9/2023	14:35	0.05	0.15	0.30	N/A	7.33	521.7	2.20	6.85	25.94	-265.7	0.25	Clear	None
3/9/2023	14:38	0.05	0.15	0.45	N/A	7.33	519.7	2.06	6.62	25.99	-270.0	0.25	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:32	14:38	6	0.45	7.33	519.7	2.06	6.62	25.99	-270.0

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: WCPS-IW0015S-008.0-20230314 Sampler: Devin Kehoe

Well ID: WCPS-IW0015S Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	5.31
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	13	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/14/2023	14:00			0	N/A								Clear	None
3/14/2023	14:03	0.05	0.15	0.15	5.44	7.49	637.9	0.77	24.16	23.37	-244.2	0.31	Clear	None
3/14/2023	14:05	0.05	0.15	0.30	5.44	7.44	599.6	0.35	17.73	23.45	-250.6	0.29	Clear	None
3/14/2023	14:08	0.05	0.15	0.45	5.45	7.42	584.7	0.25	13.83	23.49	-253.2	0.29	Clear	None
3/14/2023	14:11	0.05	0.15	0.60	5.45	7.41	576.4	0.21	14.66	23.49	-255.8	0.28	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:00	14:11	11	0.60	7.41	576.4	0.21	14.66	23.49	-255.8

GROUNDWATER SAMPLE LOG SHEET

AECOM

Event: Kennedy Space Center MLPV LTM

Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - LCP

Project No: 60615493

Sample ID: WCPS-IW0016-020.0-20230309 Sampler: Christopher Setrin

Well ID: WCPS-IW0016 Well Type: Monitoring Well

Remark:

Well Information

Well Diameter (in.):		Static Water Level (ft-BTOR):	3.96
Top of Screen (ft-BTOR):	Unknown	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	Unknown	Purge/Sample Method:	Low flow - peristalic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs

Purge Information

Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
3/9/2023	13:41	0.05	0.15	0.15	N/A	6.88	657.5	0.19	3.67	24.81	-399.4	0.32	Clear	None
3/9/2023	13:44	0.05	0.15	0.30	N/A	6.87	654.3	0.16	3.26	24.81	-399.6	0.32	Clear	None
3/9/2023	13:47	0.05	0.15	0.45	N/A	6.87	641.8	0.13	2.84	24.81	-400.5	0.32	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:41	13:47	6	0.45	6.87	641.8	0.13	2.84	24.81	-400.5

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0004-037.5-20230426 Sample Date: 4/26/2023 9:54:00 AM
Well ID: MLPV-ASMW0004 Sampler: Patrick Bendl
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.99
Top of Screen (ft-BTOC):	35.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
9:46 AM	0.05	1	1	0.99	7.24	2303.7	1.95	50.91	25.39	49.6	1.2	Clear	None
9:48 AM	0.05	0.1	1.1	0.99	7.28	2131.7	1.86	35.53	25.24	42.2	1.1	Clear	None
9:50 AM	0.05	0.1	1.2	0.99	7.29	2151.7	1.97	14.36	25.25	21.8	1.11	Clear	None
9:52 AM	0.05	0.1	1.3	0.99	7.31	2108.8	2.02	17.6	25.28	-8	1.09	Clear	None
9:54 AM	0.05	0.1	1.4	0.99	7.32	2103.1	2.12	15.02	25.28	-20	1.09	Clear	None

Start Purge:	4/26/2023 9:46:00 AM	End Purge:	4/26/2023 9:54:00 AM	Total Volume (gal):	1.4

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0005-037.5-20230426 Sample Date: 4/26/2023 10:26:00 AM
Well ID: MLPV-ASMW0005 Sampler: Patrick Bendl
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.48
Top of Screen (ft-BTOC):	35.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
10:14 AM	0.05	1	1	1.49	7.46	1756.8	8.43	17.89	25.4	20.5	0.9	Clear	None
10:16 AM	0.05	0.1	1.1	1.49	7.4	1904.3	7.71	13.81	25.22	24.1	0.98	Clear	None
10:18 AM	0.05	0.1	1.2	1.49	7.33	2042	6.54	11.57	25	28	1.05	Clear	None
10:20 AM	0.05	0.1	1.3	1.49	7.3	2049.9	6.14	13.06	25.11	29.6	1.06	Clear	None
10:22 AM	0.05	0.1	1.4	1.49	7.29	1975.7	5.78	17.77	25.35	31.3	1.02	Clear	None
10:24 AM	0.05	0.1	1.5	1.49	7.29	1932.1	5.63	19.4	25.35	31.6	1	Clear	None
10:26 AM	0.05	0.1	1.6	1.49	7.29	1910.5	5.56	16.74	25.33	31.6	0.98	Clear	None

Start Purge:	4/26/2023 10:14:00 AM	End Purge:	4/26/2023 10:26:00 AM	Total Volume (gal):	1.6

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0006-037.5-20230426 Sample Date: 4/26/2023 10:54:00 AM
Well ID: MLPV-ASMW0006 Sampler: Patrick Bendl
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.83
Top of Screen (ft-BTOC):	35.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
10:42 AM	0.05	1	1	0.83	7.2	1740.4	4.61	3.06	28.15	27.3	0.89	Clear	None
10:44 AM	0.05	0.1	1.1	0.83	7.18	2712.6	1.03	11.64	26.48	-118	1.42	Clear	None
10:46 AM	0.05	0.1	1.2	0.83	7.21	2778.2	0.23	17.1	25.97	-197.6	1.46	Clear	None
10:48 AM	0.05	0.1	1.3	0.83	7.21	2992.9	0.19	18.63	25.67	-213.9	1.58	Clear	None
10:50 AM	0.05	0.1	1.4	0.83	7.22	3057.9	0.11	14.21	25.45	-222	1.61	Clear	None
10:52 AM	0.05	0.1	1.5	0.83	7.22	3055.2	0.1	18.21	25.32	-224.3	1.61	Clear	None
10:54 AM	0.05	0.1	1.6	0.83	7.21	3079.7	0.09	18.39	25.39	-223.2	1.63	Clear	None

Start Purge:	4/26/2023 10:42:00 AM	End Purge:	4/26/2023 10:54:00 AM	Total Volume (gal):	1.6

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0031-030.0-20230426
Sample Date: 4/26/2023 1:30:00 PM
Well ID: MLPV-IW0031
Sampler: Patrick Bendl
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.61
Top of Screen (ft-BTOC):	25.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	35.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
1:22 PM	0.05	1	1	1.61	7.02	1449.5	0.1	16.86	26.41	-368.7	0.74	Clear	None
1:24 PM	0.05	0.1	1.2	1.62	6.98	1460.2	0.1	15.51	26.31	-370.5	0.74	Clear	None
1:26 PM	0.05	0.1	1.3	1.62	6.99	1468.9	0.09	14.35	26.22	-374	0.75	Clear	None
1:28 PM	0.05	0.1	1.4	1.62	6.98	1481.7	0.08	13.6	26.18	-371.4	0.75	Clear	None
1:30 PM	0.05	0.1	1.5	1.62	6.98	1471.3	0.04	12.46	26.05	-372.8	0.77	Clear	None

Start Purge:	4/26/2023 1:22:00 PM	End Purge:	4/26/2023 1:30:00 PM	Total Volume (gal):	1.5

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0046-040.0-20230426
Well ID: MLPV-IW0046
Location Type: Monitoring Well
Comments:

Sample Date: 4/26/2023 1:02:00 PM
Sampler: Patrick Bendl

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.64
Top of Screen (ft-BTOC):	35.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
12:52 PM	0.05	1	1	1.65	7.78	462.4	4.76	10.35	27.24	-420.9	0.23	Clear	None
12:54 PM	0.05	0.1	1.2	1.65	7.77	7612	0.3	7.22	25.66	-405.4	4.26	Clear	None
12:58 PM	0.05	0.1	1.3	1.65	7.64	10063.5	0.15	13.79	25.59	-396.5	5.75	Clear	None
1:00 PM	0.05	0.1	1.4	1.65	7.63	10115.1	0.11	15.13	25.45	-392.8	5.79	Clear	None
1:02 PM	0.05	0.1	1.5	1.65	7.64	10092.6	0.13	12.44	25.53	-393.8	5.77	Clear	None

Start Purge:	4/26/2023 12:52:00 PM	End Purge:	4/26/2023 1:02:00 PM	Total Volume (gal):	1.5

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0057-045.0-20230426
Well ID: MLPV-IW0057
Location Type: Monitoring Well
Comments:

Sample Date: 4/26/2023 2:14:00 PM
Sampler: Patrick Bendl

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	4.48
Top of Screen (ft-BTOC):	40.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
2:08 PM	0.05	1	1	4.49	6.79	4289	0.1	29.17	26.21	-150.3	2.31	Clear	None
2:10 PM	0.05	0.1	1.1	4.49	6.78	4172	0.09	19.2	26.11	-163.5	2.24	Clear	None
2:12 PM	0.05	0.1	1.2	4.49	6.75	4182.2	0.09	13.28	26.03	-168.4	2.25	Clear	None
2:14 PM	0.05	0.1	1.3	4.5	6.7	4075.7	0.08	12.25	25.96	-169	2.19	Clear	None

Start Purge:	4/26/2023 2:08:00 PM	End Purge:	4/26/2023 2:14:00 PM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0061-037.5-20230426
Well ID: MLPV-IW0061
Location Type: Monitoring Well
Comments:

Sample Date: 4/26/2023 12:00:00 PM
Sampler: Patrick Bendl

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	4.67
Top of Screen (ft-BTOC):	35.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
11:50 AM	0.05	1	1	4.67	7.59	1314.5	0.22	6.07	25.76	-305.1	0.66	Clear	None
11:52 AM	0.05	0.1	1.2	4.68	7.58	1438.5	0.16	3.65	25.63	-302.6	0.73	Clear	None
11:54 AM	0.05	0.1	1.3	4.68	7.57	1567.8	0.1	2.95	25.61	-299	0.8	Clear	None
11:56 AM	0.05	0.1	1.4	4.68	7.57	1728.1	0.07	5.68	25.51	-297.1	0.89	Clear	None
11:58 AM	0.05	0.1	1.5	4.68	7.58	1776.6	0.07	11.86	25.41	-297.5	0.91	Clear	None
12:00 PM	0.05	0.1	1.6	4.69	7.57	1784.9	0.05	5.98	25.53	-298	0.92	Clear	None

Start Purge:	4/26/2023 11:50:00 AM	End Purge:	4/26/2023 12:00:00 PM	Total Volume (gal):	1.6

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV BioSparge Area GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0062-042.5-20230426
Well ID: MLPV-IW0062
Location Type: Monitoring Well
Comments:

Sample Date: 4/26/2023 11:36:00 AM
Sampler: Patrick Bendl

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	4.73
Top of Screen (ft-BTOC):	40.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
11:28 AM	0.05	1	1	4.73	7.4	6066.1	0.54	12.42	26.35	-226.4	3.34	Clear	None
11:30 AM	0.05	0.1	1.1	4.74	7.41	6594.1	0.13	18.77	26.26	-229.5	3.66	Clear	None
11:32 AM	0.05	0.1	1.2	4.74	7.42	6757	0.1	16.49	26.09	-238.6	3.75	Clear	None
11:34 AM	0.05	0.1	1.3	4.74	7.42	6868.9	0.08	16.65	25.97	-241.7	3.82	Clear	None
11:36 AM	0.05	0.1	1.4	4.74	7.42	6883.8	0.07	18.17	26.06	-241.4	3.83	Clear	None

Start Purge:	4/26/2023 11:28:00 AM	End Purge:	4/26/2023 11:36:00 AM	Total Volume (gal):	1.4

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0036-042.5-20230426
Sample Date: 4/26/2023 3:15:00 PM
Well ID: MLPV-IW0036
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.77
Top of Screen (ft-BTOC):	40.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	45.00	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
2:50 PM			0									Clear	None
2:53 PM	0.05	0.15	0.15	3.81	7.2	439	0.67	10.53	26.4	-58.6	0.27	Clear	None
2:56 PM	0.05	0.15	0.3	3.81	7.21	1465	0.32	5.02	26.1	-100.1	0.78	Clear	None
2:59 PM	0.05	0.15	0.45	3.81	7.3	1624	0.33	7.26	26	-109.4	0.88	Clear	None
3:02 PM	0.05	0.15	0.6	3.81	7.31	1749	0.27	6.11	26	-113.7	0.92	Clear	None
3:05 PM	0.05	0.15	0.75	3.81	7.31	1917	0.22	4.87	26	-120.2	1.03	Clear	None
3:08 PM	0.05	0.15	0.9	3.81	7.32	2068	0.19	5.3	26	-125	1.09	Clear	None
3:11 PM	0.05	0.15	1.05	3.81	7.32	2145	0.19	5.36	26	-130	1.13	Clear	None
3:14 PM	0.05	0.15	1.2	3.81	7.33	2192	0.2	4.45	26	-133.1	1.16	Clear	None

Start Purge:	4/26/2023 2:50:00 PM	End Purge:	4/26/2023 3:14:00 PM	Total Volume (gal):	1.2

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0038-035.0-20230426
Sample Date: 4/26/2023 3:55:00 PM
Well ID: MLPV-IW0038
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.02
Top of Screen (ft-BTOC):	30.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	40.00	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
3:38 PM			1									Clear	None
3:41 PM	0.05	0.15	1.15	2.02	7.22	496	0.67	28.1	25	-290	0.3	Clear	None
3:44 PM	0.05	0.15	1.30	2.02	7.19	593	0.61	36.1	24.9	-34.1	0.36	Clear	None
3:47 PM	0.05	0.15	1.45	2.02	7.17	770	0.63	33.5	24.8	-34.1	0.41	Clear	None
3:50 PM	0.05	0.15	1.60	2.02	7.16	787	0.64	37.8	24.7	-34.8	0.44	Clear	None
3:53 PM	0.05	0.15	1.75	2.02	7.16	817	0.51	34.9	24.9	-36.2	0.46	Clear	None

Start Purge:	4/26/2023 3:38:00 PM	End Purge:	4/26/2023 3:53:00 PM	Total Volume (gal):	1.75

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0039-045.0-20230426
Well ID: MLPV-IW0039
Location Type: Monitoring Well
Comments:

Sample Date: 4/26/2023 3:43:00 PM
Sampler: Patrick Bendl

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.92
Top of Screen (ft-BTOC):	40.0000	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.0000	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	TCE, cDCE, tDCE, VC

Purge Information

Time	Purge Rate (gal/min)	Vol Purged (gal)	Cumul. Vol Purged (gal)	Depth to Water (FT)	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	Salinity (PSU)	Color (NA)	Odor (NA)
3:23 PM	0.05	0.1	0.1	1.92	6.98	2825.9	0.1	241.46	26.15	-76.3	1.49	Clear	None
3:25 PM	0.05	0.1	0.2	1.93	6.84	2629.6	0.07	138.81	25.78	-72.5	1.38	Clear	None
3:27 PM	0.05	0.1	0.3	1.93	6.84	2697.8	0.06	128.74	25.74	-69.2	1.41	Clear	None
3:29 PM	0.05	0.1	0.4	1.93	6.95	1333.9	0.05	80.49	25.54	-68.5	0.68	Clear	None
3:31 PM	0.05	0.1	0.5	1.93	6.96	758.2	0.05	83.21	25.4	-75.8	0.38	Clear	None
3:33 PM	0.05	0.1	0.6	1.94	6.95	556.2	0.04	46.65	25.22	-66.3	0.27	Clear	None
3:35 PM	0.05	0.1	0.7	1.93	6.93	531.8	0.04	27.23	25.39	-64.3	0.26	Clear	None
3:37 PM	0.05	0.1	0.8	1.94	6.94	525.5	0.05	17	25.39	-66.5	0.26	Clear	None
3:39 PM	0.05	0.1	0.9	1.94	6.95	508.5	0.05	10.98	25.32	64.2	0.25	Clear	None
3:41 PM	0.05	0.1	1	1.94	6.94	499.9	0.04	3.95	25.28	-64	0.24	Clear	None
3:43 PM	0.05	0.1	1.1	1.94	6.94	482.8	0.04	6.53	25.15	-63.5	0.23	Clear	None

Start Purge:	4/26/2023 3:23:00 PM	End Purge:	4/26/2023 3:43:00 PM	Total Volume (gal):	1.1

APPENDIX Q

LABORATORY ANALYTICAL REPORTS – GROUNDWATER SAMPLING

(CD ONLY)

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Signature

10.14.2022
Date

Eurofins Environment Testing Southeast, LLC
Alex Montoya
President
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Savannah, GA 31404

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Thursday, March 24, 2022
AECOM Technical Services, Inc. (SE004)
Attn: Teresa Amentt Jennings
150 N. Orange Ave, Suite 200
Orlando, FL 32801

RE: Laboratory Results for
Project Number: 60615493.4, Project Name/Desc: NASA KSC - MLPV BSA
ENCO Workorder(s): AF01781

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, March 16, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,



Kaitlin Dylnicki

Project Manager

Enclosure(s)

www.encolabs.com

SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: MLPV-IW0057-045.0-20220314 **Lab ID: AF01781-01** **Sampled: 03/14/22 13:42** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/21/22 00:00	03/21/22 18:24

Client ID: MLPV-IW0057-045.0-20220314 **Lab ID: AF01781-01RE1** **Sampled: 03/14/22 13:42** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/22/22 00:00	03/22/22 11:58

Client ID: MLPV-IW0058-047.5-20220314 **Lab ID: AF01781-02** **Sampled: 03/14/22 12:57** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:17	03/19/22 02:27

Client ID: MLPV-IW0058-047.5-20220314 **Lab ID: AF01781-02RE1** **Sampled: 03/14/22 12:57** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/23/22 00:00	03/23/22 15:18

Client ID: MLPV-IW0059-047.5-20220314 **Lab ID: AF01781-03** **Sampled: 03/14/22 11:57** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:17	03/19/22 02:54

Client ID: MLPV-IW0060-045.0-20220314 **Lab ID: AF01781-04** **Sampled: 03/14/22 12:49** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:17	03/19/22 03:22

Client ID: MLPV-ASMW0004-037.5-20220315 **Lab ID: AF01781-05** **Sampled: 03/15/22 09:15** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/21/22 18:53

Client ID: MLPV-ASMW0004-037.5-20220315 **Lab ID: AF01781-05RE1** **Sampled: 03/15/22 09:15** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/23/22 00:00	03/23/22 15:46

Client ID: MLPV-ASMW0005-037.5-20220314 **Lab ID: AF01781-06** **Sampled: 03/14/22 13:34** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:17	03/19/22 03:50

Client ID: MLPV-ASMW0006-037.5-20220314 **Lab ID: AF01781-07** **Sampled: 03/14/22 12:10** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:17	03/19/22 04:17

Client ID: MLPV-ASMW0006-037.5-20220314 **Lab ID: AF01781-07RE1** **Sampled: 03/14/22 12:10** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/21/22 00:00	03/21/22 19:22

Client ID: MLPV-IW0031-030.0-20220315 **Lab ID: AF01781-08** **Sampled: 03/15/22 12:06** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/18/22 13:17	03/19/22 04:45

Client ID: MLPV-IW0061-037.5-20220315 **Lab ID: AF01781-09** **Sampled: 03/15/22 09:25** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 09:41	03/21/22 10:24

Client ID: MLPV-IW0062-042.5-20220315 **Lab ID: AF01781-10** **Sampled: 03/15/22 10:17** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 09:41	03/21/22 10:52

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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: MLPV-IW0062-042.5-20220315 **Lab ID: AF01781-10RE1** **Sampled: 03/15/22 10:17** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/23/22 00:00	03/23/22 16:15

Client ID: MLPV-IW0063-037.5-20220315 **Lab ID: AF01781-11** **Sampled: 03/15/22 10:38** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 09:41	03/21/22 11:20

Client ID: MLPV-IW0063-037.5-20220315 **Lab ID: AF01781-11RE1** **Sampled: 03/15/22 10:38** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/23/22 00:00	03/23/22 16:44

Client ID: MLPV-IW0064-042.5-20220315 **Lab ID: AF01781-12** **Sampled: 03/15/22 11:23** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/21/22 12:11

Client ID: MLPV-IW0006IR-030.5-20220315 **Lab ID: AF01781-13** **Sampled: 03/15/22 09:57** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/22/22 00:39

Client ID: MLPV-IW0006IR-030.5-20220315 **Lab ID: AF01781-13RE1** **Sampled: 03/15/22 09:57** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/23/22 00:00	03/23/22 17:13

Client ID: MLPV-IW0028I-030.5-20220315 **Lab ID: AF01781-14** **Sampled: 03/15/22 13:38** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/22/22 01:07

Client ID: MLPV-IW0046-040.0-20220315 **Lab ID: AF01781-15** **Sampled: 03/15/22 12:50** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/22/22 01:36

Client ID: MLPV-IW0046-040.0-20220315 **Lab ID: AF01781-15RE1** **Sampled: 03/15/22 12:50** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/23/22 00:00	03/23/22 17:42

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SAMPLE DETECTION SUMMARY

Client ID: MLPV-IW0057-045.0-20220314 **Lab ID:** AF01781-01

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	7.5		1.3	2.5	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	2.5		1.8	2.5	ug/L	EPA 8260D	

Client ID: MLPV-IW0057-045.0-20220314 **Lab ID:** AF01781-01RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	350		7.1	10	ug/L	EPA 8260D	

Client ID: MLPV-IW0058-047.5-20220314 **Lab ID:** AF01781-02

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	9.4		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	1.1		0.73	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0058-047.5-20220314 **Lab ID:** AF01781-02RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	88		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0059-047.5-20220314 **Lab ID:** AF01781-03

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.73	I	0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	1.1		0.73	1.0	ug/L	EPA 8260D	
Vinyl chloride	37		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0060-045.0-20220314 **Lab ID:** AF01781-04

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	1.1		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	2.2		0.73	1.0	ug/L	EPA 8260D	
Vinyl chloride	88		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-ASMW0004-037.5-20220315 **Lab ID:** AF01781-05

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	4.3		1.3	2.5	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	4.3		1.8	2.5	ug/L	EPA 8260D	

Client ID: MLPV-ASMW0004-037.5-20220315 **Lab ID:** AF01781-05RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	290		7.1	10	ug/L	EPA 8260D	

Client ID: MLPV-ASMW0005-037.5-20220314 **Lab ID:** AF01781-06

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	2.6		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	36		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-ASMW0006-037.5-20220314 **Lab ID:** AF01781-07

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.62	I	0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-ASMW0006-037.5-20220314 **Lab ID:** AF01781-07RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	96		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0031-030.0-20220315 **Lab ID:** AF01781-08

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.57	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	6.1		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0061-037.5-20220315 **Lab ID:** AF01781-09

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.63	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	13		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0062-042.5-20220315 **Lab ID:** AF01781-10

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	3.6		0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0062-042.5-20220315 **Lab ID:** AF01781-10RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	170		3.6	5.0	ug/L	EPA 8260D	

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SAMPLE DETECTION SUMMARY

Client ID: MLPV-IW0063-037.5-20220315 **Lab ID:** AF01781-11

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	3.3		0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0063-037.5-20220315 **Lab ID:** AF01781-11RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	200		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0064-042.5-20220315 **Lab ID:** AF01781-12

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	11		2.6	5.0	ug/L	EPA 8260D	
Vinyl chloride	370		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0006IR-030.5-20220315 **Lab ID:** AF01781-13

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.59	I	0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0006IR-030.5-20220315 **Lab ID:** AF01781-13RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	1.6		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0046-040.0-20220315 **Lab ID:** AF01781-15

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	2.0		0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0046-040.0-20220315 **Lab ID:** AF01781-15RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	7.4		0.71	1.0	ug/L	EPA 8260D	

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ANALYTICAL RESULTS

Description: MLPV-IW0057-045.0-20220314 **Lab Sample ID:** AF01781-01 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 13:42 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**7.5**		ug/L	2.5	1.3	2.5	2C21002	EPA 8260D	03/21/22 18:24	JMW	
trans-1,2-Dichloroethene [156-60-5]^	**2.5**		ug/L	2.5	1.8	2.5	2C21002	EPA 8260D	03/21/22 18:24	JMW	
Trichloroethene [79-01-6]^	2.2	U	ug/L	2.5	2.2	2.5	2C21002	EPA 8260D	03/21/22 18:24	JMW	
Vinyl chloride [75-01-4]^	**350**		ug/L	10	7.1	10	2C22003	EPA 8260D	03/22/22 11:58	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*48*	*1*	*50.0*	*97 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 18:24*	*JMW*	
4-Bromofluorobenzene	*49*	*1*	*50.0*	*97 %*	*41-142*	*2C22003*	*EPA 8260D*	*03/22/22 11:58*	*JMW*	
Dibromofluoromethane	*44*	*1*	*50.0*	*88 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 18:24*	*JMW*	
Dibromofluoromethane	*44*	*1*	*50.0*	*88 %*	*53-146*	*2C22003*	*EPA 8260D*	*03/22/22 11:58*	*JMW*	
Toluene-d8	*50*	*1*	*50.0*	*99 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 18:24*	*JMW*	
Toluene-d8	*49*	*1*	*50.0*	*99 %*	*41-146*	*2C22003*	*EPA 8260D*	*03/22/22 11:58*	*JMW*	

Description: MLPV-IW0058-047.5-20220314 **Lab Sample ID:** AF01781-02 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 12:57 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

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Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**9.4**		ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 02:27	KKW	
trans-1,2-Dichloroethene [156-60-5]^	**1.1**		ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 02:27	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 02:27	KKW	
Vinyl chloride [75-01-4]^	**88**		ug/L	5	3.6	5.0	2C23005	EPA 8260D	03/23/22 15:18	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*53*	*1*	*50.0*	*105 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 02:27*	*KKW*	
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 15:18*	*JMW*	
Dibromofluoromethane	*51*	*1*	*50.0*	*102 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 02:27*	*KKW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*93 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 15:18*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*104 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 02:27*	*KKW*	
Toluene-d8	*49*	*1*	*50.0*	*97 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 15:18*	*JMW*	

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ANALYTICAL RESULTS

Description: MLPV-IW0059-047.5-20220314 **Lab Sample ID:** AF01781-03 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 11:57 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

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Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.73**	I	ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 02:54	KKW	
trans-1,2-Dichloroethene [156-60-5]^	**1.1**		ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 02:54	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 02:54	KKW	
Vinyl chloride [75-01-4]^	**37**		ug/L	1	0.71	1.0	2C18023	EPA 8260D	03/19/22 02:54	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*100 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 02:54*	*KKW*	
Dibromofluoromethane	*50*	*1*	*50.0*	*100 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 02:54*	*KKW*	
Toluene-d8	*51*	*1*	*50.0*	*102 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 02:54*	*KKW*	

Description: MLPV-IW0060-045.0-20220314 **Lab Sample ID:** AF01781-04 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 12:49 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

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Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**1.1**		ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 03:22	KKW	
trans-1,2-Dichloroethene [156-60-5]^	**2.2**		ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 03:22	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 03:22	KKW	
Vinyl chloride [75-01-4]^	**88**		ug/L	1	0.71	1.0	2C18023	EPA 8260D	03/19/22 03:22	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 03:22*	*KKW*	
Dibromofluoromethane	*51*	*1*	*50.0*	*101 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 03:22*	*KKW*	
Toluene-d8	*52*	*1*	*50.0*	*103 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 03:22*	*KKW*	

Description: MLPV-ASMW0004-037.5-20220315 **Lab Sample ID:** AF01781-05 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 09:15 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**4.3**		ug/L	2.5	1.3	2.5	2C21002	EPA 8260D	03/21/22 18:53	JMW	
trans-1,2-Dichloroethene [156-60-5]^	**4.3**		ug/L	2.5	1.8	2.5	2C21002	EPA 8260D	03/21/22 18:53	JMW	
Trichloroethene [79-01-6]^	2.2	U	ug/L	2.5	2.2	2.5	2C21002	EPA 8260D	03/21/22 18:53	JMW	
Vinyl chloride [75-01-4]^	**290**		ug/L	10	7.1	10	2C23005	EPA 8260D	03/23/22 15:46	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*100 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 18:53*	*JMW*	
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 15:46*	*JMW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*91 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 18:53*	*JMW*	
Dibromofluoromethane	*44*	*1*	*50.0*	*89 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 15:46*	*JMW*	
Toluene-d8	*50*	*1*	*50.0*	*100 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 18:53*	*JMW*	
Toluene-d8	*50*	*1*	*50.0*	*101 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 15:46*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-ASMW0005-037.5-20220314 **Lab Sample ID:** AF01781-06 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 13:34 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**2.6**		ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 03:50	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 03:50	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 03:50	KKW	
Vinyl chloride [75-01-4]^	**36**		ug/L	1	0.71	1.0	2C18023	EPA 8260D	03/19/22 03:50	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*53*	*1*	*50.0*	*106 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 03:50*	*KKW*	
Dibromofluoromethane	*50*	*1*	*50.0*	*100 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 03:50*	*KKW*	
Toluene-d8	*52*	*1*	*50.0*	*105 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 03:50*	*KKW*	

Description: MLPV-ASMW0006-037.5-20220314 **Lab Sample ID:** AF01781-07 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/14/22 12:10 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.62**	I	ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 04:17	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 04:17	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 04:17	KKW	
Vinyl chloride [75-01-4]^	**96**		ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 19:22	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*101 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 04:17*	*KKW*	
4-Bromofluorobenzene	*50*	*1*	*50.0*	*99 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 19:22*	*JMW*	
Dibromofluoromethane	*53*	*1*	*50.0*	*106 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 04:17*	*KKW*	
Dibromofluoromethane	*45*	*1*	*50.0*	*89 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 19:22*	*JMW*	
Toluene-d8	*53*	*1*	*50.0*	*106 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 04:17*	*KKW*	
Toluene-d8	*50*	*1*	*50.0*	*101 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 19:22*	*JMW*	

Description: MLPV-IW0031-030.0-20220315 **Lab Sample ID:** AF01781-08 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 12:06 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.57**	I	ug/L	1	0.53	1.0	2C18023	EPA 8260D	03/19/22 04:45	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18023	EPA 8260D	03/19/22 04:45	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C18023	EPA 8260D	03/19/22 04:45	KKW	
Vinyl chloride [75-01-4]^	**6.1**		ug/L	1	0.71	1.0	2C18023	EPA 8260D	03/19/22 04:45	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*101 %*	*41-142*	*2C18023*	*EPA 8260D*	*03/19/22 04:45*	*KKW*	
Dibromofluoromethane	*50*	*1*	*50.0*	*100 %*	*53-146*	*2C18023*	*EPA 8260D*	*03/19/22 04:45*	*KKW*	
Toluene-d8	*51*	*1*	*50.0*	*103 %*	*41-146*	*2C18023*	*EPA 8260D*	*03/19/22 04:45*	*KKW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0061-037.5-20220315 **Lab Sample ID:** AF01781-09 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 09:25 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.63**	I	ug/L	1	0.53	1.0	2C21005	EPA 8260D	03/21/22 10:24	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21005	EPA 8260D	03/21/22 10:24	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21005	EPA 8260D	03/21/22 10:24	KKW	
Vinyl chloride [75-01-4]^	**13**		ug/L	1	0.71	1.0	2C21005	EPA 8260D	03/21/22 10:24	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*104 %*	*41-142*	*2C21005*	*EPA 8260D*	*03/21/22 10:24*	*KKW*	
Dibromofluoromethane	*52*	*1*	*50.0*	*104 %*	*53-146*	*2C21005*	*EPA 8260D*	*03/21/22 10:24*	*KKW*	
Toluene-d8	*53*	*1*	*50.0*	*105 %*	*41-146*	*2C21005*	*EPA 8260D*	*03/21/22 10:24*	*KKW*	

Description: MLPV-IW0062-042.5-20220315 **Lab Sample ID:** AF01781-10 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 10:17 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**3.6**		ug/L	1	0.53	1.0	2C21005	EPA 8260D	03/21/22 10:52	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21005	EPA 8260D	03/21/22 10:52	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21005	EPA 8260D	03/21/22 10:52	KKW	
Vinyl chloride [75-01-4]^	**170**		ug/L	5	3.6	5.0	2C23005	EPA 8260D	03/23/22 16:15	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*100 %*	*41-142*	*2C21005*	*EPA 8260D*	*03/21/22 10:52*	*KKW*	
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 16:15*	*JMW*	
Dibromofluoromethane	*50*	*1*	*50.0*	*101 %*	*53-146*	*2C21005*	*EPA 8260D*	*03/21/22 10:52*	*KKW*	
Dibromofluoromethane	*45*	*1*	*50.0*	*89 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 16:15*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*104 %*	*41-146*	*2C21005*	*EPA 8260D*	*03/21/22 10:52*	*KKW*	
Toluene-d8	*50*	*1*	*50.0*	*100 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 16:15*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0063-037.5-20220315 **Lab Sample ID:** AF01781-11 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 10:38 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**3.3**		ug/L	1	0.53	1.0	2C21005	EPA 8260D	03/21/22 11:20	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21005	EPA 8260D	03/21/22 11:20	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21005	EPA 8260D	03/21/22 11:20	KKW	
Vinyl chloride [75-01-4]^	**200**		ug/L	5	3.6	5.0	2C23005	EPA 8260D	03/23/22 16:44	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*104 %*	*41-142*	*2C21005*	*EPA 8260D*	*03/21/22 11:20*	*KKW*	
4-Bromofluorobenzene	*50*	*1*	*50.0*	*99 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 16:44*	*JMW*	
Dibromofluoromethane	*54*	*1*	*50.0*	*109 %*	*53-146*	*2C21005*	*EPA 8260D*	*03/21/22 11:20*	*KKW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*91 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 16:44*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*104 %*	*41-146*	*2C21005*	*EPA 8260D*	*03/21/22 11:20*	*KKW*	
Toluene-d8	*50*	*1*	*50.0*	*101 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 16:44*	*JMW*	

Description: MLPV-IW0064-042.5-20220315 **Lab Sample ID:** AF01781-12 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 11:23 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**11**		ug/L	5	2.6	5.0	2C21002	EPA 8260D	03/21/22 12:11	JMW	
trans-1,2-Dichloroethene [156-60-5]^	3.6	U	ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 12:11	JMW	
Trichloroethene [79-01-6]^	4.4	U	ug/L	5	4.4	5.0	2C21002	EPA 8260D	03/21/22 12:11	JMW	
Vinyl chloride [75-01-4]^	**370**		ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 12:11	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*105 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 12:11*	*JMW*	
Dibromofluoromethane	*47*	*1*	*50.0*	*94 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 12:11*	*JMW*	
Toluene-d8	*53*	*1*	*50.0*	*105 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 12:11*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0006IR-030.5-20220315 **Lab Sample ID:** AF01781-13 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 09:57 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.59**	I	ug/L	1	0.53	1.0	2C21025	EPA 8260D	03/22/22 00:39	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21025	EPA 8260D	03/22/22 00:39	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21025	EPA 8260D	03/22/22 00:39	JMW	
Vinyl chloride [75-01-4]^	**1.6**		ug/L	1	0.71	1.0	2C23005	EPA 8260D	03/23/22 17:13	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*99 %*	*41-142*	*2C21025*	*EPA 8260D*	*03/22/22 00:39*	*JMW*	
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 17:13*	*JMW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*91 %*	*53-146*	*2C21025*	*EPA 8260D*	*03/22/22 00:39*	*JMW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*92 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 17:13*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*101 %*	*41-146*	*2C21025*	*EPA 8260D*	*03/22/22 00:39*	*JMW*	
Toluene-d8	*50*	*1*	*50.0*	*99 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 17:13*	*JMW*	

Description: MLPV-IW0028I-030.5-20220315 **Lab Sample ID:** AF01781-14 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 13:38 **Work Order:** AF01781
Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2C21025	EPA 8260D	03/22/22 01:07	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21025	EPA 8260D	03/22/22 01:07	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21025	EPA 8260D	03/22/22 01:07	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2C21025	EPA 8260D	03/22/22 01:07	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*100 %*	*41-142*	*2C21025*	*EPA 8260D*	*03/22/22 01:07*	*JMW*	
Dibromofluoromethane	*45*	*1*	*50.0*	*90 %*	*53-146*	*2C21025*	*EPA 8260D*	*03/22/22 01:07*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*102 %*	*41-146*	*2C21025*	*EPA 8260D*	*03/22/22 01:07*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0046-040.0-20220315 **Lab Sample ID:** AF01781-15 **Received:** 03/16/22 17:25

Matrix: Water **Sampled:** 03/15/22 12:50 **Work Order:** AF01781

Project: NASA KSC - MLPV BSA **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**2.0**		ug/L	1	0.53	1.0	2C21025	EPA 8260D	03/22/22 01:36	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C21025	EPA 8260D	03/22/22 01:36	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2C21025	EPA 8260D	03/22/22 01:36	JMW	
Vinyl chloride [75-01-4]^	**7.4**		ug/L	1	0.71	1.0	2C23005	EPA 8260D	03/23/22 17:42	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*50*	*1*	*50.0*	*100 %*	*41-142*	*2C21025*	*EPA 8260D*	*03/22/22 01:36*	*JMW*	
4-Bromofluorobenzene	*50*	*1*	*50.0*	*101 %*	*41-142*	*2C23005*	*EPA 8260D*	*03/23/22 17:42*	*JMW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*91 %*	*53-146*	*2C21025*	*EPA 8260D*	*03/22/22 01:36*	*JMW*	
Dibromofluoromethane	*48*	*1*	*50.0*	*95 %*	*53-146*	*2C23005*	*EPA 8260D*	*03/23/22 17:42*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*101 %*	*41-146*	*2C21025*	*EPA 8260D*	*03/22/22 01:36*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*103 %*	*41-146*	*2C23005*	*EPA 8260D*	*03/23/22 17:42*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C18023 - EPA 5030B_MS

Blank (2C18023-BLK1) Prepared: 03/18/2022 13:17 Analyzed: 03/18/2022 19:32

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*53*			*ug/L*	*50.0*		*105*	*41-142*			
Dibromofluoromethane	*50*			*ug/L*	*50.0*		*100*	*53-146*			
Toluene-d8	*51*			*ug/L*	*50.0*		*102*	*41-146*			

LCS (2C18023-BS1) Prepared: 03/18/2022 13:17 Analyzed: 03/18/2022 17:41

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0		108	56-128			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0		106	54-134			
Trichloroethene	22		1.0	ug/L	20.0		111	62-135			
Vinyl chloride	23		1.0	ug/L	20.0		116	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*102*	*41-142*			
Dibromofluoromethane	*53*			*ug/L*	*50.0*		*105*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*106*	*41-146*			

Matrix Spike (2C18023-MS1) Prepared: 03/18/2022 13:17 Analyzed: 03/18/2022 18:09

Source: AF01941-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2100		100	ug/L	2000	53 U	106	56-128			
trans-1,2-Dichloroethene	2100		100	ug/L	2000	73 U	105	54-134			
Trichloroethene	2000		100	ug/L	2000	89 U	102	62-135			
Vinyl chloride	2300		100	ug/L	2000	71 U	116	20-167			
4-Bromofluorobenzene	*5100*			*ug/L*	*5000*		*102*	*41-142*			
Dibromofluoromethane	*5200*			*ug/L*	*5000*		*104*	*53-146*			
Toluene-d8	*5100*			*ug/L*	*5000*		*103*	*41-146*			

Matrix Spike Dup (2C18023-MSD1) Prepared: 03/18/2022 13:17 Analyzed: 03/18/2022 18:36

Source: AF01941-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2000		100	ug/L	2000	53 U	102	56-128	4	17	
trans-1,2-Dichloroethene	1900		100	ug/L	2000	73 U	96	54-134	9	20	
Trichloroethene	2100		100	ug/L	2000	89 U	106	62-135	4	20	
Vinyl chloride	2300		100	ug/L	2000	71 U	113	20-167	3	24	
4-Bromofluorobenzene	*5200*			*ug/L*	*5000*		*105*	*41-142*			
Dibromofluoromethane	*5100*			*ug/L*	*5000*		*102*	*53-146*			
Toluene-d8	*5100*			*ug/L*	*5000*		*103*	*41-146*			

Batch 2C21002 - EPA 5030B_MS

Blank (2C21002-BLK1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 11:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C21002 - EPA 5030B_MS - Continued

Blank (2C21002-BLK1) Continued Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 11:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*91*	*53-146*			
Toluene-d8	*51*			*ug/L*	*50.0*		*102*	*41-146*			

LCS (2C21002-BS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 08:45

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	16		1.0	ug/L	20.0		79	56-128			
trans-1,2-Dichloroethene	16		1.0	ug/L	20.0		81	54-134			
Trichloroethene	18		1.0	ug/L	20.0		90	62-135			
Vinyl chloride	15		1.0	ug/L	20.0		74	20-167			
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*104*	*41-142*			
Dibromofluoromethane	*46*			*ug/L*	*50.0*		*92*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*105*	*41-146*			

Matrix Spike (2C21002-MS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:18

Source: AF01781-12

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	110		5.0	ug/L	100	11	102	56-128			
trans-1,2-Dichloroethene	110		5.0	ug/L	100	3.6 U	111	54-134			
Trichloroethene	120		5.0	ug/L	100	4.4 U	117	62-135			
Vinyl chloride	480		5.0	ug/L	100	370	112	20-167			
4-Bromofluorobenzene	*260*			*ug/L*	*250*		*103*	*41-142*			
Dibromofluoromethane	*230*			*ug/L*	*250*		*90*	*53-146*			
Toluene-d8	*260*			*ug/L*	*250*		*102*	*41-146*			

Matrix Spike Dup (2C21002-MSD1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:47

Source: AF01781-12

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	110		5.0	ug/L	100	11	104	56-128	1	17	
trans-1,2-Dichloroethene	110		5.0	ug/L	100	3.6 U	108	54-134	2	20	
Trichloroethene	120		5.0	ug/L	100	4.4 U	117	62-135	0.6	20	
Vinyl chloride	480		5.0	ug/L	100	370	108	20-167	0.9	24	
4-Bromofluorobenzene	*260*			*ug/L*	*250*		*105*	*41-142*			
Dibromofluoromethane	*230*			*ug/L*	*250*		*94*	*53-146*			
Toluene-d8	*270*			*ug/L*	*250*		*106*	*41-146*			

Batch 2C21005 - EPA 5030B_MS

Blank (2C21005-BLK1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:29

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C21005 - EPA 5030B_MS - Continued

Blank (2C21005-BLK1) Continued Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:29

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*103*	*41-142*			
Dibromofluoromethane	*51*			*ug/L*	*50.0*		*102*	*53-146*			
Toluene-d8	*51*			*ug/L*	*50.0*		*102*	*41-146*			

LCS (2C21005-BS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:56

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0		110	56-128			
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0		101	54-134			
Trichloroethene	20		1.0	ug/L	20.0		102	62-135			
Vinyl chloride	21		1.0	ug/L	20.0		107	20-167			
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*104*	*41-142*			
Dibromofluoromethane	*54*			*ug/L*	*50.0*		*109*	*53-146*			
Toluene-d8	*52*			*ug/L*	*50.0*		*105*	*41-146*			

Matrix Spike (2C21005-MS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 18:44

Source: AF01781-09

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.63	106	56-128			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.73 U	107	54-134			
Trichloroethene	22		1.0	ug/L	20.0	0.89 U	112	62-135			
Vinyl chloride	36		1.0	ug/L	20.0	13	112	20-167			
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*103*	*41-142*			
Dibromofluoromethane	*56*			*ug/L*	*50.0*		*113*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*106*	*41-146*			

Matrix Spike Dup (2C21005-MSD1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 19:12

Source: AF01781-09

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.63	108	56-128	2	17	
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0	0.73 U	102	54-134	5	20	
Trichloroethene	21		1.0	ug/L	20.0	0.89 U	104	62-135	8	20	
Vinyl chloride	34		1.0	ug/L	20.0	13	102	20-167	6	24	
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*102*	*41-142*			
Dibromofluoromethane	*55*			*ug/L*	*50.0*		*109*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*106*	*41-146*			

Batch 2C21025 - EPA 5030B_MS

Blank (2C21025-BLK1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 22:44

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C21025 - EPA 5030B_MS - Continued

Blank (2C21025-BLK1) Continued Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 22:44

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*49*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*90*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*98*	*41-146*			

LCS (2C21025-BS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 20:48

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	19		1.0	ug/L	20.0		93	56-128			
trans-1,2-Dichloroethene	19		1.0	ug/L	20.0		96	54-134			
Trichloroethene	21		1.0	ug/L	20.0		107	62-135			
Vinyl chloride	17		1.0	ug/L	20.0		85	20-167			
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*101*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*89*	*53-146*			
Toluene-d8	*50*			*ug/L*	*50.0*		*101*	*41-146*			

Matrix Spike (2C21025-MS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 21:17

Source: AF02030-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	2.5	97	56-128			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.73 U	106	54-134			
Trichloroethene	27		1.0	ug/L	20.0	4.3	115	62-135			
Vinyl chloride	19		1.0	ug/L	20.0	0.71 U	93	20-167			
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*101*	*41-142*			
Dibromofluoromethane	*44*			*ug/L*	*50.0*		*87*	*53-146*			
Toluene-d8	*50*			*ug/L*	*50.0*		*101*	*41-146*			

Matrix Spike Dup (2C21025-MSD1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 21:46

Source: AF02030-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	2.5	97	56-128	0.6	17	
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0	0.73 U	101	54-134	5	20	
Trichloroethene	27		1.0	ug/L	20.0	4.3	113	62-135	2	20	
Vinyl chloride	18		1.0	ug/L	20.0	0.71 U	92	20-167	0.8	24	
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*100*	*41-142*			
Dibromofluoromethane	*44*			*ug/L*	*50.0*		*88*	*53-146*			
Toluene-d8	*51*			*ug/L*	*50.0*		*101*	*41-146*			

Batch 2C22003 - EPA 5030B_MS

Blank (2C22003-BLK1) Prepared: 03/22/2022 00:00 Analyzed: 03/22/2022 11:01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C22003 - EPA 5030B_MS - Continued

Blank (2C22003-BLK1) Continued Prepared: 03/22/2022 00:00 Analyzed: 03/22/2022 11:01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
4-Bromofluorobenzene	*49*			*ug/L*	*50.0*		*97*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*90*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*98*	*41-146*			

LCS (2C22003-BS1) Prepared: 03/22/2022 00:00 Analyzed: 03/22/2022 08:37

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	19		1.0	ug/L	20.0		95	56-128			
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0		101	54-134			
Trichloroethene	22		1.0	ug/L	20.0		110	62-135			
Vinyl chloride	16		1.0	ug/L	20.0		80	20-167			
4-Bromofluorobenzene	*49*			*ug/L*	*50.0*		*98*	*41-142*			
Dibromofluoromethane	*44*			*ug/L*	*50.0*		*88*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*99*	*41-146*			

Matrix Spike (2C22003-MS1) Prepared: 03/22/2022 00:00 Analyzed: 03/22/2022 09:05

Source: AF02031-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.53 U	103	56-128			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	108	54-134			
Trichloroethene	24		1.0	ug/L	20.0	0.89 U	120	62-135			
Vinyl chloride	12		1.0	ug/L	20.0	0.71 U	60	20-167			
4-Bromofluorobenzene	*49*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*44*			*ug/L*	*50.0*		*88*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*99*	*41-146*			

Matrix Spike Dup (2C22003-MSD1) Prepared: 03/22/2022 00:00 Analyzed: 03/22/2022 09:34

Source: AF02031-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.53 U	106	56-128	2	17	
trans-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.73 U	113	54-134	4	20	
Trichloroethene	24		1.0	ug/L	20.0	0.89 U	122	62-135	2	20	
Vinyl chloride	14		1.0	ug/L	20.0	0.71 U	72	20-167	18	24	
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*90*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*98*	*41-146*			

Batch 2C23005 - EPA 5030B_MS

Blank (2C23005-BLK1) Prepared: 03/23/2022 00:00 Analyzed: 03/23/2022 10:30

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*48*			*ug/L*	*50.0*		*95*	*41-142*			

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C23005 - EPA 5030B_MS - Continued

Blank (2C23005-BLK1) Continued Prepared: 03/23/2022 00:00 Analyzed: 03/23/2022 10:30

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Dibromofluoromethane	*44*			*ug/L*	*50.0*		*88*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*97*	*41-146*			

LCS (2C23005-BS1) Prepared: 03/23/2022 00:00 Analyzed: 03/23/2022 08:35

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0		101	56-128			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0		105	54-134			
Trichloroethene	22		1.0	ug/L	20.0		112	62-135			
Vinyl chloride	17		1.0	ug/L	20.0		85	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*101*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*91*	*53-146*			
Toluene-d8	*50*			*ug/L*	*50.0*		*100*	*41-146*			

Matrix Spike (2C23005-MS1) Prepared: 03/23/2022 00:00 Analyzed: 03/23/2022 09:04

Source: AF01847-04

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	31		1.0	ug/L	20.0	10	103	56-128			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	110	54-134			
Trichloroethene	270	L	1.0	ug/L	20.0	250	137	62-135			QM-07
Vinyl chloride	19		1.0	ug/L	20.0	0.71 U	94	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*103*	*41-142*			
Dibromofluoromethane	*46*			*ug/L*	*50.0*		*92*	*53-146*			
Toluene-d8	*52*			*ug/L*	*50.0*		*103*	*41-146*			

Matrix Spike Dup (2C23005-MSD1) Prepared: 03/23/2022 00:00 Analyzed: 03/23/2022 09:32

Source: AF01847-04

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	33		1.0	ug/L	20.0	10	113	56-128	6	17	
trans-1,2-Dichloroethene	24		1.0	ug/L	20.0	0.73 U	118	54-134	7	20	
Trichloroethene	280	L	1.0	ug/L	20.0	250	146	62-135	0.6	20	QM-07
Vinyl chloride	21		1.0	ug/L	20.0	0.71 U	104	20-167	10	24	
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*102*	*41-142*			
Dibromofluoromethane	*46*			*ug/L*	*50.0*		*92*	*53-146*			
Toluene-d8	*52*			*ug/L*	*50.0*		*104*	*41-146*			

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

FLAGS/NOTES AND DEFINITIONS

PQL	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
B	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
I	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
J	Estimated value.
K	Off-scale low; Actual value is known to be less than the value given.
L	Off-scale high; Actual value is known to be greater than value given.
M	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
N	Presumptive evidence of presence of material.
O	Sampled, but analysis lost or not performed.
Q	Sample exceeded the accepted holding time.
T	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
U	Indicates that the compound was analyzed for but not detected.
V	Indicates that the analyte was detected in both the sample and the associated method blank.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*****	Not reported due to interference.
[CALC]	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QV-01	The associated continuing calibration verification standard exhibited high bias; since the result is ND, there is no impact.

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

AT-0781

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

ENCO

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 2
Site Location: Biosparge Area		PO No. 133847	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Dustin Slater 407-766-0747	Madan Parsotan 321-696-6000	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14 & 15-2
Lab Name: ENCO	Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)	

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B	4 DEG C Select PFAS by 537									Comments
	MLPV-IW0057-045.0-20220314	MLPV-IW0057	20220314	1342	WG	N	G	3	3										
	MLPV-IW0058-047.5-20220314	MLPV-IW0058	20220314	1257	WG	N	G	3	3										
	MLPV-IW0059-047.5-20220314	MLPV-IW0059	20220314	1157	WG	N	G	3	3										
	MLPV-IW0060-045.0-20220314	MLPV-IW0060	20220314	1249	WG	N	G	3	3										
	MLPV-ASMW0004-037.5-20220315	MLPV-ASMW0004	20220315	0915	WG	N	G	3	3										
	MLPV-ASMW0005-037.5-20220314	MLPV-ASMW0005	20220314	1324	WG	N	G	3	3										
	MLPV-ASMW0006-037.5-20220314	MLPV-ASMW0006	20220314	1210	WG	N	G	3	3										
	MLPV-IW0031-030.0-20220315	MLPV-IW0031	20220315	1206	WG	N	G	3	3										
	MLPV-IW0061-037.5-20220315	MLPV-IW0061	20220315	0925	WG	N	G	3	3										
	MLPV-IW0062-042.5-20220315	MLPV-IW0062	20220315	1017	WG	N	G	3	3										
	MLPV-IW0063-037.5-20220315	MLPV-IW0063	20220315	1038	WG	N	G	3	3										
	MLPV-IW0064-042.5-20220315	MLPV-IW0064	20220315	1123	WG	N	G	3	3										

***Field* Comments:**
Report only per QAPP WS #15-14 & 15-2

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		03/09/22	13:10		3/14/22	0709
2		3/16/22	1515		3/16/22	1725
3						

Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

C-206 0.2 °C

AF01781

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

ENCO

Project Name: NASA KSC - MLPV			COC No.	Page: 2 of 2	
Site Location: Biosparge Area			PO No. 133847	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark**		Send Invoice To: Instructions in MSA #		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Dustin Slater 407-766-0747	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: ENCO	Turnaround Time(specify): Standard 14 day		Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-14 & 15-2

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl 4 DEG C	Total No. of Containers	Select VOCs by SW8260B	Select PFAS by 537	Comments
	MLPV-IW0006IR-030.5-20220315	MLPV-IW006IR	20220315	0957	WG	N	G		3	3		
	MLPV-IW0028I-030.5-20220315	MLPV-IW0028I	20220315	1338	WG	N	G		3	3		
	MLPV-IW0046-040.0-20220315	MLPV-IW0046	20220315	1250	WG	N	G		3	3		
	~~MLPV-TB02~~	~~MLPV-TB02~~	~~202203~~		~~WQ~~	~~TB~~	~~G~~		~~2~~	~~2~~		
	~~MLPV-IDW02~~	~~MLPV-IDW02~~	~~202203~~		~~IDW~~	~~IDW~~	~~G~~		~~5~~	~~3~~	~~2~~	

***Field* Comments:**
Report only per QAPP WS #15-14 & 15-2

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		03/09/22	13:10.		3/14/22	0700
2		3/14/22	1515		3/14/22	1515
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

C-206 0.2 °C

ENCO Laboratories

Accurate. Timely. Responsive. Innovative.

10775 Central Port Drive
Orlando FL, 32824
Phone: 407.826.5314 FAX: 407.850.6945

Thursday, March 24, 2022
AECOM Technical Services, Inc. (SE004)
Attn: Teresa Amentt Jennings
150 N. Orange Ave, Suite 200
Orlando, FL 32801

RE: Laboratory Results for
Project Number: 60615493.4, Project Name/Desc: NASA KSC - MLPV FHS2
ENCO Workorder(s): AF01780

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, March 16, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,



Kaitlin Dylnicki

Project Manager

Enclosure(s)

www.encolabs.com

SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: MLPV-IW0034-035.0-20220315 **Lab ID: AF01780-01** **Sampled: 03/15/22 11:07** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/18/22 00:00	03/19/22 00:08

Client ID: MLPV-IW0036-042.5-20220316 **Lab ID: AF01780-02** **Sampled: 03/16/22 10:08** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 00:00	03/19/22 00:36

Client ID: MLPV-IW0038-035.0-20220316 **Lab ID: AF01780-03** **Sampled: 03/16/22 09:12** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 00:00	03/19/22 01:05

Client ID: MLPV-IW0039-045.0-20220316 **Lab ID: AF01780-04** **Sampled: 03/16/22 09:51** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 00:00	03/19/22 01:34

Client ID: MLPV-IW0039-045.0-20220316 **Lab ID: AF01780-04RE1** **Sampled: 03/16/22 09:51** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/21/22 00:00	03/21/22 16:58

Client ID: MLPV-IW0041-045.0-20220315 **Lab ID: AF01780-05** **Sampled: 03/15/22 12:46** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/18/22 00:00	03/19/22 02:03

Client ID: MLPV-IW0041-045.0-20220315 **Lab ID: AF01780-05RE1** **Sampled: 03/15/22 12:46** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/21/22 00:00	03/21/22 17:27

Client ID: MLPV-IW0042-035.0-20220316 **Lab ID: AF01780-06** **Sampled: 03/16/22 10:47** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 00:00	03/19/22 02:32

Client ID: MLPV-IW0043-045.0-20220316 **Lab ID: AF01780-07** **Sampled: 03/16/22 11:07** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 00:00	03/19/22 03:00

Client ID: MLPV-IW0043-045.0-20220316 **Lab ID: AF01780-07RE1** **Sampled: 03/16/22 11:07** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/21/22 00:00	03/21/22 17:56

Client ID: MLPV-SAMW0004D-047.5-20220316 **Lab ID: AF01780-08** **Sampled: 03/16/22 09:24** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/30/22	03/18/22 13:59	03/19/22 13:59

Client ID: MLPV-SAMW0004I-037.5-20220315 **Lab ID: AF01780-09** **Sampled: 03/15/22 13:44** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/29/22	03/18/22 13:59	03/19/22 14:26

Client ID: MLPV-TB01-20220314 **Lab ID: AF01780-10** **Sampled: 03/14/22 11:45** **Received: 03/16/22 17:25**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	03/28/22	03/18/22 13:59	03/19/22 14:54

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

SAMPLE DETECTION SUMMARY

Client ID: MLPV-IW0034-035.0-20220315 **Lab ID:** AF01780-01

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.62	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	0.92	I	0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0036-042.5-20220316 **Lab ID:** AF01780-02

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	1.4		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	44		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0038-035.0-20220316 **Lab ID:** AF01780-03

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.63	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	1.1		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0039-045.0-20220316 **Lab ID:** AF01780-04

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
trans-1,2-Dichloroethene	5.4		0.73	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0039-045.0-20220316 **Lab ID:** AF01780-04RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	140		2.6	5.0	ug/L	EPA 8260D	
Vinyl chloride	160		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0041-045.0-20220315 **Lab ID:** AF01780-05

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	26		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	2.2		0.73	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0041-045.0-20220315 **Lab ID:** AF01780-05RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	150		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0042-035.0-20220316 **Lab ID:** AF01780-06

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.63	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	1.2		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0043-045.0-20220316 **Lab ID:** AF01780-07

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
trans-1,2-Dichloroethene	2.6		0.73	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0043-045.0-20220316 **Lab ID:** AF01780-07RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	98		2.6	5.0	ug/L	EPA 8260D	
Vinyl chloride	88		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-SAMW0004D-047.5-20220316 **Lab ID:** AF01780-08

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	2.3		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	0.94	I	0.73	1.0	ug/L	EPA 8260D	
Vinyl chloride	17		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-SAMW0004I-037.5-20220315 **Lab ID:** AF01780-09

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.56	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	15		0.71	1.0	ug/L	EPA 8260D	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0034-035.0-20220315 **Lab Sample ID:** AF01780-01 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 11:07 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.62**	I	ug/L	1	0.53	1.0	2C18013	EPA 8260D	03/19/22 00:08	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 00:08	JMW	
Vinyl chloride [75-01-4]^	**0.92**	I	ug/L	1	0.71	1.0	2C18013	EPA 8260D	03/19/22 00:08	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*101 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 00:08*	*JMW*	
Dibromofluoromethane	*50*	*1*	*50.0*	*100 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 00:08*	*JMW*	
Toluene-d8	*54*	*1*	*50.0*	*108 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 00:08*	*JMW*	

Description: MLPV-IW0036-042.5-20220316 **Lab Sample ID:** AF01780-02 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 10:08 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**1.4**		ug/L	1	0.53	1.0	2C18013	EPA 8260D	03/19/22 00:36	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 00:36	JMW	
Vinyl chloride [75-01-4]^	**44**		ug/L	1	0.71	1.0	2C18013	EPA 8260D	03/19/22 00:36	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 00:36*	*JMW*	
Dibromofluoromethane	*49*	*1*	*50.0*	*99 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 00:36*	*JMW*	
Toluene-d8	*53*	*1*	*50.0*	*107 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 00:36*	*JMW*	

Description: MLPV-IW0038-035.0-20220316 **Lab Sample ID:** AF01780-03 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 09:12 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.63**	I	ug/L	1	0.53	1.0	2C18013	EPA 8260D	03/19/22 01:05	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 01:05	JMW	
Vinyl chloride [75-01-4]^	**1.1**		ug/L	1	0.71	1.0	2C18013	EPA 8260D	03/19/22 01:05	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*48*	*1*	*50.0*	*96 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 01:05*	*JMW*	
Dibromofluoromethane	*47*	*1*	*50.0*	*94 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 01:05*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*103 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 01:05*	*JMW*	

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ANALYTICAL RESULTS

Description: MLPV-IW0039-045.0-20220316 **Lab Sample ID:** AF01780-04 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 09:51 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**140**		ug/L	5	2.6	5.0	2C21002	EPA 8260D	03/21/22 16:58	JMW	
trans-1,2-Dichloroethene [156-60-5]^	**5.4**		ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 01:34	JMW	
Vinyl chloride [75-01-4]^	**160**		ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 16:58	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*49*	*1*	*50.0*	*99 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 01:34*	*JMW*	
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 16:58*	*JMW*	
Dibromofluoromethane	*48*	*1*	*50.0*	*97 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 01:34*	*JMW*	
Dibromofluoromethane	*46*	*1*	*50.0*	*93 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 16:58*	*JMW*	
Toluene-d8	*53*	*1*	*50.0*	*106 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 01:34*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*102 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 16:58*	*JMW*	

Description: MLPV-IW0041-045.0-20220315 **Lab Sample ID:** AF01780-05 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 12:46 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**26**		ug/L	1	0.53	1.0	2C18013	EPA 8260D	03/19/22 02:03	JMW	
trans-1,2-Dichloroethene [156-60-5]^	**2.2**		ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 02:03	JMW	
Vinyl chloride [75-01-4]^	**150**		ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 17:27	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*49*	*1*	*50.0*	*97 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 02:03*	*JMW*	
4-Bromofluorobenzene	*50*	*1*	*50.0*	*101 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 17:27*	*JMW*	
Dibromofluoromethane	*48*	*1*	*50.0*	*96 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 02:03*	*JMW*	
Dibromofluoromethane	*45*	*1*	*50.0*	*91 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 17:27*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*103 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 02:03*	*JMW*	
Toluene-d8	*51*	*1*	*50.0*	*102 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 17:27*	*JMW*	

Description: MLPV-IW0042-035.0-20220316 **Lab Sample ID:** AF01780-06 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 10:47 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.63**	I	ug/L	1	0.53	1.0	2C18013	EPA 8260D	03/19/22 02:32	JMW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 02:32	JMW	
Vinyl chloride [75-01-4]^	**1.2**		ug/L	1	0.71	1.0	2C18013	EPA 8260D	03/19/22 02:32	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 02:32*	*JMW*	
Dibromofluoromethane	*48*	*1*	*50.0*	*96 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 02:32*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*104 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 02:32*	*JMW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0043-045.0-20220316 **Lab Sample ID:** AF01780-07 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 11:07 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**98**		ug/L	5	2.6	5.0	2C21002	EPA 8260D	03/21/22 17:56	JMW	
trans-1,2-Dichloroethene [156-60-5]^	**2.6**		ug/L	1	0.73	1.0	2C18013	EPA 8260D	03/19/22 03:00	JMW	
Vinyl chloride [75-01-4]^	**88**		ug/L	5	3.6	5.0	2C21002	EPA 8260D	03/21/22 17:56	JMW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*48*	*1*	*50.0*	*96 %*	*41-142*	*2C18013*	*EPA 8260D*	*03/19/22 03:00*	*JMW*	
4-Bromofluorobenzene	*50*	*1*	*50.0*	*101 %*	*41-142*	*2C21002*	*EPA 8260D*	*03/21/22 17:56*	*JMW*	
Dibromofluoromethane	*47*	*1*	*50.0*	*94 %*	*53-146*	*2C18013*	*EPA 8260D*	*03/19/22 03:00*	*JMW*	
Dibromofluoromethane	*44*	*1*	*50.0*	*89 %*	*53-146*	*2C21002*	*EPA 8260D*	*03/21/22 17:56*	*JMW*	
Toluene-d8	*52*	*1*	*50.0*	*104 %*	*41-146*	*2C18013*	*EPA 8260D*	*03/19/22 03:00*	*JMW*	
Toluene-d8	*50*	*1*	*50.0*	*101 %*	*41-146*	*2C21002*	*EPA 8260D*	*03/21/22 17:56*	*JMW*	

Description: MLPV-SAMW0004D-047.5-20220316 **Lab Sample ID:** AF01780-08 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/16/22 09:24 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**2.3**		ug/L	1	0.53	1.0	2C18025	EPA 8260D	03/19/22 13:59	KKW	
trans-1,2-Dichloroethene [156-60-5]^	**0.94**	I	ug/L	1	0.73	1.0	2C18025	EPA 8260D	03/19/22 13:59	KKW	
Vinyl chloride [75-01-4]^	**17**		ug/L	1	0.71	1.0	2C18025	EPA 8260D	03/19/22 13:59	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*53*	*1*	*50.0*	*106 %*	*41-142*	*2C18025*	*EPA 8260D*	*03/19/22 13:59*	*KKW*	
Dibromofluoromethane	*52*	*1*	*50.0*	*104 %*	*53-146*	*2C18025*	*EPA 8260D*	*03/19/22 13:59*	*KKW*	
Toluene-d8	*53*	*1*	*50.0*	*105 %*	*41-146*	*2C18025*	*EPA 8260D*	*03/19/22 13:59*	*KKW*	

Description: MLPV-SAMW0004I-037.5-20220315 **Lab Sample ID:** AF01780-09 **Received:** 03/16/22 17:25
Matrix: Water **Sampled:** 03/15/22 13:44 **Work Order:** AF01780
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.56**	I	ug/L	1	0.53	1.0	2C18025	EPA 8260D	03/19/22 14:26	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18025	EPA 8260D	03/19/22 14:26	KKW	
Vinyl chloride [75-01-4]^	**15**		ug/L	1	0.71	1.0	2C18025	EPA 8260D	03/19/22 14:26	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*103 %*	*41-142*	*2C18025*	*EPA 8260D*	*03/19/22 14:26*	*KKW*	
Dibromofluoromethane	*54*	*1*	*50.0*	*107 %*	*53-146*	*2C18025*	*EPA 8260D*	*03/19/22 14:26*	*KKW*	
Toluene-d8	*53*	*1*	*50.0*	*106 %*	*41-146*	*2C18025*	*EPA 8260D*	*03/19/22 14:26*	*KKW*	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-TB01-20220314 **Lab Sample ID:** AF01780-10 **Received:** 03/16/22 17:25

Matrix: Water **Sampled:** 03/14/22 11:45 **Work Order:** AF01780

Project: NASA KSC - MLPV FHS2 **Sampled By:** ENCO - ORL

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2C18025	EPA 8260D	03/19/22 14:54	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2C18025	EPA 8260D	03/19/22 14:54	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2C18025	EPA 8260D	03/19/22 14:54	KKW	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*103 %*	*41-142*	*2C18025*	*EPA 8260D*	*03/19/22 14:54*	*KKW*	
Dibromofluoromethane	*51*	*1*	*50.0*	*102 %*	*53-146*	*2C18025*	*EPA 8260D*	*03/19/22 14:54*	*KKW*	
Toluene-d8	*53*	*1*	*50.0*	*106 %*	*41-146*	*2C18025*	*EPA 8260D*	*03/19/22 14:54*	*KKW*	

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C18013 - EPA 5030B_MS

Blank (2C18013-BLK1) Prepared: 03/18/2022 00:00 Analyzed: 03/18/2022 22:42

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*49*			*ug/L*	*50.0*		*97*	*41-142*			
Dibromofluoromethane	*48*			*ug/L*	*50.0*		*96*	*53-146*			
Toluene-d8	*52*			*ug/L*	*50.0*		*103*	*41-146*			

LCS (2C18013-BS1) Prepared: 03/18/2022 00:00 Analyzed: 03/18/2022 20:46

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0		102	56-128			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0		108	54-134			
Vinyl chloride	18		1.0	ug/L	20.0		90	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*102*	*41-142*			
Dibromofluoromethane	*48*			*ug/L*	*50.0*		*96*	*53-146*			
Toluene-d8	*54*			*ug/L*	*50.0*		*108*	*41-146*			

Matrix Spike (2C18013-MS1) Prepared: 03/18/2022 00:00 Analyzed: 03/18/2022 21:15

Source: AF00953-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.65	108	56-128			
trans-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.73 U	113	54-134			
Vinyl chloride	23		1.0	ug/L	20.0	1.6	104	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*101*	*41-142*			
Dibromofluoromethane	*48*			*ug/L*	*50.0*		*95*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*106*	*41-146*			

Matrix Spike Dup (2C18013-MSD1) Prepared: 03/18/2022 00:00 Analyzed: 03/18/2022 21:44

Source: AF00953-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.65	105	56-128	2	17	
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	111	54-134	2	20	
Vinyl chloride	22		1.0	ug/L	20.0	1.6	102	20-167	2	24	
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*100*	*41-142*			
Dibromofluoromethane	*47*			*ug/L*	*50.0*		*94*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*105*	*41-146*			

Batch 2C18025 - EPA 5030B_MS

Blank (2C18025-BLK1) Prepared: 03/18/2022 13:59 Analyzed: 03/19/2022 07:59

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*103*	*41-142*			
Dibromofluoromethane	*51*			*ug/L*	*50.0*		*102*	*53-146*			

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C18025 - EPA 5030B_MS - Continued

Blank (2C18025-BLK1) Continued Prepared: 03/18/2022 13:59 Analyzed: 03/19/2022 07:59

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Toluene-d8	*51*			*ug/L*	*50.0*		*103*	*41-146*			

LCS (2C18025-BS1) Prepared: 03/18/2022 13:59 Analyzed: 03/19/2022 06:08

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0		108	56-128			
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0		102	54-134			
Vinyl chloride	22		1.0	ug/L	20.0		110	20-167			
4-Bromofluorobenzene	*54*			*ug/L*	*50.0*		*107*	*41-142*			
Dibromofluoromethane	*51*			*ug/L*	*50.0*		*103*	*53-146*			
Toluene-d8	*52*			*ug/L*	*50.0*		*105*	*41-146*			

Matrix Spike (2C18025-MS1) Prepared: 03/18/2022 13:59 Analyzed: 03/19/2022 06:36

Source: AF01849-03

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.53 U	110	56-128			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	109	54-134			
Vinyl chloride	25		1.0	ug/L	20.0	0.71 U	125	20-167			
4-Bromofluorobenzene	*51*			*ug/L*	*50.0*		*102*	*41-142*			
Dibromofluoromethane	*52*			*ug/L*	*50.0*		*104*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*105*	*41-146*			

Matrix Spike Dup (2C18025-MSD1) Prepared: 03/18/2022 13:59 Analyzed: 03/19/2022 07:04

Source: AF01849-03

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.53 U	114	56-128	3	17	
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	108	54-134	0.9	20	
Vinyl chloride	25		1.0	ug/L	20.0	0.71 U	124	20-167	1	24	
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*105*	*41-142*			
Dibromofluoromethane	*54*			*ug/L*	*50.0*		*108*	*53-146*			
Toluene-d8	*54*			*ug/L*	*50.0*		*107*	*41-146*			

Batch 2C21002 - EPA 5030B_MS

Blank (2C21002-BLK1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 11:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*45*			*ug/L*	*50.0*		*91*	*53-146*			
Toluene-d8	*51*			*ug/L*	*50.0*		*102*	*41-146*			

LCS (2C21002-BS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 08:45

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2C21002 - EPA 5030B_MS - Continued

LCS (2C21002-BS1) Continued Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 08:45

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	16		1.0	ug/L	20.0		79	56-128			
trans-1,2-Dichloroethene	16		1.0	ug/L	20.0		81	54-134			
Vinyl chloride	15		1.0	ug/L	20.0		74	20-167			
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*104*	*41-142*			
Dibromofluoromethane	*46*			*ug/L*	*50.0*		*92*	*53-146*			
Toluene-d8	*53*			*ug/L*	*50.0*		*105*	*41-146*			

Matrix Spike (2C21002-MS1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:18

Source: AF01781-12

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	110		5.0	ug/L	100	11	102	56-128			
trans-1,2-Dichloroethene	110		5.0	ug/L	100	3.6 U	111	54-134			
Vinyl chloride	480		5.0	ug/L	100	370	112	20-167			
4-Bromofluorobenzene	*260*			*ug/L*	*250*		*103*	*41-142*			
Dibromofluoromethane	*230*			*ug/L*	*250*		*90*	*53-146*			
Toluene-d8	*260*			*ug/L*	*250*		*102*	*41-146*			

Matrix Spike Dup (2C21002-MSD1) Prepared: 03/21/2022 00:00 Analyzed: 03/21/2022 09:47

Source: AF01781-12

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	110		5.0	ug/L	100	11	104	56-128	1	17	
trans-1,2-Dichloroethene	110		5.0	ug/L	100	3.6 U	108	54-134	2	20	
Vinyl chloride	480		5.0	ug/L	100	370	108	20-167	0.9	24	
4-Bromofluorobenzene	*260*			*ug/L*	*250*		*105*	*41-142*			
Dibromofluoromethane	*230*			*ug/L*	*250*		*94*	*53-146*			
Toluene-d8	*270*			*ug/L*	*250*		*106*	*41-146*			

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

FLAGS/NOTES AND DEFINITIONS

PQL	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
B	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
I	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
J	Estimated value.
K	Off-scale low; Actual value is known to be less than the value given.
L	Off-scale high; Actual value is known to be greater than value given.
M	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
N	Presumptive evidence of presence of material.
O	Sampled, but analysis lost or not performed.
Q	Sample exceeded the accepted holding time.
T	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
U	Indicates that the compound was analyzed for but not detected.
V	Indicates that the analyte was detected in both the sample and the associated method blank.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*****	Not reported due to interference.
[CALC]	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

AF01786

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

ENCO

Project Name: NASA KSC - MLPV			COC No.	Page: 2 of 2
Site Location: Former Hot Spot 2			PO No. 133847	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark**		Send Invoice To: Instructions in MSA # 19S-24548-GV03	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
			Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Dustin Slater 407-766-0747/	Madan Parsotan 321-696-6000	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13, 15-2, & 15-14
Lab Name: ENCO		Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)	

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B	4 DEG C Select PFAS by 537	HCl Select VOCs by SW8260B by Wksht #15-14	Comments
	MLPV-IW0043-ORS.D-20220316	MLPV-IW0043	20220316	1107	WG	N	G	3	3			
	~~MLPV-IW0044~~	~~MLPV-IW0044~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	~~MLPV-IW0045~~	~~MLPV-IW0045~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	MLPV-SAMW0004D-ORS.D-20220316	MLPV-SAMW0004D	20220316	0924	WG	N	G	3	3			
	MLPV-SAMW0004I-ORS.D-20220315	MLPV-SAMW0004I	20220315	1344	WG	N	G	3	3			
	MLPV-TB01-20220314	MLPV-TB01	20220314	1145	WG	TB	G	3	3			
	~~MLPV-IDW01~~	~~MLPV-IDW01~~	~~202203~~		~~IDW~~	~~IDW~~	~~G~~	~~5~~		~~2~~	~~3~~	

***Field* Comments:**

Report only per QAPP WS #15-13 & 15-2. IDW reported by wksht 15-14 only

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		03/09/22	13:30.		3/14/22	0700
2		3/16/22	1515		3/16/22	1725
3						

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

C-206 0.2°C

AFO1780

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. | Page: 1 of 2

Project Name: NASA KSC - MLPV | PO No. 133847 | Project No. 60615493.4 | Phase:

Site Location: Former Hot Spot 2 | Send Invoice To: Instructions in MSA | EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings

TO No.: 80KSC019F0075 | AECOM Project Manager: **Linnea King Clark** | Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando | Report to: Jennifer Chastain Cc: Teresa Amentt Jennings

Sampler/Phone #: Dustin Slater 407-766-0747/ Madan Parsotan 321-696-6000 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-13, 15-2, & 15-14

Lab Name: ENCO | Turnaround Time(specify): Standard 14 day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl 4 DEG C HCl — Total No. of Containers	Select VOCs by SW8260B	Select PFAS by 537	Select VOCs by SW8260B by Wksht #15-14	Comments
	~~MLPV-IW0011I~~	~~MLPV-IW0011I~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	~~MLPV-IW0032~~	~~MLPV-IW0032~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	~~MLPV-IW0033~~	~~MLPV-IW0033~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	MLPV-IW0034 035.0-20220315	MLPV-IW0034	202203 15	1107	WG	N	G	3	3			
	~~MLPV-IW0035~~	~~MLPV-IW0035~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	MLPV-IW0036 042.5-20220316	MLPV-IW0036	202203 16	1008	WG	N	G	3	3			
	~~MLPV-IW0037~~	~~MLPV-IW0037~~	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	MLPV-IW0038 035.0-20220316	MLPV-IW0038	202203 16	0912	WG	N	G	3	3			
	MLPV-IW0039 045.0-20220316	MLPV-IW0039	202203 16	0951	WG	N	G	3	3			
	~~MLPV-IW0040~~	MLPV-IW0040	~~202203~~		~~WG~~	~~N~~	~~G~~	~~3~~	~~3~~			
	MLPV-IW0041 045.0-20220315	MLPV-IW0041	202203 15	1246	WG	N	G	3	3			
	MLPV-IW0042 035.0-20220316	MLPV-IW0042	202203 16	1047	WG	N	G	3	3			

***Field* Comments:**

Report only per QAPP WS #15-13 & 15-2. IDW reported by wksht 15-14 only

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		03/09/22	13:30		3/14/22	0700
2		3/14/22	1515		3/14/22	1723
3						

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

C-206 0.2°C

ENCO Laboratories

Accurate. Timely. Responsive. Innovative.

10775 Central Port Drive
Orlando FL, 32824
Phone: 407.826.5314 FAX: 407.850.6945

Friday, April 29, 2022
AECOM Technical Services, Inc. (SE004)
Attn: Teresa Amentt Jennings
150 N. Orange Ave, Suite 200
Orlando, FL 32801

RE: Laboratory Results for
Project Number: 60615493.4, Project Name/Desc: NASA KSC - MLPV FHS2
ENCO Workorder(s): AF03199

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Friday, April 22, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,



Kaitlin Dylnicki

Project Manager

Enclosure(s)

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SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: MLPV-IW0011I-037.5-20220421 **Lab ID: AF03199-01** **Sampled: 04/21/22 13:28** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 13:17

Client ID: MLPV-IW0032-035.0-20220421 **Lab ID: AF03199-02** **Sampled: 04/21/22 10:13** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 13:45

Client ID: MLPV-IW0033-045.0-20220421 **Lab ID: AF03199-03** **Sampled: 04/21/22 10:47** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 14:13

Client ID: MLPV-IW0033-045.0-20220421 **Lab ID: AF03199-03RE1** **Sampled: 04/21/22 10:47** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/27/22 00:00	04/27/22 11:21

Client ID: MLPV-IW0035-045.0-20220421 **Lab ID: AF03199-04** **Sampled: 04/21/22 09:13** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 14:40

Client ID: MLPV-IW0037-045.0-20220421 **Lab ID: AF03199-05** **Sampled: 04/21/22 12:44** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 11:26

Client ID: MLPV-IW0037-045.0-20220421 **Lab ID: AF03199-05RE1** **Sampled: 04/21/22 12:44** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 11:54

Client ID: MLPV-IW0040-035.0-20220421 **Lab ID: AF03199-06** **Sampled: 04/21/22 08:39** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 15:08

Client ID: MLPV-IW0044-045.0-20220421 **Lab ID: AF03199-07** **Sampled: 04/21/22 12:00** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 12:22

Client ID: MLPV-IW0044-045.0-20220421 **Lab ID: AF03199-07RE1** **Sampled: 04/21/22 12:00** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 12:50

Client ID: MLPV-IW0045-045.0-20220421 **Lab ID: AF03199-08** **Sampled: 04/21/22 11:19** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 15:35

Client ID: MLPV-IDW01-20220421 **Lab ID: AF03199-09** **Sampled: 04/21/22 14:00** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 16:03

Client ID: MLPV-TB01-20220421 **Lab ID: AF03199-10** **Sampled: 04/21/22 08:00** **Received: 04/22/22 08:30**

Parameter	Preparation	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260D	EPA 5030B_MS	05/05/22	04/26/22 00:00	04/26/22 16:31

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

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SAMPLE DETECTION SUMMARY

Client ID: MLPV-IW0032-035.0-20220421 **Lab ID:** AF03199-02

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.75	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	3.1		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0033-045.0-20220421 **Lab ID:** AF03199-03

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	100		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	9.8		0.73	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0033-045.0-20220421 **Lab ID:** AF03199-03RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	950		7.1	10	ug/L	EPA 8260D	

Client ID: MLPV-IW0037-045.0-20220421 **Lab ID:** AF03199-05RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	100		2.6	5.0	ug/L	EPA 8260D	
Vinyl chloride	200		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0040-035.0-20220421 **Lab ID:** AF03199-06

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	0.64	I	0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0044-045.0-20220421 **Lab ID:** AF03199-07

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	2.5		0.53	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0044-045.0-20220421 **Lab ID:** AF03199-07RE1

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
Vinyl chloride	200		3.6	5.0	ug/L	EPA 8260D	

Client ID: MLPV-IW0045-045.0-20220421 **Lab ID:** AF03199-08

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	6.3		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	0.95	I	0.73	1.0	ug/L	EPA 8260D	
Vinyl chloride	92		0.71	1.0	ug/L	EPA 8260D	

Client ID: MLPV-IDW01-20220421 **Lab ID:** AF03199-09

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	4.6		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	10		0.71	1.0	ug/L	EPA 8260D	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

ANALYTICAL RESULTS

Description: MLPV-IW0011I-037.5-20220421 **Lab Sample ID:** AF03199-01 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 13:28 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 13:17	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 13:17	nmc	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 13:17	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 13:17*	*nmc*	
Dibromofluoromethane	*48*	*1*	*50.0*	*97 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 13:17*	*nmc*	
Toluene-d8	*48*	*1*	*50.0*	*96 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 13:17*	*nmc*	

Description: MLPV-IW0032-035.0-20220421 **Lab Sample ID:** AF03199-02 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 10:13 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.75**	I	ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 13:45	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 13:45	nmc	
Vinyl chloride [75-01-4]^	**3.1**		ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 13:45	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*103 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 13:45*	*nmc*	
Dibromofluoromethane	*48*	*1*	*50.0*	*96 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 13:45*	*nmc*	
Toluene-d8	*48*	*1*	*50.0*	*97 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 13:45*	*nmc*	

Description: MLPV-IW0033-045.0-20220421 **Lab Sample ID:** AF03199-03 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 10:47 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**100**		ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 14:13	nmc	
trans-1,2-Dichloroethene [156-60-5]^	**9.8**		ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 14:13	nmc	
Vinyl chloride [75-01-4]^	**950**		ug/L	10	7.1	10	2D27006	EPA 8260D	04/27/22 11:21	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 14:13*	*nmc*	
4-Bromofluorobenzene	*43*	*1*	*50.0*	*86 %*	*41-142*	*2D27006*	*EPA 8260D*	*04/27/22 11:21*	*nmc*	
Dibromofluoromethane	*51*	*1*	*50.0*	*101 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 14:13*	*nmc*	
Dibromofluoromethane	*48*	*1*	*50.0*	*95 %*	*53-146*	*2D27006*	*EPA 8260D*	*04/27/22 11:21*	*nmc*	
Toluene-d8	*50*	*1*	*50.0*	*99 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 14:13*	*nmc*	
Toluene-d8	*46*	*1*	*50.0*	*92 %*	*41-146*	*2D27006*	*EPA 8260D*	*04/27/22 11:21*	*nmc*	

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ANALYTICAL RESULTS

Description: MLPV-IW0035-045.0-20220421 **Lab Sample ID:** AF03199-04 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 09:13 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 14:40	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 14:40	nmc	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 14:40	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*49*	*1*	*50.0*	*98 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 14:40*	*nmc*	
Dibromofluoromethane	*50*	*1*	*50.0*	*100 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 14:40*	*nmc*	
Toluene-d8	*49*	*1*	*50.0*	*98 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 14:40*	*nmc*	

Description: MLPV-IW0037-045.0-20220421 **Lab Sample ID:** AF03199-05 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 12:44 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**100**		ug/L	5	2.6	5.0	2D26015	EPA 8260D	04/26/22 11:54	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 11:26	nmc	
Vinyl chloride [75-01-4]^	**200**		ug/L	5	3.6	5.0	2D26015	EPA 8260D	04/26/22 11:54	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*52*	*1*	*50.0*	*105 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 11:26*	*nmc*	
4-Bromofluorobenzene	*53*	*1*	*50.0*	*105 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 11:54*	*nmc*	
Dibromofluoromethane	*50*	*1*	*50.0*	*101 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 11:26*	*nmc*	
Dibromofluoromethane	*49*	*1*	*50.0*	*98 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 11:54*	*nmc*	
Toluene-d8	*50*	*1*	*50.0*	*100 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 11:26*	*nmc*	
Toluene-d8	*50*	*1*	*50.0*	*99 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 11:54*	*nmc*	

Description: MLPV-IW0040-035.0-20220421 **Lab Sample ID:** AF03199-06 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 08:39 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**0.64**	I	ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 15:08	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 15:08	nmc	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 15:08	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 15:08*	*nmc*	
Dibromofluoromethane	*50*	*1*	*50.0*	*99 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 15:08*	*nmc*	
Toluene-d8	*48*	*1*	*50.0*	*97 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 15:08*	*nmc*	

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ANALYTICAL RESULTS

Description: MLPV-IW0044-045.0-20220421 **Lab Sample ID:** AF03199-07 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 12:00 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**2.5**		ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 12:22	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 12:22	nmc	
Vinyl chloride [75-01-4]^	**200**		ug/L	5	3.6	5.0	2D26015	EPA 8260D	04/26/22 12:50	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*53*	*1*	*50.0*	*105 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 12:22*	*nmc*	
4-Bromofluorobenzene	*51*	*1*	*50.0*	*103 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 12:50*	*nmc*	
Dibromofluoromethane	*49*	*1*	*50.0*	*98 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 12:22*	*nmc*	
Dibromofluoromethane	*50*	*1*	*50.0*	*99 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 12:50*	*nmc*	
Toluene-d8	*50*	*1*	*50.0*	*99 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 12:22*	*nmc*	
Toluene-d8	*48*	*1*	*50.0*	*97 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 12:50*	*nmc*	

Description: MLPV-IW0045-045.0-20220421 **Lab Sample ID:** AF03199-08 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 11:19 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**6.3**		ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 15:35	nmc	
trans-1,2-Dichloroethene [156-60-5]^	**0.95**	I	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 15:35	nmc	
Vinyl chloride [75-01-4]^	**92**		ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 15:35	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*103 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 15:35*	*nmc*	
Dibromofluoromethane	*50*	*1*	*50.0*	*101 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 15:35*	*nmc*	
Toluene-d8	*49*	*1*	*50.0*	*98 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 15:35*	*nmc*	

Description: MLPV-IDW01-20220421 **Lab Sample ID:** AF03199-09 **Received:** 04/22/22 08:30
Matrix: Water **Sampled:** 04/21/22 14:00 **Work Order:** AF03199
Project: NASA KSC - MLPV FHS2 **Sampled By:** Dustin Slater/Madan Parsot

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	**4.6**		ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 16:03	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 16:03	nmc	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2D26015	EPA 8260D	04/26/22 16:03	nmc	
Vinyl chloride [75-01-4]^	**10**		ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 16:03	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*101 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 16:03*	*nmc*	
Dibromofluoromethane	*49*	*1*	*50.0*	*98 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 16:03*	*nmc*	
Toluene-d8	*49*	*1*	*50.0*	*98 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 16:03*	*nmc*	

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ANALYTICAL RESULTS

Description: MLPV-TB01-20220421 **Lab Sample ID:** AF03199-10 **Received:** 04/22/22 08:30

Matrix: Water **Sampled:** 04/21/22 08:00 **Work Order:** AF03199

Project: NASA KSC - MLPV FHS2 **Sampled By:** ENCO - ORL

Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2D26015	EPA 8260D	04/26/22 16:31	nmc	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	2D26015	EPA 8260D	04/26/22 16:31	nmc	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2D26015	EPA 8260D	04/26/22 16:31	nmc	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2D26015	EPA 8260D	04/26/22 16:31	nmc	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*51*	*1*	*50.0*	*102 %*	*41-142*	*2D26015*	*EPA 8260D*	*04/26/22 16:31*	*nmc*	
Dibromofluoromethane	*48*	*1*	*50.0*	*97 %*	*53-146*	*2D26015*	*EPA 8260D*	*04/26/22 16:31*	*nmc*	
Toluene-d8	*48*	*1*	*50.0*	*96 %*	*41-146*	*2D26015*	*EPA 8260D*	*04/26/22 16:31*	*nmc*	

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QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2D26015 - EPA 5030B_MS

Blank (2D26015-BLK1) Prepared: 04/26/2022 00:00 Analyzed: 04/26/2022 10:04

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*52*			*ug/L*	*50.0*		*105*	*41-142*			
Dibromofluoromethane	*50*			*ug/L*	*50.0*		*99*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*97*	*41-146*			

LCS (2D26015-BS1) Prepared: 04/26/2022 00:00 Analyzed: 04/26/2022 08:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	21		1.0	ug/L	20.0		107	56-128			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0		104	54-134			
Trichloroethene	20		1.0	ug/L	20.0		102	62-135			
Vinyl chloride	22		1.0	ug/L	20.0		112	20-167			
4-Bromofluorobenzene	*53*			*ug/L*	*50.0*		*105*	*41-142*			
Dibromofluoromethane	*51*			*ug/L*	*50.0*		*103*	*53-146*			
Toluene-d8	*50*			*ug/L*	*50.0*		*100*	*41-146*			

Matrix Spike (2D26015-MS1) Prepared: 04/26/2022 00:00 Analyzed: 04/26/2022 08:40

Source: AF03198-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2200		100	ug/L	2000	53 U	112	56-128			
trans-1,2-Dichloroethene	2100		100	ug/L	2000	73 U	106	54-134			
Trichloroethene	2200		100	ug/L	2000	89 U	108	62-135			
Vinyl chloride	2000		100	ug/L	2000	71 U	98	20-167			
4-Bromofluorobenzene	*5100*			*ug/L*	*5000*		*103*	*41-142*			
Dibromofluoromethane	*5200*			*ug/L*	*5000*		*104*	*53-146*			
Toluene-d8	*4900*			*ug/L*	*5000*		*97*	*41-146*			

Matrix Spike Dup (2D26015-MSD1) Prepared: 04/26/2022 00:00 Analyzed: 04/26/2022 09:08

Source: AF03198-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2200		100	ug/L	2000	53 U	109	56-128	3	17	
trans-1,2-Dichloroethene	2100		100	ug/L	2000	73 U	103	54-134	3	20	
Trichloroethene	2000		100	ug/L	2000	89 U	101	62-135	7	20	
Vinyl chloride	1900		100	ug/L	2000	71 U	95	20-167	3	24	
4-Bromofluorobenzene	*5200*			*ug/L*	*5000*		*104*	*41-142*			
Dibromofluoromethane	*5000*			*ug/L*	*5000*		*100*	*53-146*			
Toluene-d8	*4800*			*ug/L*	*5000*		*96*	*41-146*			

Batch 2D27006 - EPA 5030B_MS

Blank (2D27006-BLK1) Prepared: 04/27/2022 00:00 Analyzed: 04/27/2022 10:23

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL DATA

Volatile Organic Compounds by GCMS - Quality Control

Batch 2D27006 - EPA 5030B_MS - Continued

Blank (2D27006-BLK1) Continued Prepared: 04/27/2022 00:00 Analyzed: 04/27/2022 10:23

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	*47*			*ug/L*	*50.0*		*93*	*41-142*			
Dibromofluoromethane	*52*			*ug/L*	*50.0*		*105*	*53-146*			
Toluene-d8	*48*			*ug/L*	*50.0*		*96*	*41-146*			

LCS (2D27006-BS1) Prepared: 04/27/2022 00:00 Analyzed: 04/27/2022 07:55

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0		120	56-128			
trans-1,2-Dichloroethene	25		1.0	ug/L	20.0		127	54-134			
Vinyl chloride	23		1.0	ug/L	20.0		116	20-167			
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*51*			*ug/L*	*50.0*		*101*	*53-146*			
Toluene-d8	*49*			*ug/L*	*50.0*		*98*	*41-146*			

Matrix Spike (2D27006-MS1) Prepared: 04/27/2022 00:00 Analyzed: 04/27/2022 08:28

Source: AF02886-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0	0.53 U	118	56-128			
trans-1,2-Dichloroethene	25		1.0	ug/L	20.0	0.73 U	123	54-134			
Vinyl chloride	24		1.0	ug/L	20.0	0.71 U	119	20-167			
4-Bromofluorobenzene	*50*			*ug/L*	*50.0*		*99*	*41-142*			
Dibromofluoromethane	*50*			*ug/L*	*50.0*		*100*	*53-146*			
Toluene-d8	*48*			*ug/L*	*50.0*		*97*	*41-146*			

Matrix Spike Dup (2D27006-MSD1) Prepared: 04/27/2022 00:00 Analyzed: 04/27/2022 08:57

Source: AF02886-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.53 U	116	56-128	2	17	
trans-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.73 U	117	54-134	5	20	
Vinyl chloride	23		1.0	ug/L	20.0	0.71 U	115	20-167	4	24	
4-Bromofluorobenzene	*47*			*ug/L*	*50.0*		*95*	*41-142*			
Dibromofluoromethane	*50*			*ug/L*	*50.0*		*99*	*53-146*			
Toluene-d8	*48*			*ug/L*	*50.0*		*96*	*41-146*			

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

FLAGS/NOTES AND DEFINITIONS

PQL	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
B	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
I	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
J	Estimated value.
K	Off-scale low; Actual value is known to be less than the value given.
L	Off-scale high; Actual value is known to be greater than value given.
M	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
N	Presumptive evidence of presence of material.
O	Sampled, but analysis lost or not performed.
Q	Sample exceeded the accepted holding time.
T	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
U	Indicates that the compound was analyzed for but not detected.
V	Indicates that the analyte was detected in both the sample and the associated method blank.
Y	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
Z	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
?	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
*	Not reported due to interference.
[CALC]	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

AF03199

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

	Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 2	
	Site Location: Former Hot Spot 2		PO No. 133847	Project No. 60615493.4	Phase:
	TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark**	Send Invoice To: Instructions in MSA # 19S-24548-GV03		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Dustin Slater 407-766-0747/	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
			Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13, 15-2, & 15-14
Lab Name:	ENCO	Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)		

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) **Total No. of Containers**	HCl Select VOCs by SW8260B	4 DEG C Select PFAS by 537	HCl Select VOCs by SW8260B by Wksht #15-14									Comments
	MLPV-IW0011I-037.5-20220421	MLPV-IW0011I	20220421	1328	WG	N	G	3	3											
	MLPV-IW0032-035.0-20220421	MLPV-IW0032	20220421	1013	WG	N	G	3	3											
	MLPV-IW0033-045.0-20220421	MLPV-IW0033	20220421	1047	WG	N	G	3	3											
	MLPV-IW0035-045.0-20220421	MLPV-IW0035	20220421	0913	WG	N	G	3	3											
	MLPV-IW0037-045.0-20220421	MLPV-IW0037	20220421	1244	WG	N	G	3	3											
	MLPV-IW0040-035.0-20220421	MLPV-IW0040	20220421	0839	WG	N	G	3	3											
	MLPV-IW0044-045.0-20220421	MLPV-IW0044	20220421	1200	WG	N	G	3	3											
	MLPV-IW0045-045.0-20220421	MLPV-IW0045	20220421	1119	WG	N	G	3	3											
	MLPV-IDW01-20220421	MLPV-IDW01	20220421	1400	IDW	IDW	G	6	3	3										
	MLPV-TB01-20220421	MLPV-TB01	20220421	0800	WQ	N	G	3	3											

***Field* Comments:**

Report only per QAPP WS #15-13 & 15-2. IDW reported by wksht 15-14 only

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 1-C025

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	03/15/22	1210	1	4/21/22	0630
2	4/22/22	0835	2	4.22.22	0830
3			3		

Samples Iced?(check) Yes ✓ No___ 5.3°C

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
P 843.556.8171
F 843.766.1178

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May 17, 2022

Kaitlin Dylnicki
Environmental Conservation Laboratories, Inc.
10775 Central Port Drive
Orlando, Florida 32824

Re: NASA PFAS - Dylnicki
Work Order: 577721
SDG: AF03199

Dear Kaitlin Dylnicki:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 26, 2022. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Delaney Stone

Delaney Stone
Project Manager

Purchase Order: GELP21-0027
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

ENCL001 Environmental Conservation Laboratories

Client SDG: AF03199 GEL Work Order: 577721

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

J The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Delaney Stone.

Reviewed by Delaney Stone

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: May 17, 2022

Company :	Environmental Conservation Laboratories, Inc.
Address :	10775 Central Port Drive Orlando, Florida 32824
Contact:	Kaitlin Dylnicki
Project:	NASA PFAS - Dylnicki

Client Sample ID:	MLPV-IDW01-20220421	Project:	ENCL00421
Sample ID:	577721001	Client ID:	ENCL001
Matrix:	Water		
Collect Date:	21-APR-22 14:00		
Receive Date:	26-APR-22		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
LCMSMS PFCs												
EPA 537.1Mod PFCs by LC-MS/MS "As Received"												
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	U	ND	0.000579	0.00165	ug/L	0.0175	1	MB2	05/11/22	1652	2261646	1
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	U	ND	0.000579	0.00164	ug/L	0.0175	1					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	ND	0.00116	0.00351	ug/L	0.0175	1					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	ND	0.00116	0.00351	ug/L	0.0175	1					
Perfluorobutane sulfonic acid (PFBS)	J	0.000877	0.000579	0.00156	ug/L	0.0175	1					
Perfluorodecanoic acid (PFDA)	U	ND	0.000684	0.00175	ug/L	0.0175	1					
Perfluorododecanoic acid (PFDOA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluoroheptanoic acid (PFHpA)		0.00216	0.000579	0.00175	ug/L	0.0175	1					
Perfluorohexane sulfonic acid (PFHxS)		0.00495	0.000579	0.00160	ug/L	0.0175	1					
Perfluorohexanoic acid (PFHxA)		0.00394	0.000702	0.00175	ug/L	0.0175	1					
Perfluorononanoic acid (PFNA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluorooctane sulfonic acid (PFOS)		0.0115	0.000702	0.00175	ug/L	0.0175	1					
Perfluorooctanoic acid (PFOA)		0.00899	0.000702	0.00175	ug/L	0.0175	1					
Perfluorotetradecanoic acid (PFTDA)	U	ND	0.000702	0.00175	ug/L	0.0175	1					
Perfluorotridecanoic acid (PFTrDA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluoroundecanoic acid (PFUnDA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 537.1 Mod, PFAS, Compl PFCs	Extraction in Liquid	MM3	05/04/22	0923	2261644

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: May 17, 2022

Company :	Environmental Conservation Laboratories, Inc.
Address :	10775 Central Port Drive
	Orlando, Florida 32824
Contact:	Kaitlin Dylnicki
Project:	NASA PFAS - Dylnicki

Client Sample ID:	MLPV-IDW01-20220421	Project:	ENCL00421
Sample ID:	577721001	Client ID:	ENCL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

QC Summary

Report Date: May 17, 2022

Environmental Conservation Laboratories, Inc.
10775 Central Port Drive
Orlando, Florida

Contact: **Kaitlin Dylnicki**

Workorder: **577721**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Perfluorinated Compounds											
Batch 2261646											
QC1205082680 LCS											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0177			0.0154	ug/L		87	(59%-144%)	MB2	05/11/22	13:12
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0188			0.0199	ug/L		106	(67%-136%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0175			0.0180	ug/L		103	(68%-135%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0188			0.0206	ug/L		110	(67%-144%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0188			0.0214	ug/L		114	(57%-139%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0188			0.0182	ug/L		97	(59%-145%)			
Perfluorobutane sulfonic acid (PFBS)	0.0167			0.0171	ug/L		102	(70%-144%)			
Perfluorodecanoic acid (PFDA)	0.0188			0.0205	ug/L		109	(65%-145%)			
Perfluorododecanoic acid (PFDOA)	0.0188			0.0176	ug/L		93	(65%-137%)			
Perfluoroheptanoic acid (PFHpA)	0.0188			0.0184	ug/L		98	(71%-133%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0172			0.0220	ug/L		128	(67%-145%)			
Perfluorohexanoic acid (PFHxA)	0.0188			0.0208	ug/L		110	(70%-138%)			
Perfluorononanoic acid (PFNA)	0.0188			0.0163	ug/L		87	(69%-133%)			
Perfluorooctane sulfonic acid (PFOS)	0.0188			0.0180	ug/L		95	(65%-145%)			

QC Summary

Workorder: 577721

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds										
Batch 2261646										
Perfluorooctanoic acid (PFOA)	0.0188			0.0211	ug/L		112	(66%-139%)	MB2	05/11/22 13:12
Perfluorotetradecanoic acid (PFTDA)	0.0188			0.0190	ug/L		101	(66%-138%)		
Perfluorotridecanoic acid (PFTrDA)	0.0188			0.0178	ug/L		95	(58%-140%)		
Perfluoroundecanoic acid (PFUnDA)	0.0188			0.0202	ug/L		107	(63%-135%)		
QC1205082679 MB										
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)			U	ND	ug/L					05/11/22 13:03
4,8-Dioxa-3H-perfluorononanoic acid (DONA)			U	ND	ug/L					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)			U	ND	ug/L					
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)			U	ND	ug/L					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)			U	ND	ug/L					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)			U	ND	ug/L					
Perfluorobutane sulfonic acid (PFBS)			U	ND	ug/L					
Perfluorodecanoic acid (PFDA)			U	ND	ug/L					
Perfluorododecanoic acid (PFDOA)			U	ND	ug/L					
Perfluoroheptanoic acid (PFHpA)			U	ND	ug/L					
Perfluorohexane sulfonic acid (PFHxS)			U	ND	ug/L					

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
Perfluorohexanoic acid (PFHxA)				U	ND	ug/L				MB2	05/11/22 13:03
Perfluorononanoic acid (PFNA)				U	ND	ug/L					
Perfluorooctane sulfonic acid (PFOS)				U	ND	ug/L					
Perfluorooctanoic acid (PFOA)				U	ND	ug/L					
Perfluorotetradecanoic acid (PFTDA)				U	ND	ug/L					
Perfluorotridecanoic acid (PFTrDA)				U	ND	ug/L					
Perfluoroundecanoic acid (PFUnDA)				U	ND	ug/L					
QC1205082681 577466003 MS											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0168	U	ND		0.0154	ug/L		92	(42%-138%)		05/14/22 17:01
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0178	U	ND		0.0167	ug/L		94	(62%-132%)		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0166	U	ND		0.0170	ug/L		102	(54%-139%)		
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0178	U	ND		0.0206	ug/L		116	(51%-159%)		
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0178	U	ND		0.0156	ug/L		88	(38%-148%)		
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0178	U	ND		0.0208	ug/L		117	(40%-144%)		
Perfluorobutane sulfonic acid (PFBS)	0.0158		0.614		0.652	ug/L		241*	(52%-147%)		05/12/22 15:56
Perfluorodecanoic acid (PFDA)	0.0178	U	ND		0.0184	ug/L		100	(44%-143%)		05/14/22 17:01

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
Perfluorododecanoic acid (PFDOA)	0.0178	U	ND		0.0191	ug/L		107	(45%-142%)	MB2	05/14/22 17:01
Perfluoroheptanoic acid (PFHpA)	0.0178		0.0661		0.102	ug/L		201*	(51%-149%)		
Perfluorohexane sulfonic acid (PFHxS)	0.0162		2.11		1.99	ug/L		0*	(50%-148%)		05/11/22 15:10
Perfluorohexanoic acid (PFHxA)	0.0178		0.373		0.385	ug/L		62	(50%-150%)		05/12/22 15:56
Perfluorononanoic acid (PFNA)	0.0178		0.00353		0.0252	ug/L		122	(54%-146%)		05/14/22 17:01
Perfluorooctane sulfonic acid (PFOS)	0.0178		0.907		0.981	ug/L		416*	(42%-150%)		05/12/22 15:56
Perfluorooctanoic acid (PFOA)	0.0178		0.0965		0.137	ug/L		230*	(50%-151%)		05/14/22 17:01
Perfluorotetradecanoic acid (PFTDA)	0.0178	U	ND		0.0203	ug/L		114	(41%-148%)		
Perfluorotridecanoic acid (PFTrDA)	0.0178	U	ND		0.0167	ug/L		94	(41%-142%)		
Perfluoroundecanoic acid (PFUnDA)	0.0178	U	ND		0.0212	ug/L		119	(44%-141%)		
QC1205082682 577466003 MSD											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0173	U	ND		0.0166	ug/L		96*	(0%-36%)		05/14/22 17:09
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0184	U	ND		0.0164	ug/L		89*	(0%-28%)		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0171	U	ND		0.0193	ug/L		113*	(0%-33%)		
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0184	U	ND		0.0194	ug/L		106*	(0%-28%)		
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0184	U	ND		0.0197	ug/L		108*	(0%-36%)		

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0184	U	ND		0.0199	ug/L		108*	(0%-36%)	MB2	05/14/22 17:09
Perfluorobutane sulfonic acid (PFBS)	0.0163		0.614		0.587	ug/L		0	(0%-27%)		05/12/22 16:04
Perfluorodecanoic acid (PFDA)	0.0184	U	ND		0.0197	ug/L		104*	(0%-35%)		05/14/22 17:09
Perfluorododecanoic acid (PFDOA)	0.0184	U	ND		0.0204	ug/L		111*	(0%-30%)		
Perfluoroheptanoic acid (PFHpA)	0.0184		0.0661		0.102	ug/L		196*	(0%-26%)		
Perfluorohexane sulfonic acid (PFHxS)	0.0167		2.11		2.15	ug/L		240*	(0%-31%)		05/11/22 15:18
Perfluorohexanoic acid (PFHxA)	0.0184		0.373		0.396	ug/L		123*	(0%-26%)		05/12/22 16:04
Perfluorononanoic acid (PFNA)	0.0184		0.00353		0.0235	ug/L		109*	(0%-30%)		05/14/22 17:09
Perfluorooctane sulfonic acid (PFOS)	0.0184		0.907		0.963	ug/L		305*	(0%-31%)		05/12/22 16:04
Perfluorooctanoic acid (PFOA)	0.0184		0.0965		0.132	ug/L		193*	(0%-28%)		05/14/22 17:09
Perfluorotetradecanoic acid (PFTDA)	0.0184	U	ND		0.0210	ug/L		114*	(0%-32%)		
Perfluorotridecanoic acid (PFTrDA)	0.0184	U	ND		0.0174	ug/L		95*	(0%-35%)		
Perfluoroundecanoic acid (PFUnDA)	0.0184	U	ND		0.0197	ug/L		107*	(0%-34%)		

Notes:

The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 577721

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time

A	The TIC is a suspected aldol-condensation product
B	The target analyte was detected in the associated blank.
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
E	Concentration of the target analyte exceeds the instrument calibration range
J	The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
JNX	Non Calibrated Compound
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
Q	Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where the duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

LCMSMS-Misc
Technical Case Narrative
Environmental Conservation Laboratories
SDG #: AF03199
Work Order #: 577721

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 12
Analytical Batches: 2261646 and 2261644

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
577721001	MLPV-IDW01-20220421
1205082679	Method Blank (MB)
1205082680	Laboratory Control Sample (LCS)
1205082681	577466003(NonSDG) Matrix Spike (MS)
1205082682	577466003(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS) Recovery Statement
One or more of the required spiking analytes were not within the acceptance limits in the matrix spike (MS)and/or matrix spike duplicate(MSD). The parent sample, matrix spike (MS) and matrix spike duplicate (MSD) were diluted. The recoveries may not fall within the acceptance range.

Sample	Analyte	Value
1205082681 (Non SDG 577466003MS)	Perfluorobutane sulfonic acid (PFBS)	241* (52%-147%)
	Perfluorohexane sulfonic acid (PFHxS)	0* (50%-148%)
	Perfluorooctane sulfonic acid (PFOS)	416* (42%-150%)
1205082682 (Non SDG 577466003MSD)	Perfluorobutane sulfonic acid (PFBS)	0* (52%-147%)
	Perfluorohexane sulfonic acid (PFHxS)	240* (50%-148%)
	Perfluorooctane sulfonic acid (PFOS)	305* (42%-150%)

The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value

1205082681 (Non SDG 577466003MS)	Perfluoroheptanoic acid (PFHpA)	201* (51%-149%)
	Perfluorooctanoic acid (PFOA)	230* (50%-151%)
1205082682 (Non SDG 577466003MSD)	Perfluoroheptanoic acid (PFHpA)	196* (51%-149%)
	Perfluorooctanoic acid (PFOA)	193* (50%-151%)

Internal Standard (ISTD) Acceptance
The following Internal Standard (IS) is a heavy isotope of an analyte that showed no discernable analyte peak. The IS failed high; we can be certain that the analyte is below the quantitation limit. There is no adverse impact on the quality of the data.

Sample	Analyte	Value
1205082681 (Non SDG 577466003MS)	1, 2-13C2 Fluorotelomer sulfonate 4:2	and DOD|173* (50%-150%)|GEL|173* (40%-160%)
1205082682 (Non SDG 577466003MSD)	1, 2-13C2 Fluorotelomer sulfonate 4:2	and DOD|183* (50%-150%)|GEL|183* (40%-160%)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Standard TAT

577721

SUBCONTRACT ORDER

ENCO Orlando

AF03199

J804/22/20

SENDING LABORATORY:

ENCO Orlando
10775 Central Port Drive
Orlando, FL 32824
Phone: 407.826.5314
Fax: 407.850.6945
Project Manager: Kaitlin Dylnicki

RECEIVING LABORATORY:

GEL Laboratories, Inc. (SC)
2040 Savage Road
Charleston, SC 29407
Phone :(843) 556-8171
Fax: (843) 766-1178
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	MLPV-IDW01-20220421	Water	21-Apr-22 14:00	

Analysis	Due	Expires	Analysis Comments
PFAS	29-Apr-22 15:00	05-May-22 14:00	14 analyte 537 GELP21-0027
Containers Supplied:			
5mLV (D)	250mLP (E)	250mLP (F)	

Released By	Date	Received By	Date
	4/22/22		4-26-22 0820
Released By	Date	Received By	Date

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ENCL	**SDG/AR/COC/Work Order:** 577721
Received By: BE	**Date Received:** 4.26.22
Carrier and Tracking Number	Circle Applicable: FedEx Express / FedEx Ground / UPS / Field Services / Courier / Other 5583 3250 7744

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		\	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		\	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		\	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr **Classified as: Rad 1 Rad 2 Rad 3**
D) Did the client designate samples are hazardous?		\	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		\	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria		Yes	NA	No	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	\			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	\			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	\			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius **TEMP:** 2
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR2-21 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	\			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		\		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			\	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	\			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	\			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	\			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	\			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			\	
13	COC form is properly signed in relinquished/received sections?	\			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NRL Date 4/27/22 Page 1 of 1

GL-CHL-SR-001 Rev 7

List of current GEL Certifications as of 17 May 2022

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122022−4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−22−20
Utah NELAP	SC000122021−36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 1/4/2023 12:19:58 PM

JOB DESCRIPTION

NASA KSC MLPV

JOB NUMBER

670-11450-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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1/4/2023 12:19:58 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
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(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-11450-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-11450-1

Receipt
The samples were received on 12/14/2022 1:46 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Client Sample ID: VABRA-MW0011-027.5-20221214 — Lab Sample ID: 670-11450-1

No Detections.

Client Sample ID: VABRA-MW0012-020.0-20221214 — Lab Sample ID: 670-11450-2

No Detections.

Client Sample ID: VABRA-MW0013-022.5-20221214 — Lab Sample ID: 670-11450-3

No Detections.

Client Sample ID: VABRA-MW0014-027.5-20221214 — Lab Sample ID: 670-11450-4

No Detections.

Client Sample ID: VABRA-TB01-20221214 — Lab Sample ID: 670-11450-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: VABRA-MW0011-027.5-20221214 Lab Sample ID: 670-11450-1

Date Collected: 12/14/22 10:12 **Matrix: Ground Water**
Date Received: 12/14/22 13:46

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:55	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:55	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:55	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 14:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*80 - 120*		*12/22/22 14:55*	*1*

Client Sample ID: VABRA-MW0012-020.0-20221214 Lab Sample ID: 670-11450-2

Date Collected: 12/14/22 10:47 **Matrix: Ground Water**
Date Received: 12/14/22 13:46

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:13	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:13	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:13	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 15:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/22/22 15:13*	*1*

Client Sample ID: VABRA-MW0013-022.5-20221214 Lab Sample ID: 670-11450-3

Date Collected: 12/14/22 11:32 **Matrix: Ground Water**
Date Received: 12/14/22 13:46

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:31	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:31	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:31	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 15:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/22/22 15:31*	*1*

Client Sample ID: VABRA-MW0014-027.5-20221214 Lab Sample ID: 670-11450-4

Date Collected: 12/14/22 12:11 **Matrix: Ground Water**
Date Received: 12/14/22 13:46

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:49	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:49	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:49	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 15:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/22/22 15:49*	*1*

Client Sample Results

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Client Sample ID: VABRA-TB01-20221214

Date Collected: 12/14/22 08:00
Date Received: 12/14/22 13:46

Lab Sample ID: 670-11450-5

Matrix: Water

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 12:49	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 12:49	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 12:49	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 12:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*80 - 120*		*12/22/22 12:49*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Ground Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	TOL (80-120)
670-11450-1	VABRA-MW0011-027.5-202212	101
670-11450-2	VABRA-MW0012-020.0-20221214	99
670-11450-3	VABRA-MW0013-022.5-20221214	100
670-11450-4	VABRA-MW0014-027.5-20221214	100

Surrogate Legend

TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	TOL (80-120)
660-125669-C-2 MS	Matrix Spike	101
670-11450-5	VABRA-TB01-20221214	100
678-6401-E-1 DU	Duplicate	98
LCS 670-15667/4	Lab Control Sample	102
MB 670-15667/6	Method Blank	99

Surrogate Legend

TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 670-15667/6
Matrix: Water
Analysis Batch: 15667

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:15	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:15	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:15	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 11:15	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*12/22/22 11:15*	*1*

Lab Sample ID: LCS 670-15667/4
Matrix: Water
Analysis Batch: 15667

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.6		ug/L		98	50 - 150
trans-1,2-Dichloroethene	20.0	21.9		ug/L		110	50 - 150
Trichloroethene	20.0	21.7		ug/L		108	50 - 150
Vinyl chloride	20.0	23.2		ug/L		116	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: 660-125669-C-2 MS
Matrix: Water
Analysis Batch: 15667

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.50	U	20.0	21.0		ug/L		105	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	23.5		ug/L		118	50 - 150
Trichloroethene	0.50	U	20.0	22.7		ug/L		114	50 - 150
Vinyl chloride	0.50	U	20.0	25.2		ug/L		126	50 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 678-6401-E-1 DU
Matrix: Water
Analysis Batch: 15667

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
cis-1,2-Dichloroethene	0.50	U	0.50	U	ug/L		NC	30
trans-1,2-Dichloroethene	0.50	U	0.50	U	ug/L		NC	30
Trichloroethene	0.50	U	0.50	U	ug/L		NC	30
Vinyl chloride	0.50	U	0.50	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*80 - 120*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

GC/MS VOA

Analysis Batch: 15667

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11450-1	VABRA-MW0011-027.5-20221214	Total/NA	Ground Water	8260B	
670-11450-2	VABRA-MW0012-020.0-20221214	Total/NA	Ground Water	8260B	
670-11450-3	VABRA-MW0013-022.5-20221214	Total/NA	Ground Water	8260B	
670-11450-4	VABRA-MW0014-027.5-20221214	Total/NA	Ground Water	8260B	
670-11450-5	VABRA-TB01-20221214	Total/NA	Water	8260B	
MB 670-15667/6	Method Blank	Total/NA	Water	8260B	
LCS 670-15667/4	Lab Control Sample	Total/NA	Water	8260B	
660-125669-C-2 MS	Matrix Spike	Total/NA	Water	8260B	
678-6401-E-1 DU	Duplicate	Total/NA	Water	8260B	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Client Sample ID: VABRA-MW0011-027.5-20221214
Lab Sample ID: 670-11450-1
Date Collected: 12/14/22 10:12
Matrix: Ground Water
Date Received: 12/14/22 13:46

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15667	K1P	EET ORL	12/22/22 14:55

Client Sample ID: VABRA-MW0012-020.0-20221214
Lab Sample ID: 670-11450-2
Date Collected: 12/14/22 10:47
Matrix: Ground Water
Date Received: 12/14/22 13:46

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15667	K1P	EET ORL	12/22/22 15:13

Client Sample ID: VABRA-MW0013-022.5-20221214
Lab Sample ID: 670-11450-3
Date Collected: 12/14/22 11:32
Matrix: Ground Water
Date Received: 12/14/22 13:46

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15667	K1P	EET ORL	12/22/22 15:31

Client Sample ID: VABRA-MW0014-027.5-20221214
Lab Sample ID: 670-11450-4
Date Collected: 12/14/22 12:11
Matrix: Ground Water
Date Received: 12/14/22 13:46

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15667	K1P	EET ORL	12/22/22 15:49

Client Sample ID: VABRA-TB01-20221214
Lab Sample ID: 670-11450-5
Date Collected: 12/14/22 08:00
Matrix: Water
Date Received: 12/14/22 13:46

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15667	K1P	EET ORL	12/22/22 12:49

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-11450-1
Project/Site: NASA KSC MLPV

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV

Job ID: 670-11450-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-11450-1	VABRA-MW0011-027.5-20221214	Ground Water	12/14/22 10:12	12/14/22 13:46
670-11450-2	VABRA-MW0012-020.0-20221214	Ground Water	12/14/22 10:47	12/14/22 13:46
670-11450-3	VABRA-MW0013-022.5-20221214	Ground Water	12/14/22 11:32	12/14/22 13:46
670-11450-4	VABRA-MW0014-027.5-20221214	Ground Water	12/14/22 12:11	12/14/22 13:46
670-11450-5	VABRA-TB01-20221214	Water	12/14/22 08:00	12/14/22 13:46

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of 1	
Site Location: Hot Spot 3	PO No. 148539	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075 — AECOM Project Manager: **Linnea King Clark cc: Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins — Turnaround Time(specify): Standard 14 day	Deliver Samples To: Eurofins Orlando		Site-Spicific WS#15 from QAPP: 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B	4 DEG C Select PFAS by 537	Comments
	VABRA-MW0011-0275-20221214	VABRA-MW0011	20221214	1012	WG	N	G	3	3		
	VABRA-MW0012-020-0-20221214	VABRA-MW0012	20221214	1047	WG	N	G	3	3		
	VABRA-MW0013-022-5-20221214	VABRA-MW0013	20221214	1132	WG	N	G	3	3		
	VABRA-MW0014-0275-20221214	VABRA-MW0014	20221214	1211	WG	N	G	3	3		
	VABRA-TB01-20221214	VABRA-TB01	20221214	0800	WQ	TB	G	3	3		

670-11450 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes X No 0.6 | 0.5
Shipping Company:
Tracking No:
Date Shipped:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1			1 M. Parsotan	12/14/22	0930
2 M. Parsotan	12/14/22	1345	2 JMM	12/14/22	13.46
3			3		

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-11450-1

Login Number: 11450
List Number: 1
Creator: Semple, Rachel

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

GEL Laboratories LLC
a member of The GEL Group INC

PO Box 30712 Charleston, SC 29417
2040 Savage Road Charleston, SC 29407
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F 843.766.1178

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May 17, 2022

Kaitlin Dylnicki
Environmental Conservation Laboratories, Inc.
10775 Central Port Drive
Orlando, Florida 32824

Re: NASA PFAS - Dylnicki
Work Order: 577721
SDG: AF03199

Dear Kaitlin Dylnicki:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on April 26, 2022. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at www.gel.com.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Delaney Stone

Delaney Stone
Project Manager

Purchase Order: GELP21-0027
Enclosures

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 − (843) 556−8171 − www.gel.com

Certificate of Analysis Report
for

ENCL001 Environmental Conservation Laboratories

Client SDG: AF03199 GEL Work Order: 577721

The Qualifiers in this report are defined as follows:

* A quality control analyte recovery is outside of specified acceptance criteria

** Analyte is a Tracer compound

** Analyte is a surrogate compound

J The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Delaney Stone.

Reviewed by Delaney Stone

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: May 17, 2022

Company :	Environmental Conservation Laboratories, Inc.
Address :	10775 Central Port Drive Orlando, Florida 32824
Contact:	Kaitlin Dylnicki
Project:	NASA PFAS - Dylnicki

Client Sample ID:	MLPV-IDW01-20220421	Project:	ENCL00421
Sample ID:	577721001	Client ID:	ENCL001
Matrix:	Water		
Collect Date:	21-APR-22 14:00		
Receive Date:	26-APR-22		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
LCMSMS PFCs												
EPA 537.1Mod PFCs by LC-MS/MS "As Received"												
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	U	ND	0.000579	0.00165	ug/L	0.0175	1	MB2	05/11/22	1652	2261646	1
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	U	ND	0.000579	0.00164	ug/L	0.0175	1					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	ND	0.00116	0.00351	ug/L	0.0175	1					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	ND	0.00116	0.00351	ug/L	0.0175	1					
Perfluorobutane sulfonic acid (PFBS)	J	0.000877	0.000579	0.00156	ug/L	0.0175	1					
Perfluorodecanoic acid (PFDA)	U	ND	0.000684	0.00175	ug/L	0.0175	1					
Perfluorododecanoic acid (PFDOA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluoroheptanoic acid (PFHpA)		0.00216	0.000579	0.00175	ug/L	0.0175	1					
Perfluorohexane sulfonic acid (PFHxS)		0.00495	0.000579	0.00160	ug/L	0.0175	1					
Perfluorohexanoic acid (PFHxA)		0.00394	0.000702	0.00175	ug/L	0.0175	1					
Perfluorononanoic acid (PFNA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluorooctane sulfonic acid (PFOS)		0.0115	0.000702	0.00175	ug/L	0.0175	1					
Perfluorooctanoic acid (PFOA)		0.00899	0.000702	0.00175	ug/L	0.0175	1					
Perfluorotetradecanoic acid (PFTDA)	U	ND	0.000702	0.00175	ug/L	0.0175	1					
Perfluorotridecanoic acid (PFTrDA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
Perfluoroundecanoic acid (PFUnDA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	U	ND	0.000579	0.00175	ug/L	0.0175	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 537.1 Mod, PFAS, Compl PFCs	Extraction in Liquid	MM3	05/04/22	0923	2261644

GEL LABORATORIES LLC
2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: May 17, 2022

Company :	Environmental Conservation Laboratories, Inc.
Address :	10775 Central Port Drive
	Orlando, Florida 32824
Contact:	Kaitlin Dylnicki
Project:	NASA PFAS - Dylnicki

Client Sample ID:	MLPV-IDW01-20220421	Project:	ENCL00421
Sample ID:	577721001	Client ID:	ENCL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method

The following Analytical Methods were performed:

Method	Description	Analyst Comments
1	EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15	

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

QC Summary

Report Date: May 17, 2022

Environmental Conservation Laboratories, Inc.
10775 Central Port Drive
Orlando, Florida

Contact: **Kaitlin Dylnicki**

Workorder: **577721**

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Perfluorinated Compounds											
Batch 2261646											
QC1205082680 LCS											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0177			0.0154	ug/L		87	(59%-144%)	MB2	05/11/22	13:12
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0188			0.0199	ug/L		106	(67%-136%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0175			0.0180	ug/L		103	(68%-135%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0188			0.0206	ug/L		110	(67%-144%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0188			0.0214	ug/L		114	(57%-139%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0188			0.0182	ug/L		97	(59%-145%)			
Perfluorobutane sulfonic acid (PFBS)	0.0167			0.0171	ug/L		102	(70%-144%)			
Perfluorodecanoic acid (PFDA)	0.0188			0.0205	ug/L		109	(65%-145%)			
Perfluorododecanoic acid (PFDOA)	0.0188			0.0176	ug/L		93	(65%-137%)			
Perfluoroheptanoic acid (PFHpA)	0.0188			0.0184	ug/L		98	(71%-133%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0172			0.0220	ug/L		128	(67%-145%)			
Perfluorohexanoic acid (PFHxA)	0.0188			0.0208	ug/L		110	(70%-138%)			
Perfluorononanoic acid (PFNA)	0.0188			0.0163	ug/L		87	(69%-133%)			
Perfluorooctane sulfonic acid (PFOS)	0.0188			0.0180	ug/L		95	(65%-145%)			

QC Summary

Workorder: 577721

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds										
Batch 2261646										
Perfluorooctanoic acid (PFOA)	0.0188			0.0211	ug/L		112	(66%-139%)	MB2	05/11/22 13:12
Perfluorotetradecanoic acid (PFTDA)	0.0188			0.0190	ug/L		101	(66%-138%)		
Perfluorotridecanoic acid (PFTrDA)	0.0188			0.0178	ug/L		95	(58%-140%)		
Perfluoroundecanoic acid (PFUnDA)	0.0188			0.0202	ug/L		107	(63%-135%)		
QC1205082679 MB										
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)			U	ND	ug/L					05/11/22 13:03
4,8-Dioxa-3H-perfluorononanoic acid (DONA)			U	ND	ug/L					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)			U	ND	ug/L					
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)			U	ND	ug/L					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)			U	ND	ug/L					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)			U	ND	ug/L					
Perfluorobutane sulfonic acid (PFBS)			U	ND	ug/L					
Perfluorodecanoic acid (PFDA)			U	ND	ug/L					
Perfluorododecanoic acid (PFDOA)			U	ND	ug/L					
Perfluoroheptanoic acid (PFHpA)			U	ND	ug/L					
Perfluorohexane sulfonic acid (PFHxS)			U	ND	ug/L					

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
Perfluorohexanoic acid (PFHxA)				U	ND	ug/L				MB2	05/11/22 13:03
Perfluorononanoic acid (PFNA)				U	ND	ug/L					
Perfluorooctane sulfonic acid (PFOS)				U	ND	ug/L					
Perfluorooctanoic acid (PFOA)				U	ND	ug/L					
Perfluorotetradecanoic acid (PFTDA)				U	ND	ug/L					
Perfluorotridecanoic acid (PFTrDA)				U	ND	ug/L					
Perfluoroundecanoic acid (PFUnDA)				U	ND	ug/L					
QC1205082681 577466003 MS											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0168	U	ND		0.0154	ug/L		92	(42%-138%)		05/14/22 17:01
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0178	U	ND		0.0167	ug/L		94	(62%-132%)		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0166	U	ND		0.0170	ug/L		102	(54%-139%)		
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0178	U	ND		0.0206	ug/L		116	(51%-159%)		
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0178	U	ND		0.0156	ug/L		88	(38%-148%)		
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0178	U	ND		0.0208	ug/L		117	(40%-144%)		
Perfluorobutane sulfonic acid (PFBS)	0.0158		0.614		0.652	ug/L		241*	(52%-147%)		05/12/22 15:56
Perfluorodecanoic acid (PFDA)	0.0178	U	ND		0.0184	ug/L		100	(44%-143%)		05/14/22 17:01

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
Perfluorododecanoic acid (PFDOA)	0.0178	U	ND		0.0191	ug/L		107	(45%-142%)	MB2	05/14/22 17:01
Perfluoroheptanoic acid (PFHpA)	0.0178		0.0661		0.102	ug/L		201*	(51%-149%)		
Perfluorohexane sulfonic acid (PFHxS)	0.0162		2.11		1.99	ug/L		0*	(50%-148%)		05/11/22 15:10
Perfluorohexanoic acid (PFHxA)	0.0178		0.373		0.385	ug/L		62	(50%-150%)		05/12/22 15:56
Perfluorononanoic acid (PFNA)	0.0178		0.00353		0.0252	ug/L		122	(54%-146%)		05/14/22 17:01
Perfluorooctane sulfonic acid (PFOS)	0.0178		0.907		0.981	ug/L		416*	(42%-150%)		05/12/22 15:56
Perfluorooctanoic acid (PFOA)	0.0178		0.0965		0.137	ug/L		230*	(50%-151%)		05/14/22 17:01
Perfluorotetradecanoic acid (PFTDA)	0.0178	U	ND		0.0203	ug/L		114	(41%-148%)		
Perfluorotridecanoic acid (PFTrDA)	0.0178	U	ND		0.0167	ug/L		94	(41%-142%)		
Perfluoroundecanoic acid (PFUnDA)	0.0178	U	ND		0.0212	ug/L		119	(44%-141%)		
QC1205082682 577466003 MSD											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0173	U	ND		0.0166	ug/L		96*	(0%-36%)		05/14/22 17:09
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0184	U	ND		0.0164	ug/L		89*	(0%-28%)		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0171	U	ND		0.0193	ug/L		113*	(0%-33%)		
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0184	U	ND		0.0194	ug/L		106*	(0%-28%)		
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0184	U	ND		0.0197	ug/L		108*	(0%-36%)		

QC Summary

Workorder: 577721

Parmname	NOM		Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date Time
Perfluorinated Compounds											
Batch 2261646											
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0184	U	ND		0.0199	ug/L		108*	(0%-36%)	MB2	05/14/22 17:09
Perfluorobutane sulfonic acid (PFBS)	0.0163		0.614		0.587	ug/L		0	(0%-27%)		05/12/22 16:04
Perfluorodecanoic acid (PFDA)	0.0184	U	ND		0.0197	ug/L		104*	(0%-35%)		05/14/22 17:09
Perfluorododecanoic acid (PFDOA)	0.0184	U	ND		0.0204	ug/L		111*	(0%-30%)		
Perfluoroheptanoic acid (PFHpA)	0.0184		0.0661		0.102	ug/L		196*	(0%-26%)		
Perfluorohexane sulfonic acid (PFHxS)	0.0167		2.11		2.15	ug/L		240*	(0%-31%)		05/11/22 15:18
Perfluorohexanoic acid (PFHxA)	0.0184		0.373		0.396	ug/L		123*	(0%-26%)		05/12/22 16:04
Perfluorononanoic acid (PFNA)	0.0184		0.00353		0.0235	ug/L		109*	(0%-30%)		05/14/22 17:09
Perfluorooctane sulfonic acid (PFOS)	0.0184		0.907		0.963	ug/L		305*	(0%-31%)		05/12/22 16:04
Perfluorooctanoic acid (PFOA)	0.0184		0.0965		0.132	ug/L		193*	(0%-28%)		05/14/22 17:09
Perfluorotetradecanoic acid (PFTDA)	0.0184	U	ND		0.0210	ug/L		114*	(0%-32%)		
Perfluorotridecanoic acid (PFTrDA)	0.0184	U	ND		0.0174	ug/L		95*	(0%-35%)		
Perfluoroundecanoic acid (PFUnDA)	0.0184	U	ND		0.0197	ug/L		107*	(0%-34%)		

Notes:

The Qualifiers in this report are defined as follows:

- ** Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported

GEL LABORATORIES LLC
2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 577721

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time

A	The TIC is a suspected aldol-condensation product
B	The target analyte was detected in the associated blank.
C	Analyte has been confirmed by GC/MS analysis
D	Results are reported from a diluted aliquot of the sample
E	Concentration of the target analyte exceeds the instrument calibration range
J	The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
JNX	Non Calibrated Compound
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor
N/A	RPD or %Recovery limits do not apply.
N1	See case narrative
ND	Analyte concentration is not detected above the detection limit
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
Q	Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.
R	Sample results are rejected
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
UJ	Compound cannot be extracted
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
Y	QC Samples were not spiked with this compound
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where the duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.
* Indicates that a Quality Control parameter was not within specifications.
For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

LCMSMS-Misc
Technical Case Narrative
Environmental Conservation Laboratories
SDG #: AF03199
Work Order #: 577721

Product: **The Extraction and Analysis of Per and Polyfluroalkyl Substances Using LCMSMS**
Analytical Method: EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15
Analytical Procedure: GL-OA-E-076 REV# 12
Analytical Batches: 2261646 and 2261644

The following samples were analyzed using the above methods and analytical procedure(s).

GEL Sample ID#	Client Sample Identification
577721001	MLPV-IDW01-20220421
1205082679	Method Blank (MB)
1205082680	Laboratory Control Sample (LCS)
1205082681	577466003(NonSDG) Matrix Spike (MS)
1205082682	577466003(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

Data Summary:

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

Quality Control (QC) Information

Matrix Spike (MS) Recovery Statement
One or more of the required spiking analytes were not within the acceptance limits in the matrix spike (MS)and/or matrix spike duplicate(MSD). The parent sample, matrix spike (MS) and matrix spike duplicate (MSD) were diluted. The recoveries may not fall within the acceptance range.

Sample	Analyte	Value
1205082681 (Non SDG 577466003MS)	Perfluorobutane sulfonic acid (PFBS)	241* (52%-147%)
	Perfluorohexane sulfonic acid (PFHxS)	0* (50%-148%)
	Perfluorooctane sulfonic acid (PFOS)	416* (42%-150%)
1205082682 (Non SDG 577466003MSD)	Perfluorobutane sulfonic acid (PFBS)	0* (52%-147%)
	Perfluorohexane sulfonic acid (PFHxS)	240* (50%-148%)
	Perfluorooctane sulfonic acid (PFOS)	305* (42%-150%)

The MS or MSD (See Below) recovered spiked analytes outside of the established acceptance limits. As similar recoveries were displayed in the MS and MSD, the failures were attributed to sample matrix interference and the data were reported.

Sample	Analyte	Value

1205082681 (Non SDG 577466003MS)	Perfluoroheptanoic acid (PFHpA)	201* (51%-149%)
	Perfluorooctanoic acid (PFOA)	230* (50%-151%)
1205082682 (Non SDG 577466003MSD)	Perfluoroheptanoic acid (PFHpA)	196* (51%-149%)
	Perfluorooctanoic acid (PFOA)	193* (50%-151%)

Internal Standard (ISTD) Acceptance
The following Internal Standard (IS) is a heavy isotope of an analyte that showed no discernable analyte peak. The IS failed high; we can be certain that the analyte is below the quantitation limit. There is no adverse impact on the quality of the data.

Sample	Analyte	Value
1205082681 (Non SDG 577466003MS)	1, 2-13C2 Fluorotelomer sulfonate 4:2	and DOD|173* (50%-150%)|GEL|173* (40%-160%)
1205082682 (Non SDG 577466003MSD)	1, 2-13C2 Fluorotelomer sulfonate 4:2	and DOD|183* (50%-150%)|GEL|183* (40%-160%)

Certification Statement

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

Standard TAT

577721

SUBCONTRACT ORDER

ENCO Orlando

AF03199

J804/22/20

SENDING LABORATORY:

ENCO Orlando
10775 Central Port Drive
Orlando, FL 32824
Phone: 407.826.5314
Fax: 407.850.6945
Project Manager: Kaitlin Dylnicki

RECEIVING LABORATORY:

GEL Laboratories, Inc. (SC)
2040 Savage Road
Charleston, SC 29407
Phone :(843) 556-8171
Fax: (843) 766-1178
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	MLPV-IDW01-20220421	Water	21-Apr-22 14:00	

Analysis	Due	Expires	Analysis Comments
PFAS	29-Apr-22 15:00	05-May-22 14:00	14 analyte 537 GELP21-0027
Containers Supplied:			
5mLV (D)	250mLP (E)	250mLP (F)	

Released By	Date	Received By	Date
	4/22/22		4-26-22 0820
Released By	Date	Received By	Date

GEL Laboratories LLC

SAMPLE RECEIPT & REVIEW FORM

Client: ENCL	**SDG/AR/COC/Work Order:** 577721
Received By: BE	**Date Received:** 4.26.22
Carrier and Tracking Number	Circle Applicable: FedEx Express / FedEx Ground / UPS / Field Services / Courier / Other 5583 3250 7744

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A)Shipped as a DOT Hazardous?		\	Hazard Class Shipped: UN#: If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___
B) Did the client designate the samples are to be received as radioactive?		\	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		\	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): 0 CPM / mR/Hr **Classified as: Rad 1 Rad 2 Rad 3**
D) Did the client designate samples are hazardous?		\	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		\	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria		Yes	NA	No	**Comments/Qualifiers (Required for Non-Conforming Items)**
1	Shipping containers received intact and sealed?	\			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	\			Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	\			Preservation Method: Wet Ice Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius **TEMP:** 2
4	Daily check performed and passed on IR temperature gun?	✓			**Temperature Device Serial #:** IR2-21 Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	\			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?		\		Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?			\	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___(If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___(If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected:
8	Samples received within holding time?	\			ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	\			ID's and containers affected:
10	Date & time on COC match date & time on bottles?	\			Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	\			Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?			\	
13	COC form is properly signed in relinquished/received sections?	\			Circle Applicable: Not relinquished Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials NRL Date 4/27/22 Page 1 of 1

GL-CHL-SR-001 Rev 7

List of current GEL Certifications as of 17 May 2022

State	Certification
Alabama	42200
Alaska	17−018
Alaska Drinking Water	SC00012
Arkansas	88−0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH−0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330−15−00283, P330−15−00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C−SC−01
Kansas NELAP	E−10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M−SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE−OS−26−13
Nevada	SC000122022−4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R−158
Oklahoma	2019−165
Pennsylvania NELAP	68−00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235−22−20
Utah NELAP	SC000122021−36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 1/17/2023 4:30:53 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV IDW
SDG NUMBER Biosparge Area / Hot Spot 2

JOB NUMBER

670-11524-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

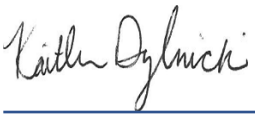
my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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1/17/2023 4:30:53 PM
Revision 1

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*	ISTD response or retention time outside acceptable limits
U	Indicates that the compound was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-11524-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-11524-1

REVISION

The report being provided is a revision of the original report sent on 1/17/2023. The report (revision 1) is being revised due to updated units for the soil 8260D analysis..

Report revision history

Receipt
The samples were received on 12/15/2022 10:52 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 4.2°C

GC/MS VOA
Method 8260B: Surrogate recovery for the following sample was outside of acceptance limits: (670-11524-L-1 DU). There was insufficient sample to perform a re-extraction; therefore, the data have been reported.

Method 8260B: Surrogate recovery for the following sample was outside of acceptance limits: (670-11524-L-1 DU). There was insufficient sample to perform a re-extraction; therefore, the data have been reported.

Method 8260B: Internal standard responses were outside of acceptance limits for the following sample: MLPV - IDW10 - 20221214 (670-11524-10). The sample(s) shows evidence of matrix interference. Evidence of matrix interferences is not obvious. This was a 2nd analysis confirmation.

Method 8260B: Surrogate recovery for the following sample was outside control limits: MLPV - IDW10 - 20221214 (670-11524-10). Evidence of matrix interferences is not obvious. This was a 2nd analysis confirmation.

Method 8260B: Internal standard responses were outside of acceptance limits for the following sample: MLPV - IDW13 - 20221214 (670-11524-13). Evidence of matrix interferences is not obvious. This was a second analysis of confirmation of matrix interference.

Method 8260B: Surrogate recovery for the following sample was outside control limits: MLPV - IDW13 - 20221214 (670-11524-13). Evidence of matrix interferences is not obvious. This was a second analysis of confirmation of matrix interference.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

PFAS
Method PFC_IDA: The recovery for the labeled isotope: M2-4:2 FTS in the following sample: MLPV - IDW02 - 20221214 (670-11524-2) is outside the QC acceptance limits. Since the recovery is high and the native analyte is not detected in the sample, the data is reported.

Method PFC_IDA: The recovery for the labeled isotope: M2-4:2 FTS and M2-6:2 FTS in the following sample: MLPV - IDW05 - 20221214 (670-11524-5) is outside the QC acceptance limits. Since the recovery is high and the native analyte is not detected in the sample, the data is reported.

Method PFC_IDA: The sample injection standard peak areas in the following sample: MLPV - IDW04 - 20221214 (670-11524-4) are outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.The recovery for the labeled isotope(s) M2-4:2 FTS, M2-6:2 FTS and 13C3 PFBS in the following sample: MLPV - IDW04 - 20221214 (670-11524-4) is outside the QC acceptance limits due to the matrix of the sample.

Job ID: 670-11524-1 (Continued)

Laboratory: Eurofins Orlando (Continued)

Method PFC_IDA: The recovery for the labeled isotope(s): M2-4:2 FTS and d3-NMePFOSA in sample: MLPV - IDW06 - 20221214 (670-11524-6) is outside the QC acceptance limits as noted on the QC Summary. The results are reported as per the client acceptance.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method Moisture: The sample duplicate (DUP) precision for analytical batch 860-84951 was outside control limits. Sample non-homogeneity is suspected.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW01 - 20221214 — Lab Sample ID: 670-11524-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.0010	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.00070	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.00079	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0031		0.0020	0.00098	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0023		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.00084	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV - IDW02 - 20221214 — Lab Sample ID: 670-11524-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.00059	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.00053	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.00054	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0024		0.0020	0.00098	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0016	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.00052	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV - IDW03 - 20221214 — Lab Sample ID: 670-11524-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid	0.00062	I	0.0020	0.00050	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV - IDW04 - 20221214 — Lab Sample ID: 670-11524-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	760	I	800	400	ug/L	2		300.0	Total/NA
Perfluorobutanesulfonic acid	0.00067	I	0.0020	0.00050	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.00052	I	0.0020	0.00050	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0014	I	0.0020	0.0010	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0035		0.0020	0.00050	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0014	I	0.0020	0.00050	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	49	I	100	40	ug/L	1		365.4	Total/NA

Client Sample ID: MLPV - IDW05 - 20221214 — Lab Sample ID: 670-11524-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.023		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0096		0.0049	0.0019	ug/L	1		537 IDA	Total/NA
Perfluoroheptanesulfonic acid	0.0092		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0053		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.13		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.032		0.0019	0.00087	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00071	I	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.016		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.029		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0081		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid - DL	0.65		0.019	0.0097	ug/L	10		537 IDA	Total/NA
Total Phosphorus as P	88	I	100	40	ug/L	1		365.4	Total/NA

Client Sample ID: MLPV - IDW06 - 20221214 — Lab Sample ID: 670-11524-6

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid	0.00099	I J	0.0020	0.00049	ug/L	1		537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW06 - 20221214 (Continued) — Lab Sample ID: 670-11524-6

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid	0.0018	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.00095	I	0.0020	0.00089	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.018		0.0020	0.00099	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.00094	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.00055	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV - IDW07 - 20221214 — Lab Sample ID: 670-11524-7

No Detections.

Client Sample ID: MLPV - IDW08 - 20221214 — Lab Sample ID: 670-11524-8

No Detections.

Client Sample ID: MLPV - IDW09 - 20221214 — Lab Sample ID: 670-11524-9

No Detections.

Client Sample ID: MLPV - IDW10 - 20221214 — Lab Sample ID: 670-11524-10

No Detections.

Client Sample ID: MLPV - IDW11 - 20221214 — Lab Sample ID: 670-11524-11

No Detections.

Client Sample ID: MLPV - IDW12 - 20221214 — Lab Sample ID: 670-11524-12

No Detections.

Client Sample ID: MLPV - IDW13 - 20221214 — Lab Sample ID: 670-11524-13

No Detections.

Client Sample ID: MLPV - IDW14 - 20221214 — Lab Sample ID: 670-11524-14

No Detections.

Client Sample ID: MLPV - IDW15 - 20221214 — Lab Sample ID: 670-11524-15

No Detections.

Client Sample ID: MLPV - IDW16 - 20221214 — Lab Sample ID: 670-11524-16

No Detections.

Client Sample ID: MLPV - IDW17 - 20221214 — Lab Sample ID: 670-11524-17

No Detections.

Client Sample ID: MLPV - IDW18 - 20221214 — Lab Sample ID: 670-11524-18

No Detections.

Client Sample ID: MLPV - IDW19 - 20221214 — Lab Sample ID: 670-11524-19

No Detections.

Client Sample ID: MLPV - TB01 - 20221214 — Lab Sample ID: 670-11524-20

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

Client Sample ID: MLPV - IDW01 - 20221214

Date Collected: 12/14/22 11:15
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-1

Matrix: Water

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/22/22 14:18*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*12/22/22 14:18*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	1000	U	2000	1000	ug/L			12/15/22 20:15	5

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		12/26/22 08:57	12/30/22 22:56	1
8:2 Fluorotelomer sulfonic acid	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 22:56	1
9Cl-PF3ONS	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
DONA	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
HFPODA	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 22:56	1
NEtFOSAA	0.00049	U	0.0029	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
NMeFOSAA	0.00059	U	0.0020	0.00059	ug/L		12/26/22 08:57	12/30/22 22:56	1
NMeFOSA	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorobutanesulfonic acid	**0.0010**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorobutanoic acid	0.0020	U	0.0049	0.0020	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorodecanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorodecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorododecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluoroheptanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluoroheptanoic acid	**0.00070**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorohexanesulfonic acid	**0.00079**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorohexanoic acid	0.00088	U	0.0020	0.00088	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorononanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorononanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorooctanesulfonamide	0.00068	U	0.0020	0.00068	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorooctanesulfonic acid	**0.0031**		0.0020	0.00098	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorooctanoic acid	**0.0023**		0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluoropentanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluoropentanoic acid	**0.00084**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorotetradecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluorotridecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1
Perfluoroundecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 22:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*195*		*10 - 200*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
M2-6:2 FTS	*162*		*17 - 200*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
M2-8:2 FTS	*129*		*33 - 200*	*12/26/22 08:57*	*12/30/22 22:56*	*1*

Client Sample ID: MLPV - IDW01 - 20221214

Lab Sample ID: 670-11524-1

Date Collected: 12/14/22 11:15
Matrix: Water
Date Received: 12/15/22 10:52

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2-PFDoDA	*107*		*17 - 176*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C2 PFTeDA	*91*		*10 - 179*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C3 HFPO-DA	*107*		*17 - 185*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C3 PFBS	*141*		*16 - 200*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C3 PFHxS	*105*		*28 - 188*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C4 PFBA	*110*		*42 - 165*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C4 PFHpA	*104*		*31 - 182*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C5 PFPeA	*137*		*38 - 187*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
d5-NEtFOSAA	*144*		*29 - 195*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C6 PFDA	*110*		*49 - 163*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C8 PFOA	*102*		*48 - 162*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C8 PFOS	*115*		*51 - 159*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C8 FOSA	*113*		*10 - 168*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
d3-NMeFOSAA	*133*		*31 - 174*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
d3-NMePFOSA	*58*		*10 - 155*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C5 PFHxA	*95*		*24 - 179*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C7 PFUnA	*118*		*34 - 174*	*12/26/22 08:57*	*12/30/22 22:56*	*1*
13C9 PFNA	*133*		*51 - 167*	*12/26/22 08:57*	*12/30/22 22:56*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		01/04/23 09:47	01/04/23 23:50	1

Client Sample ID: MLPV - IDW02 - 20221214

Lab Sample ID: 670-11524-2

Date Collected: 12/14/22 11:30
Matrix: Water
Date Received: 12/15/22 10:52

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 15:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 15:50*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	2000	U	4000	2000	ug/L			12/15/22 18:53	10

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		12/26/22 08:57	12/30/22 23:07	1
8:2 Fluorotelomer sulfonic acid	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 23:07	1
9Cl-PF3ONS	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
DONA	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1

Client Sample ID: MLPV - IDW02 - 20221214

Date Collected: 12/14/22 11:30
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-2

Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HFPODA	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 23:07	1
NEtFOSAA	0.00049	U	0.0029	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
NMeFOSAA	0.00059	U	0.0020	0.00059	ug/L		12/26/22 08:57	12/30/22 23:07	1
NMeFOSA	0.00098	U	0.0029	0.00098	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorobutanesulfonic acid	**0.00059**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorobutanoic acid	0.0020	U	0.0049	0.0020	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorodecanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorodecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorododecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluoroheptanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluoroheptanoic acid	**0.00053**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorohexanesulfonic acid	**0.00054**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorohexanoic acid	0.00088	U	0.0020	0.00088	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorononanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorononanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorooctanesulfonamide	0.00068	U	0.0020	0.00068	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorooctanesulfonic acid	**0.0024**		0.0020	0.00098	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorooctanoic acid	**0.0016**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluoropentanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluoropentanoic acid	**0.00052**	**I**	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorotetradecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluorotridecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1
Perfluoroundecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/26/22 08:57	12/30/22 23:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*203*	*	*10 - 200*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
M2-6:2 FTS	*153*		*17 - 200*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
M2-8:2 FTS	*132*		*33 - 200*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C2-PFDoDA	*110*		*17 - 176*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C2 PFTeDA	*94*		*10 - 179*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C3 HFPO-DA	*102*		*17 - 185*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C3 PFBS	*145*		*16 - 200*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C3 PFHxS	*104*		*28 - 188*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C4 PFBA	*115*		*42 - 165*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C4 PFHpA	*105*		*31 - 182*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C5 PFPeA	*143*		*38 - 187*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
d5-NEtFOSAA	*142*		*29 - 195*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C6 PFDA	*111*		*49 - 163*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C8 PFOA	*104*		*48 - 162*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C8 PFOS	*115*		*51 - 159*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C8 FOSA	*112*		*10 - 168*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
d3-NMeFOSAA	*128*		*31 - 174*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
d3-NMePFOSA	*74*		*10 - 155*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C5 PFHxA	*98*		*24 - 179*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C7 PFUnA	*112*		*34 - 174*	*12/26/22 08:57*	*12/30/22 23:07*	*1*
13C9 PFNA	*130*		*51 - 167*	*12/26/22 08:57*	*12/30/22 23:07*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		01/04/23 09:47	01/04/23 23:47	1

Client Sample ID: MLPV - IDW03 - 20221214

Date Collected: 12/14/22 11:45
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-3

Matrix: Water

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 16:08*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	2000	U	4000	2000	ug/L			12/15/22 19:10	10

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		12/26/22 08:57	12/30/22 23:18	1
8:2 Fluorotelomer sulfonic acid	0.00099	U	0.0030	0.00099	ug/L		12/26/22 08:57	12/30/22 23:18	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
DONA	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
HFPODA	0.00099	U	0.0030	0.00099	ug/L		12/26/22 08:57	12/30/22 23:18	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		12/26/22 08:57	12/30/22 23:18	1
NMeFOSA	0.00099	U	0.0030	0.00099	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorohexanoic acid	0.00089	U	0.0020	0.00089	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorooctanesulfonic acid	0.00099	U	0.0020	0.00099	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorooctanoic acid	**0.00062**	**I**	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*188*		*10 - 200*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
M2-6:2 FTS	*134*		*17 - 200*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
M2-8:2 FTS	*117*		*33 - 200*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C2-PFDoDA	*91*		*17 - 176*	*12/26/22 08:57*	*12/30/22 23:18*	*1*

Client Sample ID: MLPV - IDW03 - 20221214

Lab Sample ID: 670-11524-3

Date Collected: 12/14/22 11:45
Matrix: Water
Date Received: 12/15/22 10:52

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFTeDA	*86*		*10 - 179*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C3 HFPO-DA	*109*		*17 - 185*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C3 PFBS	*120*		*16 - 200*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C3 PFHxS	*90*		*28 - 188*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C4 PFBA	*100*		*42 - 165*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C4 PFHpA	*92*		*31 - 182*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C5 PFPeA	*113*		*38 - 187*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
d5-NEtFOSAA	*123*		*29 - 195*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C6 PFDA	*96*		*49 - 163*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C8 PFOA	*87*		*48 - 162*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C8 PFOS	*104*		*51 - 159*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C8 FOSA	*92*		*10 - 168*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
d3-NMeFOSAA	*104*		*31 - 174*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
d3-NMePFOSA	*35*		*10 - 155*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C5 PFHxA	*85*		*24 - 179*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C7 PFUnA	*101*		*34 - 174*	*12/26/22 08:57*	*12/30/22 23:18*	*1*
13C9 PFNA	*114*		*51 - 167*	*12/26/22 08:57*	*12/30/22 23:18*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		01/04/23 09:47	01/04/23 23:49	1

Client Sample ID: MLPV - IDW04 - 20221214

Lab Sample ID: 670-11524-4

Date Collected: 12/14/22 12:05
Matrix: Water
Date Received: 12/15/22 10:52

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 16:26*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**760**	**I**	800	400	ug/L			12/15/22 19:26	2

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		12/26/22 08:57	12/30/22 23:29	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 23:29	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
DONA	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 23:29	1

Client Sample ID: MLPV - IDW04 - 20221214

Date Collected: 12/14/22 12:05
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-4

Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		12/26/22 08:57	12/30/22 23:29	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorobutanesulfonic acid	**0.00067**	**I**	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluoroheptanoic acid	**0.00052**	**I**	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorooctanesulfonic acid	**0.0014**	**I**	0.0020	0.0010	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorooctanoic acid	**0.0035**		0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluoropentanoic acid	**0.0014**	**I**	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 23:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*201*	*	*10 - 200*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
M2-6:2 FTS	*211*	*	*17 - 200*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
M2-8:2 FTS	*179*		*33 - 200*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C2-PFDoDA	*98*		*17 - 176*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C2 PFTeDA	*84*		*10 - 179*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C3 HFPO-DA	*75*		*17 - 185*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C3 PFBS	*209*	*	*16 - 200*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C3 PFHxS	*95*		*28 - 188*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C4 PFBA	*105*		*42 - 165*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C4 PFHpA	*88*		*31 - 182*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C5 PFPeA	*164*		*38 - 187*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
d5-NEtFOSAA	*144*		*29 - 195*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C6 PFDA	*109*		*49 - 163*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C8 PFOA	*91*		*48 - 162*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C8 PFOS	*114*		*51 - 159*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C8 FOSA	*98*		*10 - 168*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
d3-NMeFOSAA	*123*		*31 - 174*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
d3-NMePFOSA	*40*		*10 - 155*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C5 PFHxA	*75*		*24 - 179*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C7 PFUnA	*114*		*34 - 174*	*12/26/22 08:57*	*12/30/22 23:29*	*1*
13C9 PFNA	*131*		*51 - 167*	*12/26/22 08:57*	*12/30/22 23:29*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	**49**	**I**	100	40	ug/L		01/04/23 09:47	01/04/23 23:52	1

Client Sample ID: MLPV - IDW05 - 20221214

Date Collected: 12/14/22 12:25
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-5

Matrix: Water

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 16:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 16:44*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	400	U	800	400	ug/L			12/15/22 19:42	2

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		12/26/22 08:57	12/30/22 23:40	1
8:2 Fluorotelomer sulfonic acid	0.00097	U	0.0029	0.00097	ug/L		12/26/22 08:57	12/30/22 23:40	1
9Cl-PF3ONS	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
DONA	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
HFPODA	0.00097	U	0.0029	0.00097	ug/L		12/26/22 08:57	12/30/22 23:40	1
NEtFOSAA	0.00049	U	0.0029	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
NMeFOSAA	0.00058	U	0.0019	0.00058	ug/L		12/26/22 08:57	12/30/22 23:40	1
NMeFOSA	0.00097	U	0.0029	0.00097	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorobutanesulfonic acid	**0.023**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorobutanoic acid	**0.0096**		0.0049	0.0019	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorodecanesulfonic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorodecanoic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorododecanoic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluoroheptanesulfonic acid	**0.0092**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluoroheptanoic acid	**0.0053**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorohexanesulfonic acid	**0.13**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorohexanoic acid	**0.032**		0.0019	0.00087	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorononanesulfonic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorononanoic acid	**0.00071**	**I**	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorooctanesulfonamide	0.00068	U	0.0019	0.00068	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorooctanoic acid	**0.016**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluoropentanesulfonic acid	**0.029**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluoropentanoic acid	**0.0081**		0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorotetradecanoic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluorotridecanoic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1
Perfluoroundecanoic acid	0.00049	U	0.0019	0.00049	ug/L		12/26/22 08:57	12/30/22 23:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*217*	*	*10 - 200*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
M2-6:2 FTS	*241*	*	*17 - 200*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
M2-8:2 FTS	*148*		*33 - 200*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C2-PFDoDA	*95*		*17 - 176*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C2 PFTeDA	*86*		*10 - 179*	*12/26/22 08:57*	*12/30/22 23:40*	*1*

Client Sample ID: MLPV - IDW05 - 20221214 Lab Sample ID: 670-11524-5

Date Collected: 12/14/22 12:25 **Matrix: Water**
Date Received: 12/15/22 10:52

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C3 HFPO-DA	*73*		*17 - 185*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C3 PFBS	*114*		*16 - 200*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C3 PFHxS	*83*		*28 - 188*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C4 PFBA	*102*		*42 - 165*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C4 PFHpA	*82*		*31 - 182*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C5 PFPeA	*86*		*38 - 187*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
d5-NEtFOSAA	*136*		*29 - 195*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C6 PFDA	*102*		*49 - 163*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C8 PFOA	*97*		*48 - 162*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C8 PFOS	*108*		*51 - 159*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C8 FOSA	*96*		*10 - 168*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
d3-NMeFOSAA	*114*		*31 - 174*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
d3-NMePFOSA	*44*		*10 - 155*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C5 PFHxA	*75*		*24 - 179*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C7 PFUnA	*108*		*34 - 174*	*12/26/22 08:57*	*12/30/22 23:40*	*1*
13C9 PFNA	*125*		*51 - 167*	*12/26/22 08:57*	*12/30/22 23:40*	*1*

Method: EPA 537 IDA - EPA 537 Isotope Dilution - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid	0.65		0.019	0.0097	ug/L		12/26/22 08:57	01/04/23 16:05	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C8 PFOS	*115*		*51 - 159*	*12/26/22 08:57*	*01/04/23 16:05*	*10*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	88	I	100	40	ug/L		01/04/23 09:47	01/04/23 23:53	1

Client Sample ID: MLPV - IDW06 - 20221214 Lab Sample ID: 670-11524-6

Date Collected: 12/14/22 12:55 **Matrix: Water**
Date Received: 12/15/22 10:52

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 17:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 17:02*	*1*

Method: MCAWW 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	1000	U	2000	1000	ug/L			12/15/22 19:59	5

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1

Client Sample ID: MLPV - IDW06 - 20221214

Date Collected: 12/14/22 12:55
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-6

Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0049	0.0042	ug/L		12/28/22 06:41	12/30/22 05:57	1
8:2 Fluorotelomer sulfonic acid	0.00099	U	0.0030	0.00099	ug/L		12/28/22 06:41	12/30/22 05:57	1
9Cl-PF3ONS	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
DONA	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
HFPODA	0.00099	U	0.0030	0.00099	ug/L		12/28/22 06:41	12/30/22 05:57	1
NEtFOSAA	0.00049	U	0.0030	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
NMeFOSAA	0.00059	U	0.0020	0.00059	ug/L		12/28/22 06:41	12/30/22 05:57	1
NMeFOSA	0.00099	U	0.0030	0.00099	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorobutanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorobutanoic acid	0.0020	U	0.0049	0.0020	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorodecanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorodecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorododecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluoroheptanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluoroheptanoic acid	**0.00099**	**I J**	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorohexanesulfonic acid	**0.0018**	**I**	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorohexanoic acid	**0.00095**	**I**	0.0020	0.00089	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorononanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorononanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorooctanesulfonamide	0.00069	U	0.0020	0.00069	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorooctanesulfonic acid	**0.018**		0.0020	0.00099	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorooctanoic acid	**0.00094**	**I**	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluoropentanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluoropentanoic acid	**0.00055**	**I**	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorotetradecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluorotridecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1
Perfluoroundecanoic acid	0.00049	U	0.0020	0.00049	ug/L		12/28/22 06:41	12/30/22 05:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*220*	*	*10 - 200*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
M2-6:2 FTS	*176*		*17 - 200*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
M2-8:2 FTS	*130*		*33 - 200*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C2-PFDoDA	*94*		*17 - 176*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C2 PFTeDA	*90*		*10 - 179*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C3 HFPO-DA	*87*		*17 - 185*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C3 PFBS	*160*		*16 - 200*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C3 PFHxS	*107*		*28 - 188*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C4 PFBA	*115*		*42 - 165*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C4 PFHpA	*105*		*31 - 182*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C5 PFPeA	*141*		*38 - 187*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
d5-NEtFOSAA	*97*		*29 - 195*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C6 PFDA	*94*		*49 - 163*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C8 PFOA	*107*		*48 - 162*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C8 PFOS	*111*		*51 - 159*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C8 FOSA	*50*		*10 - 168*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
d3-NMeFOSAA	*95*		*31 - 174*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
d3-NMePFOSA	*6*	*	*10 - 155*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C5 PFHxA	*101*		*24 - 179*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C7 PFUnA	*91*		*34 - 174*	*12/28/22 06:41*	*12/30/22 05:57*	*1*
13C9 PFNA	*120*		*51 - 167*	*12/28/22 06:41*	*12/30/22 05:57*	*1*

Client Sample ID: MLPV - IDW06 - 20221214 Lab Sample ID: 670-11524-6

Date Collected: 12/14/22 12:55 **Matrix: Water**
Date Received: 12/15/22 10:52

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		01/04/23 09:47	01/04/23 23:48	1

Client Sample ID: MLPV - IDW07 - 20221214 Lab Sample ID: 670-11524-7

Date Collected: 12/14/22 11:08 **Matrix: Solid**
Date Received: 12/15/22 10:52 **Percent Solids: 97.7**

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 10:56	12/23/22 00:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*	*12/15/22 10:56*	*12/23/22 00:06*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:39	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:39	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:39	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:39	1

Client Sample ID: MLPV - IDW08 - 20221214 Lab Sample ID: 670-11524-8

Date Collected: 12/14/22 11:30 **Matrix: Solid**
Date Received: 12/15/22 10:52 **Percent Solids: 98.3**

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/23/22 00:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*60 - 140*	*12/15/22 13:49*	*12/23/22 00:29*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:42	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:42	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:42	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:42	1

Client Sample ID: MLPV - IDW09 - 20221214

Lab Sample ID: 670-11524-9
Date Collected: 12/14/22 11:45
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.2

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1
cis-1,2-Dichloroethene	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1
Tetrachloroethene	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1
trans-1,2-Dichloroethene	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1
Trichloroethene	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1
Vinyl chloride	0.0029	U	0.012	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 14:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*60 - 140*	*12/15/22 13:49*	*12/27/22 14:48*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:46	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:46	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:46	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:46	1

Client Sample ID: MLPV - IDW10 - 20221214

Lab Sample ID: 670-11524-10
Date Collected: 12/14/22 11:50
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.5

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1
cis-1,2-Dichloroethene	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1
Tetrachloroethene	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1
trans-1,2-Dichloroethene	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1
Trichloroethene	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1
Vinyl chloride	0.0034	U *	0.014	0.0034	mg/Kg	☼	12/15/22 13:49	12/27/22 15:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*90*	*	*60 - 140*	*12/15/22 13:49*	*12/27/22 15:11*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:49	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:49	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:49	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:49	1

Client Sample ID: MLPV - IDW11 - 20221214

Lab Sample ID: 670-11524-11
Date Collected: 12/14/22 12:05
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.4

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1
cis-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1
Tetrachloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1
trans-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1
Trichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1

Client Sample ID: MLPV - IDW11 - 20221214

Lab Sample ID: 670-11524-11
Date Collected: 12/14/22 12:05
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.4

Method: SW846 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 09:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*60 - 140*	*12/15/22 13:49*	*12/28/22 09:15*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:53	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:53	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:53	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:53	1

Client Sample ID: MLPV - IDW12 - 20221214

Lab Sample ID: 670-11524-12
Date Collected: 12/14/22 12:15
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.2

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 15:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*60 - 140*	*12/15/22 13:49*	*12/27/22 15:57*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:56	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:56	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:56	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:56	1

Client Sample ID: MLPV - IDW13 - 20221214

Lab Sample ID: 670-11524-13
Date Collected: 12/14/22 12:30
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.2

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1
cis-1,2-Dichloroethene	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1
Tetrachloroethene	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1
trans-1,2-Dichloroethene	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1
Trichloroethene	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1
Vinyl chloride	0.0030	U *	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 09:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*86*	*	*60 - 140*	*12/15/22 13:49*	*12/28/22 09:38*	*1*

Client Sample ID: MLPV - IDW13 - 20221214 Lab Sample ID: 670-11524-13

Date Collected: 12/14/22 12:30 **Matrix: Solid**
Date Received: 12/15/22 10:52 **Percent Solids: 98.2**

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 17:00	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 17:00	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 17:00	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 17:00	1

Client Sample ID: MLPV - IDW14 - 20221214 Lab Sample ID: 670-11524-14

Date Collected: 12/14/22 12:45 **Matrix: Solid**
Date Received: 12/15/22 10:52 **Percent Solids: 98.6**

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1
cis-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1
Tetrachloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1
trans-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1
Trichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1
Vinyl chloride	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 16:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*	*12/15/22 13:49*	*12/27/22 16:43*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 17:18	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 17:18	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 17:18	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 17:18	1

Client Sample ID: MLPV - IDW15 - 20221214 Lab Sample ID: 670-11524-15

Date Collected: 12/14/22 12:50 **Matrix: Solid**
Date Received: 12/15/22 10:52 **Percent Solids: 98.7**

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/27/22 17:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*60 - 140*	*12/15/22 13:49*	*12/27/22 17:06*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 17:21	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 17:21	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 17:21	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 17:21	1

Client Sample ID: MLPV - IDW16 - 20221214

Lab Sample ID: 670-11524-16
Date Collected: 12/14/22 13:00
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.5

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1
cis-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1
Tetrachloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1
trans-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1
Trichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1
Vinyl chloride	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/27/22 17:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*	*12/15/22 13:49*	*12/27/22 17:29*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/05/23 10:45	01/06/23 02:29	1
Cadmium	12	U	25	12	ug/L		01/05/23 10:45	01/06/23 02:29	1
Chromium	11	U	50	11	ug/L		01/05/23 10:45	01/06/23 02:29	1
Lead	18	U	50	18	ug/L		01/05/23 10:45	01/06/23 02:29	1

Client Sample ID: MLPV - IDW17 - 20221214

Lab Sample ID: 670-11524-17
Date Collected: 12/14/22 13:10
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.7

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1
cis-1,2-Dichloroethene	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1
Tetrachloroethene	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1
trans-1,2-Dichloroethene	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1
Trichloroethene	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1
Vinyl chloride	0.0029	U	0.011	0.0029	mg/Kg	☼	12/15/22 13:49	12/27/22 17:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*60 - 140*	*12/15/22 13:49*	*12/27/22 17:52*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/05/23 10:45	01/06/23 02:33	1
Cadmium	12	U	25	12	ug/L		01/05/23 10:45	01/06/23 02:33	1
Chromium	11	U	50	11	ug/L		01/05/23 10:45	01/06/23 02:33	1
Lead	18	U	50	18	ug/L		01/05/23 10:45	01/06/23 02:33	1

Client Sample ID: MLPV - IDW18 - 20221214

Lab Sample ID: 670-11524-18
Date Collected: 12/14/22 13:20
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.8

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1
cis-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1
Tetrachloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1
trans-1,2-Dichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1
Trichloroethene	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1

Client Sample ID: MLPV - IDW18 - 20221214

Lab Sample ID: 670-11524-18
Date Collected: 12/14/22 13:20
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.8

Method: SW846 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.0031	U	0.012	0.0031	mg/Kg	☼	12/15/22 13:49	12/28/22 10:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*	*12/15/22 13:49*	*12/28/22 10:01*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/05/23 10:45	01/06/23 02:36	1
Cadmium	12	U	25	12	ug/L		01/05/23 10:45	01/06/23 02:36	1
Chromium	11	U	50	11	ug/L		01/05/23 10:45	01/06/23 02:36	1
Lead	18	U	50	18	ug/L		01/05/23 10:45	01/06/23 02:36	1

Client Sample ID: MLPV - IDW19 - 20221214

Lab Sample ID: 670-11524-19
Date Collected: 12/14/22 13:30
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.8

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg	☼	12/15/22 13:49	12/28/22 10:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*	*12/15/22 13:49*	*12/28/22 10:24*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/05/23 10:45	01/06/23 02:54	1
Cadmium	12	U	25	12	ug/L		01/05/23 10:45	01/06/23 02:54	1
Chromium	11	U	50	11	ug/L		01/05/23 10:45	01/06/23 02:54	1
Lead	18	U	50	18	ug/L		01/05/23 10:45	01/06/23 02:54	1

Client Sample ID: MLPV - TB01 - 20221214

Lab Sample ID: 670-11524-20
Date Collected: 12/14/22 08:00
Matrix: Water
Date Received: 12/15/22 10:52

Method: SW846 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 14:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*80 - 120*		*12/22/22 14:00*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
Lab Sample ID	Client Sample ID	TOL (60-140)
670-11524-7	MLPV - IDW07 - 20221214	93
670-11524-8	MLPV - IDW08 - 20221214	95
670-11524-9	MLPV - IDW09 - 20221214	95
670-11524-10	MLPV - IDW10 - 20221214	90 *
670-11524-11	MLPV - IDW11 - 20221214	94
670-11524-12	MLPV - IDW12 - 20221214	95
670-11524-13	MLPV - IDW13 - 20221214	86 *
670-11524-14	MLPV - IDW14 - 20221214	93
670-11524-15	MLPV - IDW15 - 20221214	96
670-11524-16	MLPV - IDW16 - 20221214	93
670-11524-17	MLPV - IDW17 - 20221214	96
670-11524-18	MLPV - IDW18 - 20221214	93
670-11524-19	MLPV - IDW19 - 20221214	93
LCS 670-15787/4	Lab Control Sample	95
LCS 670-15941/5	Lab Control Sample	95
LCS 670-16060/4	Lab Control Sample	93
LCSD 670-15787/5	Lab Control Sample Dup	97
LCSD 670-15941/6	Lab Control Sample Dup	96
LCSD 670-16060/5	Lab Control Sample Dup	94
MB 670-15787/8	Method Blank	95
MB 670-15941/9	Method Blank	94
MB 670-16060/8	Method Blank	93

Surrogate Legend

TOL = Toluene-d8 (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	TOL (80-120)	TOL (80-120)
670-11524-1	MLPV - IDW01 - 20221214	103	103
670-11524-1 DU	MLPV - IDW01 - 20221214	104	104
670-11524-2	MLPV - IDW02 - 20221214	104	104
670-11524-3	MLPV - IDW03 - 20221214	104	104
670-11524-4	MLPV - IDW04 - 20221214	104	104
670-11524-5	MLPV - IDW05 - 20221214	104	104
670-11524-6	MLPV - IDW06 - 20221214	104	104
670-11524-20	MLPV - TB01 - 20221214	104	104
670-11627-D-1 MS	Matrix Spike	101	101
LCS 670-15648/5	Lab Control Sample	101	101
LCS 670-15651/5	Lab Control Sample	101	101
MB 670-15648/7	Method Blank	102	102
MB 670-15651/7	Method Blank	102	102

Surrogate Legend

TOL = Toluene-d8 (Surr)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	PFDoDA	PFTDA	HFPODA	C3PFBS	C3PFHS
Lab Sample ID	Client Sample ID	(10-200)	(17-200)	(33-200)	(17-176)	(10-179)	(17-185)	(16-200)	(28-188)
670-11524-1	MLPV - IDW01 - 20221214	195	162	129	107	91	107	141	105
670-11524-2	MLPV - IDW02 - 20221214	203 *	153	132	110	94	102	145	104
670-11524-3	MLPV - IDW03 - 20221214	188	134	117	91	86	109	120	90
670-11524-4	MLPV - IDW04 - 20221214	201 *	211 *	179	98	84	75	209 *	95
670-11524-5	MLPV - IDW05 - 20221214	217 *	241 *	148	95	86	73	114	83
670-11524-5 - DL	MLPV - IDW05 - 20221214								
670-11524-6	MLPV - IDW06 - 20221214	220 *	176	130	94	90	87	160	107
LCS 410-330204/2-A	Lab Control Sample	110	112	119	111	105	120	107	117
LCS 410-330663/3-A	Lab Control Sample	105	109	110	110	111	102	109	104
LCSD 410-330204/3-A	Lab Control Sample Dup	95	107	110	110	109	113	106	101
LCSD 410-330663/4-A	Lab Control Sample Dup	107	105	102	98	107	102	104	102
MB 410-330204/1-A	Method Blank	92	106	106	79	78	109	96	98
MB 410-330663/1-A	Method Blank	95	100	109	103	117	91	95	96

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	C4PFHA	PFPeA	d5NEFOS	C6PFDA	C8PFOA	C8PFOS	PFOSA
Lab Sample ID	Client Sample ID	(42-165)	(31-182)	(38-187)	(29-195)	(49-163)	(48-162)	(51-159)	(10-168)
670-11524-1	MLPV - IDW01 - 20221214	110	104	137	144	110	102	115	113
670-11524-2	MLPV - IDW02 - 20221214	115	105	143	142	111	104	115	112
670-11524-3	MLPV - IDW03 - 20221214	100	92	113	123	96	87	104	92
670-11524-4	MLPV - IDW04 - 20221214	105	88	164	144	109	91	114	98
670-11524-5	MLPV - IDW05 - 20221214	102	82	86	136	102	97	108	96
670-11524-5 - DL	MLPV - IDW05 - 20221214							115	
670-11524-6	MLPV - IDW06 - 20221214	115	105	141	97	94	107	111	50
LCS 410-330204/2-A	Lab Control Sample	117	110	118	149	114	106	122	123
LCS 410-330663/3-A	Lab Control Sample	111	100	108	101	104	102	117	94
LCSD 410-330204/3-A	Lab Control Sample Dup	109	100	114	142	110	99	117	117
LCSD 410-330663/4-A	Lab Control Sample Dup	109	106	108	98	98	93	110	93
MB 410-330204/1-A	Method Blank	105	101	104	116	100	99	105	101
MB 410-330663/1-A	Method Blank	101	98	100	95	93	96	100	91

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		d3NMFOS	d3NMFSA	13C5PHA	13C7PUA	C9PFNA			
Lab Sample ID	Client Sample ID	(31-174)	(10-155)	(24-179)	(34-174)	(51-167)			
670-11524-1	MLPV - IDW01 - 20221214	133	58	95	118	133			
670-11524-2	MLPV - IDW02 - 20221214	128	74	98	112	130			
670-11524-3	MLPV - IDW03 - 20221214	104	35	85	101	114			
670-11524-4	MLPV - IDW04 - 20221214	123	40	75	114	131			
670-11524-5	MLPV - IDW05 - 20221214	114	44	75	108	125			
670-11524-5 - DL	MLPV - IDW05 - 20221214								
670-11524-6	MLPV - IDW06 - 20221214	95	6 *	101	91	120			
LCS 410-330204/2-A	Lab Control Sample	135	61	112	119	132			
LCS 410-330663/3-A	Lab Control Sample	106	63	106	99	116			
LCSD 410-330204/3-A	Lab Control Sample Dup	134	59	101	118	122			
LCSD 410-330663/4-A	Lab Control Sample Dup	104	56	104	102	111			
MB 410-330204/1-A	Method Blank	109	53	103	100	111			
MB 410-330663/1-A	Method Blank	97	58	100	95	102			

Surrogate Legend

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

M282FTS = M2-8:2 FTS
PFDoDA = 13C2-PFDoDA
PFTDA = 13C2 PFTeDA
HFPODA = 13C3 HFPO-DA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
PFBA = 13C4 PFBA
C4PFHA = 13C4 PFHpA
PFPeA = 13C5 PFPeA
d5NEFOS = d5-NEtFOSAA
C6PFDA = 13C6 PFDA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
d3NMFOS = d3-NMeFOSAA
d3NMFSA = d3-NMePFOSA
13C5PHA = 13C5 PFHxA
13C7PUA = 13C7 PFUnA
C9PFNA = 13C9 PFNA

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 670-15648/7
Matrix: Water
Analysis Batch: 15648

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/22/22 11:29*	*1*

Lab Sample ID: LCS 670-15648/5
Matrix: Water
Analysis Batch: 15648

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene			20.0	19.6		ug/L		98	50 - 150		
Tetrachloroethene			20.0	15.8		ug/L		79	50 - 150		
cis-1,2-Dichloroethene			20.0	18.7		ug/L		93	50 - 150		
Trichloroethene			20.0	18.7		ug/L		94	50 - 150		
trans-1,2-Dichloroethene			20.0	18.1		ug/L		90	50 - 150		
Vinyl chloride			20.0	19.1		ug/L		96	50 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 670-11627-D-1 MS
Matrix: Water
Analysis Batch: 15648

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene	0.50	U	20.0	28.1		ug/L		140	50 - 150		
Tetrachloroethene	0.50	U	20.0	21.4		ug/L		107	50 - 150		
cis-1,2-Dichloroethene	0.50	U	20.0	24.0		ug/L		120	50 - 150		
Trichloroethene	0.50	U	20.0	25.9		ug/L		130	50 - 150		
trans-1,2-Dichloroethene	0.50	U	20.0	23.9		ug/L		119	50 - 150		
Vinyl chloride	0.50	U	20.0	26.9		ug/L		134	50 - 150		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 670-11524-1 DU
Matrix: Water
Analysis Batch: 15648

Client Sample ID: MLPV - IDW01 - 20221214
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
1,1-Dichloroethene	0.50	U		0.50	U	ug/L				NC	
Tetrachloroethene	0.50	U		0.50	U	ug/L				NC	
cis-1,2-Dichloroethene	0.50	U		0.50	U	ug/L				NC	

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 670-11524-1 DU
Matrix: Water
Analysis Batch: 15648

Client Sample ID: MLPV - IDW01 - 20221214
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Trichloroethene	0.50	U	0.50	U	ug/L		NC	
trans-1,2-Dichloroethene	0.50	U	0.50	U	ug/L		NC	
Vinyl chloride	0.50	U	0.50	U	ug/L		NC	

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: MB 670-15651/7
Matrix: Water
Analysis Batch: 15651

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			12/22/22 11:29	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*80 - 120*		*12/22/22 11:29*	*1*

Lab Sample ID: LCS 670-15651/5
Matrix: Water
Analysis Batch: 15651

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	20.0	19.6		ug/L		98	50 - 150
Tetrachloroethene	20.0	15.8		ug/L		79	50 - 150
cis-1,2-Dichloroethene	20.0	18.7		ug/L		93	50 - 150
Trichloroethene	20.0	18.7		ug/L		94	50 - 150
trans-1,2-Dichloroethene	20.0	18.1		ug/L		90	50 - 150
Vinyl chloride	20.0	19.1		ug/L		96	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 670-11627-D-1 MS
Matrix: Water
Analysis Batch: 15651

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene	0.50	U	20.0	28.1		ug/L		140	50 - 150
Tetrachloroethene	0.50	U	20.0	21.4		ug/L		107	50 - 150
cis-1,2-Dichloroethene	0.50	U	20.0	24.0		ug/L		120	50 - 150
Trichloroethene	0.50	U	20.0	25.9		ug/L		130	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	23.9		ug/L		119	50 - 150
Vinyl chloride	0.50	U	20.0	26.9		ug/L		134	50 - 150

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	101		80 - 120

Lab Sample ID: 670-11524-1 DU
Matrix: Water
Analysis Batch: 15651

Client Sample ID: MLPV - IDW01 - 20221214
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
1,1-Dichloroethene	0.50	U		0.50	U	ug/L				NC	
Tetrachloroethene	0.50	U		0.50	U	ug/L				NC	
cis-1,2-Dichloroethene	0.50	U		0.50	U	ug/L				NC	
Trichloroethene	0.50	U		0.50	U	ug/L				NC	
trans-1,2-Dichloroethene	0.50	U		0.50	U	ug/L				NC	
Vinyl chloride	0.50	U		0.50	U	ug/L				NC	

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	104		80 - 120

Lab Sample ID: MB 670-15787/8
Matrix: Solid
Analysis Batch: 15787

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg			12/22/22 23:20	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	95		60 - 140		12/22/22 23:20	1

Lab Sample ID: LCS 670-15787/4
Matrix: Solid
Analysis Batch: 15787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
1,1-Dichloroethene			0.0500	0.0396		mg/Kg		79	50 - 150		
Tetrachloroethene			0.0500	0.0368		mg/Kg		74	50 - 150		
cis-1,2-Dichloroethene			0.0500	0.0355		mg/Kg		71	50 - 150		
Trichloroethene			0.0500	0.0388		mg/Kg		78	50 - 150		
trans-1,2-Dichloroethene			0.0500	0.0384		mg/Kg		77	50 - 150		
Vinyl chloride			0.0500	0.0348		mg/Kg		70	50 - 150		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	95		60 - 140

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 670-15787/5
Matrix: Solid
Analysis Batch: 15787

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1-Dichloroethene			0.0500	0.0404		mg/Kg		81	50 - 150	2	30
Tetrachloroethene			0.0500	0.0433		mg/Kg		87	50 - 150	16	30
cis-1,2-Dichloroethene			0.0500	0.0365		mg/Kg		73	50 - 150	3	30
Trichloroethene			0.0500	0.0409		mg/Kg		82	50 - 150	5	30
trans-1,2-Dichloroethene			0.0500	0.0386		mg/Kg		77	50 - 150	1	30
Vinyl chloride			0.0500	0.0361		mg/Kg		72	50 - 150	4	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*60 - 140*

Lab Sample ID: MB 670-15941/9
Matrix: Solid
Analysis Batch: 15941

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg			12/27/22 13:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*60 - 140*		*12/27/22 13:47*	*1*

Lab Sample ID: LCS 670-15941/5
Matrix: Solid
Analysis Batch: 15941

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene			0.0500	0.0467		mg/Kg		93	50 - 150
Tetrachloroethene			0.0500	0.0468		mg/Kg		94	50 - 150
cis-1,2-Dichloroethene			0.0500	0.0496		mg/Kg		99	50 - 150
Trichloroethene			0.0500	0.0527		mg/Kg		105	50 - 150
trans-1,2-Dichloroethene			0.0500	0.0497		mg/Kg		99	50 - 150
Vinyl chloride			0.0500	0.0479		mg/Kg		96	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*60 - 140*

Lab Sample ID: LCSD 670-15941/6
Matrix: Solid
Analysis Batch: 15941

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1-Dichloroethene			0.0500	0.0503		mg/Kg		101	50 - 150	7	30
Tetrachloroethene			0.0500	0.0482		mg/Kg		96	50 - 150	3	30
cis-1,2-Dichloroethene			0.0500	0.0500		mg/Kg		100	50 - 150	1	30

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 670-15941/6
Matrix: Solid
Analysis Batch: 15941

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Trichloroethene			0.0500	0.0552		mg/Kg		110	50 - 150	5	30
trans-1,2-Dichloroethene			0.0500	0.0531		mg/Kg		106	50 - 150	7	30
Vinyl chloride			0.0500	0.0491		mg/Kg		98	50 - 150	2	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*60 - 140*

Lab Sample ID: MB 670-16060/8
Matrix: Solid
Analysis Batch: 16060

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1
Tetrachloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1
cis-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1
Trichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1
trans-1,2-Dichloroethene	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1
Vinyl chloride	0.0030	U	0.012	0.0030	mg/Kg			12/28/22 08:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*93*		*60 - 140*		*12/28/22 08:06*	*1*

Lab Sample ID: LCS 670-16060/4
Matrix: Solid
Analysis Batch: 16060

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
1,1-Dichloroethene			0.0500	0.0501		mg/Kg		100	50 - 150
Tetrachloroethene			0.0500	0.0584		mg/Kg		117	50 - 150
cis-1,2-Dichloroethene			0.0500	0.0542		mg/Kg		108	50 - 150
Trichloroethene			0.0500	0.0607		mg/Kg		121	50 - 150
trans-1,2-Dichloroethene			0.0500	0.0562		mg/Kg		112	50 - 150
Vinyl chloride			0.0500	0.0640		mg/Kg		128	50 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*93*		*60 - 140*

Lab Sample ID: LCSD 670-16060/5
Matrix: Solid
Analysis Batch: 16060

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,1-Dichloroethene			0.0500	0.0501		mg/Kg		100	50 - 150	0	30
Tetrachloroethene			0.0500	0.0582		mg/Kg		116	50 - 150	0	30
cis-1,2-Dichloroethene			0.0500	0.0522		mg/Kg		104	50 - 150	4	30
Trichloroethene			0.0500	0.0604		mg/Kg		121	50 - 150	0	30
trans-1,2-Dichloroethene			0.0500	0.0552		mg/Kg		110	50 - 150	2	30
Vinyl chloride			0.0500	0.0621		mg/Kg		124	50 - 150	3	30

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	94		60 - 140

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-14787/6
Matrix: Water
Analysis Batch: 14787

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			12/15/22 14:14	1

Lab Sample ID: LCS 670-14787/4
Matrix: Water
Analysis Batch: 14787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	4000	4000		ug/L		100	90 - 110

Lab Sample ID: LCSD 670-14787/5
Matrix: Water
Analysis Batch: 14787

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	4000	3840		ug/L		96	90 - 110	4	20

Lab Sample ID: 670-11529-D-4 MS
Matrix: Water
Analysis Batch: 14787

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	1400		5000	6760		ug/L		106	80 - 120

Lab Sample ID: 670-11529-D-4 MSD
Matrix: Water
Analysis Batch: 14787

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	1400		5000	6730		ug/L		106	80 - 120	1	20

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-330204/1-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330204

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		12/26/22 08:57	12/30/22 19:58	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 19:58	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
DONA	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 19:58	1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-330204/1-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330204

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		12/26/22 08:57	12/30/22 19:58	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/26/22 08:57	12/30/22 19:58	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*92*		*10 - 200*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
M2-6:2 FTS	*106*		*17 - 200*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
M2-8:2 FTS	*106*		*33 - 200*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C2-PFDoDA	*79*		*17 - 176*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C2 PFTeDA	*78*		*10 - 179*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C3 HFPO-DA	*109*		*17 - 185*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C3 PFBS	*96*		*16 - 200*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C3 PFHxS	*98*		*28 - 188*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C4 PFBA	*105*		*42 - 165*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C4 PFHpA	*101*		*31 - 182*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C5 PFPeA	*104*		*38 - 187*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
d5-NEtFOSAA	*116*		*29 - 195*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C6 PFDA	*100*		*49 - 163*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C8 PFOA	*99*		*48 - 162*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C8 PFOS	*105*		*51 - 159*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C8 FOSA	*101*		*10 - 168*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
d3-NMeFOSAA	*109*		*31 - 174*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
d3-NMePFOSA	*53*		*10 - 155*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C5 PFHxA	*103*		*24 - 179*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C7 PFUnA	*100*		*34 - 174*	*12/26/22 08:57*	*12/30/22 19:58*	*1*
13C9 PFNA	*111*		*51 - 167*	*12/26/22 08:57*	*12/30/22 19:58*	*1*

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-330204/2-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330204

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0216		ug/L		91	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0187		ug/L		78	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0204		ug/L		84	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0207		ug/L		84	55 - 138
9Cl-PF3ONS	0.0238	0.0207		ug/L		87	59 - 135
DONA	0.0242	0.0215		ug/L		89	55 - 143
HFPODA	0.0256	0.0196		ug/L		76	50 - 135
NEtFOSAA	0.0256	0.0207		ug/L		81	55 - 134
NMeFOSAA	0.0256	0.0224		ug/L		87	59 - 140
NMeFOSA	0.0256	0.0278		ug/L		109	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0208		ug/L		92	53 - 138
Perfluorobutanoic acid	0.0256	0.0200		ug/L		78	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0207		ug/L		84	55 - 137
Perfluorodecanoic acid	0.0256	0.0234		ug/L		91	56 - 138
Perfluorododecanoic acid	0.0256	0.0225		ug/L		88	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0180		ug/L		74	56 - 140
Perfluoroheptanoic acid	0.0256	0.0232		ug/L		91	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0194		ug/L		83	58 - 134
Perfluorohexanoic acid	0.0256	0.0221		ug/L		86	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0208		ug/L		85	59 - 136
Perfluorononanoic acid	0.0256	0.0215		ug/L		84	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0215		ug/L		84	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0199		ug/L		84	45 - 150
Perfluorooctanoic acid	0.0256	0.0239		ug/L		94	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0227		ug/L		95	55 - 140
Perfluoropentanoic acid	0.0256	0.0220		ug/L		86	57 - 141
Perfluorotetradecanoic acid	0.0256	0.0236		ug/L		92	62 - 139
Perfluorotridecanoic acid	0.0256	0.0243		ug/L		95	58 - 146
Perfluoroundecanoic acid	0.0256	0.0220		ug/L		86	60 - 141

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-4:2 FTS	*110*		*10 - 200*
M2-6:2 FTS	*112*		*17 - 200*
M2-8:2 FTS	*119*		*33 - 200*
13C2-PFDoDA	*111*		*17 - 176*
13C2 PFTeDA	*105*		*10 - 179*
13C3 HFPO-DA	*120*		*17 - 185*
13C3 PFBS	*107*		*16 - 200*
13C3 PFHxS	*117*		*28 - 188*
13C4 PFBA	*117*		*42 - 165*
13C4 PFHpA	*110*		*31 - 182*
13C5 PFPeA	*118*		*38 - 187*
d5-NEtFOSAA	*149*		*29 - 195*
13C6 PFDA	*114*		*49 - 163*
13C8 PFOA	*106*		*48 - 162*
13C8 PFOS	*122*		*51 - 159*
13C8 FOSA	*123*		*10 - 168*
d3-NMeFOSAA	*135*		*31 - 174*

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-330204/2-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330204

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
d3-NMePFOSA	61		10 - 155
13C5 PFHxA	112		24 - 179
13C7 PFUnA	119		34 - 174
13C9 PFNA	132		51 - 167

Lab Sample ID: LCSD 410-330204/3-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 330204

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS			0.0238	0.0211		ug/L		89	53 - 139	2	30
4:2 Fluorotelomer sulfonic acid			0.0239	0.0223		ug/L		93	55 - 139	17	30
6:2 Fluorotelomer sulfonic acid			0.0243	0.0213		ug/L		88	28 - 173	4	30
8:2 Fluorotelomer sulfonic acid			0.0245	0.0230		ug/L		94	55 - 138	10	30
9Cl-PF3ONS			0.0238	0.0218		ug/L		92	59 - 135	5	30
DONA			0.0242	0.0224		ug/L		93	55 - 143	5	30
HFPODA			0.0256	0.0205		ug/L		80	50 - 135	5	30
NEtFOSAA			0.0256	0.0226		ug/L		88	55 - 134	9	30
NMeFOSAA			0.0256	0.0232		ug/L		91	59 - 140	4	30
NMeFOSA			0.0256	0.0291		ug/L		114	64 - 143	4	30
Perfluorobutanesulfonic acid			0.0227	0.0217		ug/L		96	53 - 138	4	30
Perfluorobutanoic acid			0.0256	0.0210		ug/L		82	59 - 136	5	30
Perfluorodecanesulfonic acid			0.0247	0.0223		ug/L		90	55 - 137	8	30
Perfluorodecanoic acid			0.0256	0.0249		ug/L		97	56 - 138	6	30
Perfluorododecanoic acid			0.0256	0.0227		ug/L		89	59 - 143	1	30
Perfluoroheptanesulfonic acid			0.0244	0.0208		ug/L		85	56 - 140	14	30
Perfluoroheptanoic acid			0.0256	0.0245		ug/L		96	59 - 145	5	30
Perfluorohexanesulfonic acid			0.0233	0.0216		ug/L		93	58 - 134	11	30
Perfluorohexanoic acid			0.0256	0.0232		ug/L		91	58 - 139	5	30
Perfluorononanesulfonic acid			0.0246	0.0215		ug/L		88	59 - 136	3	30
Perfluorononanoic acid			0.0256	0.0238		ug/L		93	61 - 139	10	30
Perfluorooctanesulfonamide			0.0256	0.0240		ug/L		94	43 - 167	11	30
Perfluorooctanesulfonic acid			0.0237	0.0211		ug/L		89	45 - 150	6	30
Perfluorooctanoic acid			0.0256	0.0241		ug/L		94	51 - 145	1	30
Perfluoropentanesulfonic acid			0.0240	0.0236		ug/L		98	55 - 140	4	30
Perfluoropentanoic acid			0.0256	0.0221		ug/L		86	57 - 141	0	30
Perfluorotetradecanoic acid			0.0256	0.0232		ug/L		91	62 - 139	2	30
Perfluorotridecanoic acid			0.0256	0.0243		ug/L		95	58 - 146	0	30
Perfluoroundecanoic acid			0.0256	0.0244		ug/L		95	60 - 141	10	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
M2-4:2 FTS	95		10 - 200
M2-6:2 FTS	107		17 - 200
M2-8:2 FTS	110		33 - 200
13C2-PFDoDA	110		17 - 176
13C2 PFTeDA	109		10 - 179
13C3 HFPO-DA	113		17 - 185
13C3 PFBS	106		16 - 200
13C3 PFHxS	101		28 - 188

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-330204/3-A
Matrix: Water
Analysis Batch: 331564

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 330204

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFBA	*109*		*42 - 165*
13C4 PFHpA	*100*		*31 - 182*
13C5 PFPeA	*114*		*38 - 187*
d5-NEtFOSAA	*142*		*29 - 195*
13C6 PFDA	*110*		*49 - 163*
13C8 PFOA	*99*		*48 - 162*
13C8 PFOS	*117*		*51 - 159*
13C8 FOSA	*117*		*10 - 168*
d3-NMeFOSAA	*134*		*31 - 174*
d3-NMePFOSA	*59*		*10 - 155*
13C5 PFHxA	*101*		*24 - 179*
13C7 PFUnA	*118*		*34 - 174*
13C9 PFNA	*122*		*51 - 167*

Lab Sample ID: MB 410-330663/1-A
Matrix: Water
Analysis Batch: 331216

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 330663

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		12/28/22 06:41	12/30/22 01:41	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		12/28/22 06:41	12/30/22 01:41	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
DONA	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		12/28/22 06:41	12/30/22 01:41	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		12/28/22 06:41	12/30/22 01:41	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		12/28/22 06:41	12/30/22 01:41	1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-4:2 FTS	95		10 - 200	12/28/22 06:41	12/30/22 01:41	1
M2-6:2 FTS	100		17 - 200	12/28/22 06:41	12/30/22 01:41	1
M2-8:2 FTS	109		33 - 200	12/28/22 06:41	12/30/22 01:41	1
13C2-PFDoDA	103		17 - 176	12/28/22 06:41	12/30/22 01:41	1
13C2 PFTeDA	117		10 - 179	12/28/22 06:41	12/30/22 01:41	1
13C3 HFPO-DA	91		17 - 185	12/28/22 06:41	12/30/22 01:41	1
13C3 PFBS	95		16 - 200	12/28/22 06:41	12/30/22 01:41	1
13C3 PFHxS	96		28 - 188	12/28/22 06:41	12/30/22 01:41	1
13C4 PFBA	101		42 - 165	12/28/22 06:41	12/30/22 01:41	1
13C4 PFHpA	98		31 - 182	12/28/22 06:41	12/30/22 01:41	1
13C5 PFPeA	100		38 - 187	12/28/22 06:41	12/30/22 01:41	1
d5-NEtFOSAA	95		29 - 195	12/28/22 06:41	12/30/22 01:41	1
13C6 PFDA	93		49 - 163	12/28/22 06:41	12/30/22 01:41	1
13C8 PFOA	96		48 - 162	12/28/22 06:41	12/30/22 01:41	1
13C8 PFOS	100		51 - 159	12/28/22 06:41	12/30/22 01:41	1
13C8 FOSA	91		10 - 168	12/28/22 06:41	12/30/22 01:41	1
d3-NMeFOSAA	97		31 - 174	12/28/22 06:41	12/30/22 01:41	1
d3-NMePFOSA	58		10 - 155	12/28/22 06:41	12/30/22 01:41	1
13C5 PFHxA	100		24 - 179	12/28/22 06:41	12/30/22 01:41	1
13C7 PFUnA	95		34 - 174	12/28/22 06:41	12/30/22 01:41	1
13C9 PFNA	102		51 - 167	12/28/22 06:41	12/30/22 01:41	1

Lab Sample ID: LCS 410-330663/3-A
Matrix: Water
Analysis Batch: 331216

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330663

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0246		ug/L		103	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0266		ug/L		111	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0252		ug/L		104	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0213		ug/L		87	55 - 138
9Cl-PF3ONS	0.0238	0.0246		ug/L		103	59 - 135
DONA	0.0242	0.0253		ug/L		104	55 - 143
HFPODA	0.0256	0.0276		ug/L		108	50 - 135
NEtFOSAA	0.0256	0.0258		ug/L		101	55 - 134
NMeFOSAA	0.0256	0.0239		ug/L		93	59 - 140
NMeFOSA	0.0256	0.0245		ug/L		96	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0249		ug/L		110	53 - 138
Perfluorobutanoic acid	0.0256	0.0234		ug/L		92	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0235		ug/L		95	55 - 137
Perfluorodecanoic acid	0.0256	0.0268		ug/L		105	56 - 138
Perfluorododecanoic acid	0.0256	0.0241		ug/L		94	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0246		ug/L		101	56 - 140
Perfluoroheptanoic acid	0.0256	0.0291		ug/L		114	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0252		ug/L		108	58 - 134
Perfluorohexanoic acid	0.0256	0.0267		ug/L		104	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0235		ug/L		96	59 - 136
Perfluorononanoic acid	0.0256	0.0279		ug/L		109	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0261		ug/L		102	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0245		ug/L		104	45 - 150
Perfluorooctanoic acid	0.0256	0.0279		ug/L		109	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0246		ug/L		103	55 - 140

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-330663/3-A
Matrix: Water
Analysis Batch: 331216

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 330663

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Perfluoropentanoic acid			0.0256	0.0263		ug/L		103	57 - 141		
Perfluorotetradecanoic acid			0.0256	0.0293		ug/L		114	62 - 139		
Perfluorotridecanoic acid			0.0256	0.0262		ug/L		102	58 - 146		
Perfluoroundecanoic acid			0.0256	0.0279		ug/L		109	60 - 141		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-4:2 FTS	*105*		*10 - 200*
M2-6:2 FTS	*109*		*17 - 200*
M2-8:2 FTS	*110*		*33 - 200*
13C2-PFDoDA	*110*		*17 - 176*
13C2 PFTeDA	*111*		*10 - 179*
13C3 HFPO-DA	*102*		*17 - 185*
13C3 PFBS	*109*		*16 - 200*
13C3 PFHxS	*104*		*28 - 188*
13C4 PFBA	*111*		*42 - 165*
13C4 PFHpA	*100*		*31 - 182*
13C5 PFPeA	*108*		*38 - 187*
d5-NEtFOSAA	*101*		*29 - 195*
13C6 PFDA	*104*		*49 - 163*
13C8 PFOA	*102*		*48 - 162*
13C8 PFOS	*117*		*51 - 159*
13C8 FOSA	*94*		*10 - 168*
d3-NMeFOSAA	*106*		*31 - 174*
d3-NMePFOSA	*63*		*10 - 155*
13C5 PFHxA	*106*		*24 - 179*
13C7 PFUnA	*99*		*34 - 174*
13C9 PFNA	*116*		*51 - 167*

Lab Sample ID: LCSD 410-330663/4-A
Matrix: Water
Analysis Batch: 331216

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 330663

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS			0.0238	0.0249		ug/L		104	53 - 139	1	30
4:2 Fluorotelomer sulfonic acid			0.0239	0.0246		ug/L		103	55 - 139	8	30
6:2 Fluorotelomer sulfonic acid			0.0243	0.0237		ug/L		98	28 - 173	6	30
8:2 Fluorotelomer sulfonic acid			0.0245	0.0241		ug/L		98	55 - 138	12	30
9Cl-PF3ONS			0.0238	0.0255		ug/L		107	59 - 135	3	30
DONA			0.0242	0.0255		ug/L		106	55 - 143	1	30
HFPODA			0.0256	0.0259		ug/L		101	50 - 135	6	30
NEtFOSAA			0.0256	0.0246		ug/L		96	55 - 134	5	30
NMeFOSAA			0.0256	0.0266		ug/L		104	59 - 140	11	30
NMeFOSA			0.0256	0.0250		ug/L		97	64 - 143	2	30
Perfluorobutanesulfonic acid			0.0227	0.0247		ug/L		109	53 - 138	1	30
Perfluorobutanoic acid			0.0256	0.0230		ug/L		90	59 - 136	2	30
Perfluorodecanesulfonic acid			0.0247	0.0240		ug/L		97	55 - 137	2	30
Perfluorodecanoic acid			0.0256	0.0270		ug/L		105	56 - 138	1	30
Perfluorododecanoic acid			0.0256	0.0259		ug/L		101	59 - 143	7	30
Perfluoroheptanesulfonic acid			0.0244	0.0241		ug/L		99	56 - 140	2	30

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-330663/4-A
Matrix: Water
Analysis Batch: 331216

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 330663

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroheptanoic acid			0.0256	0.0275		ug/L		108	59 - 145	6	30
Perfluorohexanesulfonic acid			0.0233	0.0251		ug/L		108	58 - 134	0	30
Perfluorohexanoic acid			0.0256	0.0261		ug/L		102	58 - 139	2	30
Perfluorononanesulfonic acid			0.0246	0.0237		ug/L		96	59 - 136	1	30
Perfluorononanoic acid			0.0256	0.0279		ug/L		109	61 - 139	0	30
Perfluorooctanesulfonamide			0.0256	0.0273		ug/L		107	43 - 167	4	30
Perfluorooctanesulfonic acid			0.0237	0.0240		ug/L		101	45 - 150	2	30
Perfluorooctanoic acid			0.0256	0.0304		ug/L		119	51 - 145	9	30
Perfluoropentanesulfonic acid			0.0240	0.0241		ug/L		100	55 - 140	2	30
Perfluoropentanoic acid			0.0256	0.0250		ug/L		98	57 - 141	5	30
Perfluorotetradecanoic acid			0.0256	0.0258		ug/L		101	62 - 139	13	30
Perfluorotridecanoic acid			0.0256	0.0275		ug/L		107	58 - 146	5	30
Perfluoroundecanoic acid			0.0256	0.0268		ug/L		105	60 - 141	4	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
M2-4:2 FTS	*107*		*10 - 200*
M2-6:2 FTS	*105*		*17 - 200*
M2-8:2 FTS	*102*		*33 - 200*
13C2-PFDoDA	*98*		*17 - 176*
13C2 PFTeDA	*107*		*10 - 179*
13C3 HFPO-DA	*102*		*17 - 185*
13C3 PFBS	*104*		*16 - 200*
13C3 PFHxS	*102*		*28 - 188*
13C4 PFBA	*109*		*42 - 165*
13C4 PFHpA	*106*		*31 - 182*
13C5 PFPeA	*108*		*38 - 187*
d5-NEtFOSAA	*98*		*29 - 195*
13C6 PFDA	*98*		*49 - 163*
13C8 PFOA	*93*		*48 - 162*
13C8 PFOS	*110*		*51 - 159*
13C8 FOSA	*93*		*10 - 168*
d3-NMeFOSAA	*104*		*31 - 174*
d3-NMePFOSA	*56*		*10 - 155*
13C5 PFHxA	*104*		*24 - 179*
13C7 PFUnA	*102*		*34 - 174*
13C9 PFNA	*111*		*51 - 167*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 860-84507/1-A
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 84507

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.1	U	10	8.1	ug/L		01/05/23 10:45	01/06/23 00:49	1
Cadmium	2.4	U	5.0	2.4	ug/L		01/05/23 10:45	01/06/23 00:49	1
Chromium	2.31	I	10	2.2	ug/L		01/05/23 10:45	01/06/23 00:49	1
Lead	3.7	U	10	3.7	ug/L		01/05/23 10:45	01/06/23 00:49	1

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LCS 860-84507/2-A
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 84507

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1000	917		ug/L		92	80 - 120
Cadmium	1000	911		ug/L		91	80 - 120
Chromium	1000	918		ug/L		92	80 - 120
Lead	1000	934		ug/L		93	80 - 120

Lab Sample ID: LCSD 860-84507/3-A
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 84507

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1000	914		ug/L		91	80 - 120	0	20
Cadmium	1000	906		ug/L		91	80 - 120	1	20
Chromium	1000	921		ug/L		92	80 - 120	0	20
Lead	1000	929		ug/L		93	80 - 120	1	20

Lab Sample ID: MB 860-84680/1-A
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 84680

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.1	U	10	8.1	ug/L		01/06/23 09:30	01/06/23 14:08	1
Cadmium	2.4	U	5.0	2.4	ug/L		01/06/23 09:30	01/06/23 14:08	1
Chromium	2.2	U	10	2.2	ug/L		01/06/23 09:30	01/06/23 14:08	1
Lead	3.7	U	10	3.7	ug/L		01/06/23 09:30	01/06/23 14:08	1

Lab Sample ID: LCS 860-84680/2-A
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 84680

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1000	893		ug/L		89	80 - 120
Cadmium	1000	892		ug/L		89	80 - 120
Chromium	1000	912		ug/L		91	80 - 120
Lead	1000	907		ug/L		91	80 - 120

Lab Sample ID: LCSD 860-84680/3-A
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 84680

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1000	910		ug/L		91	80 - 120	2	20
Cadmium	1000	897		ug/L		90	80 - 120	1	20
Chromium	1000	909		ug/L		91	80 - 120	0	20
Lead	1000	910		ug/L		91	80 - 120	0	20

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LB 860-84399/1-B
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 84507

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/05/23 10:45	01/06/23 01:00	1
Cadmium	12	U	25	12	ug/L		01/05/23 10:45	01/06/23 01:00	1
Chromium	11	U	50	11	ug/L		01/05/23 10:45	01/06/23 01:00	1
Lead	18	U	50	18	ug/L		01/05/23 10:45	01/06/23 01:00	1

Lab Sample ID: 860-39349-A-1-F MS
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Matrix Spike
Prep Type: TCLP
Prep Batch: 84507

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	40	U	1000	985		ug/L		99	75 - 125
Cadmium	12	U	1000	970		ug/L		97	75 - 125
Chromium	11	U	1000	950		ug/L		95	75 - 125
Lead	18	U	1000	985		ug/L		99	75 - 125

Lab Sample ID: 860-39349-A-1-G MSD
Matrix: Solid
Analysis Batch: 84677

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP
Prep Batch: 84507

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	40	U	1000	1020		ug/L		102	75 - 125	3	20
Cadmium	12	U	1000	965		ug/L		97	75 - 125	1	20
Chromium	11	U	1000	935		ug/L		94	75 - 125	2	20
Lead	18	U	1000	960		ug/L		96	75 - 125	3	20

Lab Sample ID: LB 860-84229/1-B
Matrix: Solid
Analysis Batch: 84885

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 84680

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 16:35	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 16:35	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 16:35	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 16:35	1

Lab Sample ID: LB 860-84620/1-B
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 84680

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		01/06/23 09:30	01/06/23 14:18	1
Cadmium	12	U	25	12	ug/L		01/06/23 09:30	01/06/23 14:18	1
Chromium	11	U	50	11	ug/L		01/06/23 09:30	01/06/23 14:18	1
Lead	18	U	50	18	ug/L		01/06/23 09:30	01/06/23 14:18	1

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 560-107158-A-1-B MS
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Matrix Spike
Prep Type: TCLP
Prep Batch: 84680

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	40	U	1000	930		ug/L		93	75 - 125
Cadmium	12	U	1000	980		ug/L		98	75 - 125
Chromium	11	U	1000	915		ug/L		92	75 - 125
Lead	18	U	1000	975		ug/L		98	75 - 125

Lab Sample ID: 560-107158-D-1-D MSD
Matrix: Solid
Analysis Batch: 84759

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP
Prep Batch: 84680

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	40	U	1000	955		ug/L		96	75 - 125	3	20
Cadmium	12	U	1000	975		ug/L		98	75 - 125	1	20
Chromium	11	U	1000	910		ug/L		91	75 - 125	1	20
Lead	18	U	1000	975		ug/L		98	75 - 125	0	20

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-16778/2-A
Matrix: Water
Analysis Batch: 16907

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 16778

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		01/04/23 09:47	01/04/23 23:27	1

Lab Sample ID: LCS 670-16778/1-A
Matrix: Water
Analysis Batch: 16907

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 16778

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	1500	1500		ug/L		100	90 - 110

Lab Sample ID: 670-11474-C-1-A MS
Matrix: Water
Analysis Batch: 16907

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 16778

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	41	I	1500	1380		ug/L		89	85 - 115

Lab Sample ID: 670-11474-C-1-B MSD
Matrix: Water
Analysis Batch: 16907

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 16778

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	41	I	1500	1380		ug/L		89	85 - 115	0	20

GC/MS VOA

Prep Batch: 14731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	Total/NA	Solid	5035	
670-11524-8	MLPV - IDW08 - 20221214	Total/NA	Solid	5035	
670-11524-9	MLPV - IDW09 - 20221214	Total/NA	Solid	5035	
670-11524-10	MLPV - IDW10 - 20221214	Total/NA	Solid	5035	
670-11524-11	MLPV - IDW11 - 20221214	Total/NA	Solid	5035	
670-11524-12	MLPV - IDW12 - 20221214	Total/NA	Solid	5035	
670-11524-13	MLPV - IDW13 - 20221214	Total/NA	Solid	5035	
670-11524-14	MLPV - IDW14 - 20221214	Total/NA	Solid	5035	
670-11524-15	MLPV - IDW15 - 20221214	Total/NA	Solid	5035	
670-11524-16	MLPV - IDW16 - 20221214	Total/NA	Solid	5035	
670-11524-17	MLPV - IDW17 - 20221214	Total/NA	Solid	5035	
670-11524-18	MLPV - IDW18 - 20221214	Total/NA	Solid	5035	
670-11524-19	MLPV - IDW19 - 20221214	Total/NA	Solid	5035	

Analysis Batch: 15648

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	8260B	
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	8260B	
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	8260B	
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	8260B	
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	8260B	
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	8260B	
670-11524-20	MLPV - TB01 - 20221214	Total/NA	Water	8260B	
MB 670-15648/7	Method Blank	Total/NA	Water	8260B	
LCS 670-15648/5	Lab Control Sample	Total/NA	Water	8260B	
670-11627-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-11524-1 DU	MLPV - IDW01 - 20221214	Total/NA	Water	8260B	

Analysis Batch: 15651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	8260B	
MB 670-15651/7	Method Blank	Total/NA	Water	8260B	
LCS 670-15651/5	Lab Control Sample	Total/NA	Water	8260B	
670-11627-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-11524-1 DU	MLPV - IDW01 - 20221214	Total/NA	Water	8260B	

Analysis Batch: 15787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	Total/NA	Solid	8260B	14731
670-11524-8	MLPV - IDW08 - 20221214	Total/NA	Solid	8260B	14731
MB 670-15787/8	Method Blank	Total/NA	Solid	8260B	
LCS 670-15787/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 670-15787/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

Analysis Batch: 15941

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-9	MLPV - IDW09 - 20221214	Total/NA	Solid	8260B	14731
670-11524-10	MLPV - IDW10 - 20221214	Total/NA	Solid	8260B	14731
670-11524-12	MLPV - IDW12 - 20221214	Total/NA	Solid	8260B	14731
670-11524-14	MLPV - IDW14 - 20221214	Total/NA	Solid	8260B	14731
670-11524-15	MLPV - IDW15 - 20221214	Total/NA	Solid	8260B	14731

GC/MS VOA (Continued)

Analysis Batch: 15941 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-16	MLPV - IDW16 - 20221214	Total/NA	Solid	8260B	14731
670-11524-17	MLPV - IDW17 - 20221214	Total/NA	Solid	8260B	14731
MB 670-15941/9	Method Blank	Total/NA	Solid	8260B	
LCS 670-15941/5	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 670-15941/6	Lab Control Sample Dup	Total/NA	Solid	8260B	

Analysis Batch: 16060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-11	MLPV - IDW11 - 20221214	Total/NA	Solid	8260B	14731
670-11524-13	MLPV - IDW13 - 20221214	Total/NA	Solid	8260B	14731
670-11524-18	MLPV - IDW18 - 20221214	Total/NA	Solid	8260B	14731
670-11524-19	MLPV - IDW19 - 20221214	Total/NA	Solid	8260B	14731
MB 670-16060/8	Method Blank	Total/NA	Solid	8260B	
LCS 670-16060/4	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 670-16060/5	Lab Control Sample Dup	Total/NA	Solid	8260B	

HPLC/IC

Analysis Batch: 14787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	300.0	
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	300.0	
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	300.0	
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	300.0	
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	300.0	
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	300.0	
MB 670-14787/6	Method Blank	Total/NA	Water	300.0	
LCS 670-14787/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-14787/5	Lab Control Sample Dup	Total/NA	Water	300.0	
670-11529-D-4 MS	Matrix Spike	Total/NA	Water	300.0	
670-11529-D-4 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 330204

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	537 IDA	
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	537 IDA	
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	537 IDA	
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	537 IDA	
670-11524-4 - RA	MLPV - IDW04 - 20221214	Total/NA	Water	537 IDA	
670-11524-5 - DL	MLPV - IDW05 - 20221214	Total/NA	Water	537 IDA	
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	537 IDA	
MB 410-330204/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-330204/2-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-330204/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

Prep Batch: 330663

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	537 IDA	
MB 410-330663/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-330663/3-A	Lab Control Sample	Total/NA	Water	537 IDA	

LCMS (Continued)

Prep Batch: 330663 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 410-330663/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

Analysis Batch: 331216

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	537 IDA	330663
MB 410-330663/1-A	Method Blank	Total/NA	Water	537 IDA	330663
LCS 410-330663/3-A	Lab Control Sample	Total/NA	Water	537 IDA	330663
LCSD 410-330663/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	330663

Analysis Batch: 331564

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	537 IDA	330204
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	537 IDA	330204
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	537 IDA	330204
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	537 IDA	330204
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	537 IDA	330204
MB 410-330204/1-A	Method Blank	Total/NA	Water	537 IDA	330204
LCS 410-330204/2-A	Lab Control Sample	Total/NA	Water	537 IDA	330204
LCSD 410-330204/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	330204

Analysis Batch: 332514

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-4 - RA	MLPV - IDW04 - 20221214	Total/NA	Water	537 IDA	330204
670-11524-5 - DL	MLPV - IDW05 - 20221214	Total/NA	Water	537 IDA	330204

Metals

Leach Batch: 84229

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	TCLP	Solid	1311	
670-11524-8	MLPV - IDW08 - 20221214	TCLP	Solid	1311	
670-11524-9	MLPV - IDW09 - 20221214	TCLP	Solid	1311	
670-11524-10	MLPV - IDW10 - 20221214	TCLP	Solid	1311	
670-11524-11	MLPV - IDW11 - 20221214	TCLP	Solid	1311	
670-11524-12	MLPV - IDW12 - 20221214	TCLP	Solid	1311	
670-11524-13	MLPV - IDW13 - 20221214	TCLP	Solid	1311	
670-11524-14	MLPV - IDW14 - 20221214	TCLP	Solid	1311	
670-11524-15	MLPV - IDW15 - 20221214	TCLP	Solid	1311	
LB 860-84229/1-B	Method Blank	TCLP	Solid	1311	

Leach Batch: 84399

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-16	MLPV - IDW16 - 20221214	TCLP	Solid	1311	
670-11524-17	MLPV - IDW17 - 20221214	TCLP	Solid	1311	
670-11524-18	MLPV - IDW18 - 20221214	TCLP	Solid	1311	
670-11524-19	MLPV - IDW19 - 20221214	TCLP	Solid	1311	
LB 860-84399/1-B	Method Blank	TCLP	Solid	1311	
860-39349-A-1-F MS	Matrix Spike	TCLP	Solid	1311	
860-39349-A-1-G MSD	Matrix Spike Duplicate	TCLP	Solid	1311	

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Metals

Prep Batch: 84507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-16	MLPV - IDW16 - 20221214	TCLP	Solid	3010A	84399
670-11524-17	MLPV - IDW17 - 20221214	TCLP	Solid	3010A	84399
670-11524-18	MLPV - IDW18 - 20221214	TCLP	Solid	3010A	84399
670-11524-19	MLPV - IDW19 - 20221214	TCLP	Solid	3010A	84399
LB 860-84399/1-B	Method Blank	TCLP	Solid	3010A	84399
MB 860-84507/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 860-84507/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 860-84507/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	
860-39349-A-1-F MS	Matrix Spike	TCLP	Solid	3010A	84399
860-39349-A-1-G MSD	Matrix Spike Duplicate	TCLP	Solid	3010A	84399

Leach Batch: 84620

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 860-84620/1-B	Method Blank	TCLP	Solid	1311	
560-107158-A-1-B MS	Matrix Spike	TCLP	Solid	1311	
560-107158-D-1-D MSD	Matrix Spike Duplicate	TCLP	Solid	1311	

Analysis Batch: 84677

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-16	MLPV - IDW16 - 20221214	TCLP	Solid	6010D	84507
670-11524-17	MLPV - IDW17 - 20221214	TCLP	Solid	6010D	84507
670-11524-18	MLPV - IDW18 - 20221214	TCLP	Solid	6010D	84507
670-11524-19	MLPV - IDW19 - 20221214	TCLP	Solid	6010D	84507
LB 860-84399/1-B	Method Blank	TCLP	Solid	6010D	84507
MB 860-84507/1-A	Method Blank	Total/NA	Solid	6010D	84507
LCS 860-84507/2-A	Lab Control Sample	Total/NA	Solid	6010D	84507
LCSD 860-84507/3-A	Lab Control Sample Dup	Total/NA	Solid	6010D	84507
860-39349-A-1-F MS	Matrix Spike	TCLP	Solid	6010D	84507
860-39349-A-1-G MSD	Matrix Spike Duplicate	TCLP	Solid	6010D	84507

Prep Batch: 84680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	TCLP	Solid	3010A	84229
670-11524-8	MLPV - IDW08 - 20221214	TCLP	Solid	3010A	84229
670-11524-9	MLPV - IDW09 - 20221214	TCLP	Solid	3010A	84229
670-11524-10	MLPV - IDW10 - 20221214	TCLP	Solid	3010A	84229
670-11524-11	MLPV - IDW11 - 20221214	TCLP	Solid	3010A	84229
670-11524-12	MLPV - IDW12 - 20221214	TCLP	Solid	3010A	84229
670-11524-13	MLPV - IDW13 - 20221214	TCLP	Solid	3010A	84229
670-11524-14	MLPV - IDW14 - 20221214	TCLP	Solid	3010A	84229
670-11524-15	MLPV - IDW15 - 20221214	TCLP	Solid	3010A	84229
LB 860-84229/1-B	Method Blank	TCLP	Solid	3010A	84229
LB 860-84620/1-B	Method Blank	TCLP	Solid	3010A	84620
MB 860-84680/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 860-84680/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 860-84680/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	
560-107158-A-1-B MS	Matrix Spike	TCLP	Solid	3010A	84620
560-107158-D-1-D MSD	Matrix Spike Duplicate	TCLP	Solid	3010A	84620

Metals

Analysis Batch: 84759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 860-84620/1-B	Method Blank	TCLP	Solid	6010D	84680
MB 860-84680/1-A	Method Blank	Total/NA	Solid	6010D	84680
LCS 860-84680/2-A	Lab Control Sample	Total/NA	Solid	6010D	84680
LCSD 860-84680/3-A	Lab Control Sample Dup	Total/NA	Solid	6010D	84680
560-107158-A-1-B MS	Matrix Spike	TCLP	Solid	6010D	84680
560-107158-D-1-D MSD	Matrix Spike Duplicate	TCLP	Solid	6010D	84680

Analysis Batch: 84885

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	TCLP	Solid	6010D	84680
670-11524-8	MLPV - IDW08 - 20221214	TCLP	Solid	6010D	84680
670-11524-9	MLPV - IDW09 - 20221214	TCLP	Solid	6010D	84680
670-11524-10	MLPV - IDW10 - 20221214	TCLP	Solid	6010D	84680
670-11524-11	MLPV - IDW11 - 20221214	TCLP	Solid	6010D	84680
670-11524-12	MLPV - IDW12 - 20221214	TCLP	Solid	6010D	84680
670-11524-13	MLPV - IDW13 - 20221214	TCLP	Solid	6010D	84680
670-11524-14	MLPV - IDW14 - 20221214	TCLP	Solid	6010D	84680
670-11524-15	MLPV - IDW15 - 20221214	TCLP	Solid	6010D	84680
LB 860-84229/1-B	Method Blank	TCLP	Solid	6010D	84680

General Chemistry

Prep Batch: 16778

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	365.2/365.3/365	
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	365.2/365.3/365	
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	365.2/365.3/365	
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	365.2/365.3/365	
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	365.2/365.3/365	
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	365.2/365.3/365	
MB 670-16778/2-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-16778/1-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-11474-C-1-A MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-11474-C-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 16907

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-1	MLPV - IDW01 - 20221214	Total/NA	Water	365.4	16778
670-11524-2	MLPV - IDW02 - 20221214	Total/NA	Water	365.4	16778
670-11524-3	MLPV - IDW03 - 20221214	Total/NA	Water	365.4	16778
670-11524-4	MLPV - IDW04 - 20221214	Total/NA	Water	365.4	16778
670-11524-5	MLPV - IDW05 - 20221214	Total/NA	Water	365.4	16778
670-11524-6	MLPV - IDW06 - 20221214	Total/NA	Water	365.4	16778
MB 670-16778/2-A	Method Blank	Total/NA	Water	365.4	16778
LCS 670-16778/1-A	Lab Control Sample	Total/NA	Water	365.4	16778
670-11474-C-1-A MS	Matrix Spike	Total/NA	Water	365.4	16778
670-11474-C-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	16778

Analysis Batch: 84951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-7	MLPV - IDW07 - 20221214	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 84951 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-11524-8	MLPV - IDW08 - 20221214	Total/NA	Solid	Moisture	
670-11524-9	MLPV - IDW09 - 20221214	Total/NA	Solid	Moisture	
670-11524-10	MLPV - IDW10 - 20221214	Total/NA	Solid	Moisture	
670-11524-11	MLPV - IDW11 - 20221214	Total/NA	Solid	Moisture	
670-11524-12	MLPV - IDW12 - 20221214	Total/NA	Solid	Moisture	
670-11524-13	MLPV - IDW13 - 20221214	Total/NA	Solid	Moisture	
670-11524-14	MLPV - IDW14 - 20221214	Total/NA	Solid	Moisture	
670-11524-15	MLPV - IDW15 - 20221214	Total/NA	Solid	Moisture	
670-11524-16	MLPV - IDW16 - 20221214	Total/NA	Solid	Moisture	
670-11524-17	MLPV - IDW17 - 20221214	Total/NA	Solid	Moisture	
670-11524-18	MLPV - IDW18 - 20221214	Total/NA	Solid	Moisture	
670-11524-19	MLPV - IDW19 - 20221214	Total/NA	Solid	Moisture	
MB 860-84951/1	Method Blank	Total/NA	Solid	Moisture	
860-40630-A-1 DU	Duplicate	Total/NA	Solid	Moisture	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW01 - 20221214

Lab Sample ID: 670-11524-1
Matrix: Water
Date Collected: 12/14/22 11:15
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 14:18
Total/NA	Analysis	8260B		1	15651	K1P	EET ORL	12/22/22 14:18
Total/NA	Analysis	300.0		5	14787	YS	EET ORL	12/15/22 20:15
Total/NA	Prep	537 IDA			330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA		1	331564	PY4D	ELLE	12/30/22 22:56
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:50

Client Sample ID: MLPV - IDW02 - 20221214

Lab Sample ID: 670-11524-2
Matrix: Water
Date Collected: 12/14/22 11:30
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 15:50
Total/NA	Analysis	300.0		10	14787	YS	EET ORL	12/15/22 18:53
Total/NA	Prep	537 IDA			330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA		1	331564	PY4D	ELLE	12/30/22 23:07
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:47

Client Sample ID: MLPV - IDW03 - 20221214

Lab Sample ID: 670-11524-3
Matrix: Water
Date Collected: 12/14/22 11:45
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 16:08
Total/NA	Analysis	300.0		10	14787	YS	EET ORL	12/15/22 19:10
Total/NA	Prep	537 IDA			330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA		1	331564	PY4D	ELLE	12/30/22 23:18
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:49

Client Sample ID: MLPV - IDW04 - 20221214

Lab Sample ID: 670-11524-4
Matrix: Water
Date Collected: 12/14/22 12:05
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 16:26
Total/NA	Analysis	300.0		2	14787	YS	EET ORL	12/15/22 19:26
Total/NA	Prep	537 IDA			330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA		1	331564	PY4D	ELLE	12/30/22 23:29
Total/NA	Prep	537 IDA	RA		330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA	RA	1	332514	PY4D	ELLE	01/04/23 15:54

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW04 - 20221214

Date Collected: 12/14/22 12:05
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:52

Client Sample ID: MLPV - IDW05 - 20221214

Date Collected: 12/14/22 12:25
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 16:44
Total/NA	Analysis	300.0		2	14787	YS	EET ORL	12/15/22 19:42
Total/NA	Prep	537 IDA			330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA		1	331564	PY4D	ELLE	12/30/22 23:40
Total/NA	Prep	537 IDA	DL		330204	S7AC	ELLE	12/26/22 08:57
Total/NA	Analysis	537 IDA	DL	10	332514	PY4D	ELLE	01/04/23 16:05
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:53

Client Sample ID: MLPV - IDW06 - 20221214

Date Collected: 12/14/22 12:55
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 17:02
Total/NA	Analysis	300.0		5	14787	YS	EET ORL	12/15/22 19:59
Total/NA	Prep	537 IDA			330663	RC3V	ELLE	12/28/22 06:41
Total/NA	Analysis	537 IDA		1	331216	UUV6	ELLE	12/30/22 05:57
Total/NA	Prep	365.2/365.3/365			16778	AT	EET ORL	01/04/23 09:47
Total/NA	Analysis	365.4		1	16907	AT	EET ORL	01/04/23 23:48

Client Sample ID: MLPV - IDW07 - 20221214

Date Collected: 12/14/22 11:08
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-7

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:39
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW07 - 20221214
Lab Sample ID: 670-11524-7
Date Collected: 12/14/22 11:08
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 97.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 10:56
Total/NA	Analysis	8260B		1	15787	K1P	EET ORL	12/23/22 00:06

Client Sample ID: MLPV - IDW08 - 20221214
Lab Sample ID: 670-11524-8
Date Collected: 12/14/22 11:30
Matrix: Solid
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:42
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW08 - 20221214
Lab Sample ID: 670-11524-8
Date Collected: 12/14/22 11:30
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15787	K1P	EET ORL	12/23/22 00:29

Client Sample ID: MLPV - IDW09 - 20221214
Lab Sample ID: 670-11524-9
Date Collected: 12/14/22 11:45
Matrix: Solid
Date Received: 12/15/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:46
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW09 - 20221214
Lab Sample ID: 670-11524-9
Date Collected: 12/14/22 11:45
Matrix: Solid
Date Received: 12/15/22 10:52
Percent Solids: 98.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 14:48

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW10 - 20221214
Date Collected: 12/14/22 11:50
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-10
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:49
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW10 - 20221214
Date Collected: 12/14/22 11:50
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-10
Matrix: Solid
Percent Solids: 98.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 15:11

Client Sample ID: MLPV - IDW11 - 20221214
Date Collected: 12/14/22 12:05
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-11
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:53
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW11 - 20221214
Date Collected: 12/14/22 12:05
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-11
Matrix: Solid
Percent Solids: 98.4

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	16060	JW	EET ORL	12/28/22 09:15

Client Sample ID: MLPV - IDW12 - 20221214
Date Collected: 12/14/22 12:15
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-12
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 16:56
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW12 - 20221214
Date Collected: 12/14/22 12:15
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-12
Matrix: Solid
Percent Solids: 98.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 15:57

Client Sample ID: MLPV - IDW13 - 20221214
Date Collected: 12/14/22 12:30
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-13
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 17:00
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW13 - 20221214
Date Collected: 12/14/22 12:30
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-13
Matrix: Solid
Percent Solids: 98.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	16060	JW	EET ORL	12/28/22 09:38

Client Sample ID: MLPV - IDW14 - 20221214
Date Collected: 12/14/22 12:45
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 17:18
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW14 - 20221214
Date Collected: 12/14/22 12:45
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-14
Matrix: Solid
Percent Solids: 98.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 16:43

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW15 - 20221214
Date Collected: 12/14/22 12:50
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-15
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84229	EMC	EET HOU	01/03/23 17:00 - 01/04/23 09:00 [1]
TCLP	Prep	3010A			84680	MD	EET HOU	01/06/23 09:30
TCLP	Analysis	6010D		1	84885	JDM	EET HOU	01/06/23 17:21
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW15 - 20221214
Date Collected: 12/14/22 12:50
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-15
Matrix: Solid
Percent Solids: 98.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 17:06

Client Sample ID: MLPV - IDW16 - 20221214
Date Collected: 12/14/22 13:00
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-16
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84399	EMC	EET HOU	01/04/23 13:00 - 01/05/23 05:00 [1]
TCLP	Prep	3010A			84507	MD	EET HOU	01/05/23 10:45
TCLP	Analysis	6010D		1	84677	JDM	EET HOU	01/06/23 02:29
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW16 - 20221214
Date Collected: 12/14/22 13:00
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-16
Matrix: Solid
Percent Solids: 98.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 17:29

Client Sample ID: MLPV - IDW17 - 20221214
Date Collected: 12/14/22 13:10
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-17
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84399	EMC	EET HOU	01/04/23 13:00 - 01/05/23 05:00 [1]
TCLP	Prep	3010A			84507	MD	EET HOU	01/05/23 10:45
TCLP	Analysis	6010D		1	84677	JDM	EET HOU	01/06/23 02:33
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Client Sample ID: MLPV - IDW17 - 20221214
Date Collected: 12/14/22 13:10
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-17
Matrix: Solid
Percent Solids: 98.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	15941	K1P	EET ORL	12/27/22 17:52

Client Sample ID: MLPV - IDW18 - 20221214
Date Collected: 12/14/22 13:20
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-18
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84399	EMC	EET HOU	01/04/23 13:00 - 01/05/23 05:00 [1]
TCLP	Prep	3010A			84507	MD	EET HOU	01/05/23 10:45
TCLP	Analysis	6010D		1	84677	JDM	EET HOU	01/06/23 02:36
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW18 - 20221214
Date Collected: 12/14/22 13:20
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-18
Matrix: Solid
Percent Solids: 98.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	16060	JW	EET ORL	12/28/22 10:01

Client Sample ID: MLPV - IDW19 - 20221214
Date Collected: 12/14/22 13:30
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-19
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			84399	EMC	EET HOU	01/04/23 13:00 - 01/05/23 05:00 [1]
TCLP	Prep	3010A			84507	MD	EET HOU	01/05/23 10:45
TCLP	Analysis	6010D		1	84677	JDM	EET HOU	01/06/23 02:54
Total/NA	Analysis	Moisture		1	84951	JM	EET HOU	01/09/23 13:05

Client Sample ID: MLPV - IDW19 - 20221214
Date Collected: 12/14/22 13:30
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-19
Matrix: Solid
Percent Solids: 98.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			14731	RG	EET ORL	12/15/22 13:49
Total/NA	Analysis	8260B		1	16060	JW	EET ORL	12/28/22 10:24

Client Sample ID: MLPV - TB01 - 20221214
Date Collected: 12/14/22 08:00
Date Received: 12/15/22 10:52

Lab Sample ID: 670-11524-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	15648	K1P	EET ORL	12/22/22 14:00

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	01-08-23

Laboratory: Eurofins Houston

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	88-00759	08-04-23
Florida	NELAP	E871002	06-30-23
Louisiana	NELAP	03054	06-30-23
Louisiana (All)	NELAP	03054	06-30-23
Oklahoma	State	1306	08-31-23
Texas	NELAP	T104704215-22-48	06-30-23
Texas	TCEQ Water Supply	T104704215	12-28-25
USDA	US Federal Programs	P330-22-00025	03-02-23

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87997	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
300.0	Anions, Ion Chromatography	MCAWW	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
6010D	Metals (ICP)	SW846	EET HOU
365.4	Phosphorus, Total	EPA	EET ORL
Moisture	Percent Moisture	EPA	EET HOU
1311	TCLP Extraction	SW846	EET HOU
3010A	Preparation, Total Metals	SW846	EET HOU
365.2/365.3/365	Phosphorus, Total	MCAWW	EET ORL
5030C	Purge and Trap	SW846	EET ORL
5035	Closed System Purge and Trap	SW846	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-11524-1
SDG: Biosparge Area / Hot Spot 2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-11524-1	MLPV - IDW01 - 20221214	Water	12/14/22 11:15	12/15/22 10:52
670-11524-2	MLPV - IDW02 - 20221214	Water	12/14/22 11:30	12/15/22 10:52
670-11524-3	MLPV - IDW03 - 20221214	Water	12/14/22 11:45	12/15/22 10:52
670-11524-4	MLPV - IDW04 - 20221214	Water	12/14/22 12:05	12/15/22 10:52
670-11524-5	MLPV - IDW05 - 20221214	Water	12/14/22 12:25	12/15/22 10:52
670-11524-6	MLPV - IDW06 - 20221214	Water	12/14/22 12:55	12/15/22 10:52
670-11524-7	MLPV - IDW07 - 20221214	Solid	12/14/22 11:08	12/15/22 10:52
670-11524-8	MLPV - IDW08 - 20221214	Solid	12/14/22 11:30	12/15/22 10:52
670-11524-9	MLPV - IDW09 - 20221214	Solid	12/14/22 11:45	12/15/22 10:52
670-11524-10	MLPV - IDW10 - 20221214	Solid	12/14/22 11:50	12/15/22 10:52
670-11524-11	MLPV - IDW11 - 20221214	Solid	12/14/22 12:05	12/15/22 10:52
670-11524-12	MLPV - IDW12 - 20221214	Solid	12/14/22 12:15	12/15/22 10:52
670-11524-13	MLPV - IDW13 - 20221214	Solid	12/14/22 12:30	12/15/22 10:52
670-11524-14	MLPV - IDW14 - 20221214	Solid	12/14/22 12:45	12/15/22 10:52
670-11524-15	MLPV - IDW15 - 20221214	Solid	12/14/22 12:50	12/15/22 10:52
670-11524-16	MLPV - IDW16 - 20221214	Solid	12/14/22 13:00	12/15/22 10:52
670-11524-17	MLPV - IDW17 - 20221214	Solid	12/14/22 13:10	12/15/22 10:52
670-11524-18	MLPV - IDW18 - 20221214	Solid	12/14/22 13:20	12/15/22 10:52
670-11524-19	MLPV - IDW19 - 20221214	Solid	12/14/22 13:30	12/15/22 10:52
670-11524-20	MLPV - TB01 - 20221214	Water	12/14/22 08:00	12/15/22 10:52

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler: Britany Follett / Crowe Beaty	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-3310-1235.1
Client Contact: Teresa Amentt Jennings	Phone: 919 302 0636 / 719 293 7524	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: FL	Page: Page 1 of 3
Company: AECOM Technical Services Inc.	PWSID:			Job #:
Address: 150 North Orange Avenue Suite 200	Due Date Requested:			
City: Orlando	TAT Requested (days):			
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No			
Phone: 919-461-1282(Tel)	PO #: 148569			
Email: teresa.amentt.jennings@aecom.com	WO #: 60615493.4			
Project Name: NASA KSC MLPV	Project #: 67001428			
Site: Biosparge Area / Hot Spot 2	SSOW#:			

Analysis Requested

670-11524 Chain of Custody

J - DI Water
K - EDTA
L - EDA
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Select VOCs by 8260B	Select PFAS by 537	Nitrate by EPA 300.0	Total Phosphorous by EPA 365.4	Select VOCs by Summa 8260B Kit	TCLP As, Cd, Cr, & Pb by SW-846 1311/6010C	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
MLPV-IDW01-20221214	20221214	1115	G	W	N	N	3	2	1	1			7	
MLPV-IDW02-20221214	20221214	1130	G	W	N	N	3	2	1	1			7	
MLPV-IDW03-20221214	20221214	1145	G	W	N	N	3	2	1	1			7	
MLPV-IDW04-20221214	20221214	1205	G	W	N	N	3	2	1	1			7	
MLPV-IDW05-20221214	20221214	1225	G	W	N	N	3	2	1	1			7	
MLPV-IDW06-20221214	20221214	1255	G	W	N	N	3	2	1	1			7	
MLPV-IDW07-20221214	20221214	1108	G	S	N	N					4 @	1	5	
MLPV-IDW08-20221214	20221214	1130	G	S	N	N					4 @	1	5	
MLPV-IDW09-20221214	20221214	1145	G	S	N	N					4	1	5	
MLPV-IDW10-20221214	20221214	1150	G	S	N	N					4	1	5	
MLPV-IDW11-20221214	20221214	1205	G	S	N	N					4	1	5	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					12/14/22 0933	AECOM
2		12/14/22 1549	AECOM	JMM	12/15/22 1015	eurofins
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 4.3 | 4.2

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler: Brittany Follett / Caroline Bekius	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-3310-1235.2
Client Contact: Teresa Amentt Jennings	Phone: 415 302 0230 / 717 343 9249	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: FL	Page: Page 2 of 3
Company: AECOM Technical Services Inc.	PWSID:	Analysis Requested		Job #:
Address: 150 North Orange Avenue Suite 200	Due Date Requested:			
City: Orlando	TAT Requested (days):			
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No			
Phone: 919-461-1282(Tel)	PO #: 148569			
Email: teresa.amentt.jennings@aecom.com	WO #: 60615493.4			
Project Name: NASA KSC MLPV	Project #: 67001428			
Site: Bunsperge Area / Hot Spot 2	SSOW#:			

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Perchlorate by SW846 6850	Perfluorinated Compounds by EPA 537	Perfluorinated Compounds by EPA 3535	Total Phosphorus by EPA 365.3	Target VOCs by SW846 8260B	TCLP As Cd Cr Pb Se Ag by SW 1311 / 6010C	Total Number of containers	Special Instructions/Note:
			Preservation Code:											
MLPV-IDW12-20221214	20221214	1215	G	S	N	N					4	1	5	
MLPV-IDW13-20221214	20221214	1230	G	S	N	N					4	1	5	
MLPV-IDW14-20221214	20221214	1245	G	S	N	N					4	1	5	
MLPV-IDW15-20221214	20221214	1250	G	S	N	N					4	1	5	
MLPV-IDW16-20221214	20221214	1300	G	S	N	N					4	1	5	
MLPV-IDW17-20221214	20221214	1310	G	S	N	N					4	1	5	
MLPV-IDW18-20221214	20221214	1320	G	S	N	N					4	1	5	
MLPV-IDW19-20221214	20221214	1330	G (MS)	S	N	N					4	1	5	
MLPV-TB01-20221214	20221214	0800	G	W	N	N	3						3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1					12/14/22 @ 0933	AECOM
2		12/14/22 @ 1500	AECOM	JMM	12/15/22 1015	eurofins
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 4.3 | 4.2

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-2710.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Florida		Job #: 670-11524-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 1/9/2023			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV IDW	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA/3535_PFC (MOD) NASA KCS WS#15-2 DOD	PRE_SCREEN_PFAS/PFAS_PreScn_W_P	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MLPV - IDW01 - 20221214 (670-11524-1)	12/14/22	11:15 Eastern		Water			X	X	2	
MLPV - IDW02 - 20221214 (670-11524-2)	12/14/22	11:30 Eastern		Water			X	X	2	
MLPV - IDW03 - 20221214 (670-11524-3)	12/14/22	11:45 Eastern		Water			X	X	2	
MLPV - IDW04 - 20221214 (670-11524-4)	12/14/22	12:05 Eastern		Water			X	X	2	
MLPV - IDW05 - 20221214 (670-11524-5)	12/14/22	12:25 Eastern		Water			X	X	2	
MLPV - IDW06 - 20221214 (670-11524-6)	12/14/22	12:55 Eastern		Water			X	X	2	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	BB	12/15 1555				
2						
3				MRR	12/16/22 1000	UPS

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 2.6

MB

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-2716.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 2
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Florida		Job #: 670-11524-1
Address: 4145 Greenbriar Dr	Due Date Requested: 1/8/2023			
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV IDW	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A HCL, B NaOH, C Zn Acetate, D Nitric Acid, E NaHSO4, F MeOH, G Amchlor, H Ascorbic Acid, I Ice, J DI Water, K EDTA, L EDA, M Hexane, N None, O AsNaO2, P Na2O4S, Q Na2SO3, R Na2S2O3, S H2SO4, T TSP Dodecahydrate, U Acetone, V MCAA, W pH 4-5, Y Trizma, Z other (specify)
Other:

Sample Identification Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010D/1311T_M (MOD) TCLP As Cd Cr Pb	Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X			X	
MLPV - IDW07 20221214 (670-11524-7)	12/14/22	11:08 Eastern		Solid			X	X	1	
MLPV IDW08 20221214 (670-11524-8)	12/14/22	11:30 Eastern		Solid			X	X	1	
MLPV IDW09 20221214 (670-11524-9)	12/14/22	11:45 Eastern		Solid			X	X	1	
MLPV - IDW10 20221214 (670-11524-10)	12/14/22	11:50 Eastern		Solid			X	X	1	
MLPV IDW11 20221214 (670-11524-11)	12/14/22	12:05 Eastern		Solid			X	X	1	
MLPV IDW12 20221214 (670-11524-12)	12/14/22	12:15 Eastern		Solid			X	X	1	
MLPV IDW13 20221214 (670-11524-13)	12/14/22	12:30 Eastern		Solid			X	X	1	
MLPV IDW14 20221214 (670-11524-14)	12/14/22	12:45 Eastern		Solid			X	X	1	
MLPV IDW15 - 20221214 (670-11524-15)	12/14/22	12:50 Eastern		Solid			X	X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	12/15 1728		FedEx		
Relinquished by: FedEX	Date/Time:	Company	Received by:	Date/Time: 12/16/22 11:06AM	Company EX
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and

Temp: IR ID:HOU-343
C/F +0.3 3 4
Corrected Temp: 3 7

Ver 06/08/2021

1/17/2023 (Rev. 1)

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-11524-1
SDG Number: Biosparge Area / Hot Spot 2

Login Number: 11524
List Number: 1
Creator: Hartley, Tyler

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Extra kit was included but not filled for sample IDW09.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-11524-1
SDG Number: Biosparge Area / Hot Spot 2

Login Number: 11524
List Number: 3
Creator: Pena, Jesiel

List Source: Eurofins Houston
List Creation: 12/16/22 03:39 PM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-11524-1
SDG Number: Biosparge Area / Hot Spot 2

Login Number: 11524
List Number: 2
Creator: Ballard, Megan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 12/16/22 01:07 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/22/2023 3:55:43 PM

JOB DESCRIPTION

NASA KSC MLPV Biosparge Area

JOB NUMBER

670-15879-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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3/22/2023 3:55:43 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-15879-2
Project/Site: NASA KSC MLPV Biosparge Area

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV Biosparge Area

Job ID: 670-15879-2

Job ID: 670-15879-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-15879-2

Receipt
The samples were received on 3/8/2023 2:55 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.8°C

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0063-037.5-20230308 (670-15879-11) and MLPV-IW0064-042.5-20230308 (670-15879-12). Elevated reporting limits (RLs) are provided.

Method 8260D: The matrix spike duplicate (MSD) recoveries for analytical batch 670-27051 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: (670-16001-E-3), (670-16001-E-3 MS), (400-234398-A-11) and (400-234398-A-11 DU). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc. Job ID: 670-15879-2
Project/Site: NASA KSC MLPV Biosparge Area

Client Sample ID: MLPV-ASMW0004-037.5-20230308 Lab Sample ID: 670-15879-5

No Detections.

Client Sample ID: MLPV-IW0031-030.0-20230308 Lab Sample ID: 670-15879-8

No Detections.

Client Sample ID: MLPV-IW0061-040.0-20230308 Lab Sample ID: 670-15879-9

No Detections.

Client Sample ID: MLPV-IW0062-042.5-20230308 Lab Sample ID: 670-15879-10

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	34		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0063-037.5-20230308 Lab Sample ID: 670-15879-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	7.7	I	10	5.3	ug/L	10		8260D	Total/NA
Vinyl chloride - DL	190		10	7.1	ug/L	10		8260D	Total/NA

Client Sample ID: MLPV-IW0064-042.5-20230308 Lab Sample ID: 670-15879-12

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride - DL	460		25	18	ug/L	25		8260D	Total/NA

Client Sample ID: MLPV-IW0006IR-030.5-20230308 Lab Sample ID: 670-15879-13

No Detections.

Client Sample ID: MLPV-IW0046-040.0-20230308 Lab Sample ID: 670-15879-15

No Detections.

Client Sample ID: MLPV-TB02-20230308 Lab Sample ID: 670-15879-16

No Detections.

Client Sample ID: MLPV-IW0057-045.0-20230308 Lab Sample ID: 670-15879-19

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-ASMW0004-037.5-20230308 Lab Sample ID: 670-15879-5

Date Collected: 03/08/23 14:17 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 15:43	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 15:43	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 15:43	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 15:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/21/23 15:43*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/21/23 15:43*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*03/21/23 15:43*	*1*

Client Sample ID: MLPV-IW0031-030.0-20230308 Lab Sample ID: 670-15879-8

Date Collected: 03/08/23 11:24 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 16:36	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 16:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 16:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 16:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*40 - 146*		*03/21/23 16:36*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/21/23 16:36*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 16:36*	*1*

Client Sample ID: MLPV-IW0061-040.0-20230308 Lab Sample ID: 670-15879-9

Date Collected: 03/08/23 12:55 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 16:54	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 16:54	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 16:54	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 16:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/21/23 16:54*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*03/21/23 16:54*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 16:54*	*1*

Client Sample ID: MLPV-IW0062-042.5-20230308 Lab Sample ID: 670-15879-10

Date Collected: 03/08/23 12:22 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 19:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 19:03	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 19:03	1
Vinyl chloride	**34**		1.0	0.71	ug/L			03/21/23 19:03	1

Client Sample ID: MLPV-IW0062-042.5-20230308 Lab Sample ID: 670-15879-10

Date Collected: 03/08/23 12:22 **Matrix: Water**
Date Received: 03/08/23 14:55

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		03/21/23 19:03	1
4-Bromofluorobenzene (Surr)	95		41 - 142		03/21/23 19:03	1
Dibromofluoromethane (Surr)	101		53 - 146		03/21/23 19:03	1

Client Sample ID: MLPV-IW0063-037.5-20230308 Lab Sample ID: 670-15879-11

Date Collected: 03/08/23 12:47 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**7.7**	**I**	10	5.3	ug/L			03/21/23 13:01	10
trans-1,2-Dichloroethene	7.3	U	10	7.3	ug/L			03/21/23 13:01	10
Trichloroethene	8.9	U	10	8.9	ug/L			03/21/23 13:01	10
Vinyl chloride	**190**		10	7.1	ug/L			03/21/23 13:01	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146		03/21/23 13:01	10
4-Bromofluorobenzene (Surr)	118		41 - 142		03/21/23 13:01	10
Dibromofluoromethane (Surr)	103		53 - 146		03/21/23 13:01	10

Client Sample ID: MLPV-IW0064-042.5-20230308 Lab Sample ID: 670-15879-12

Date Collected: 03/08/23 12:08 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	13	U	25	13	ug/L			03/21/23 19:45	25
trans-1,2-Dichloroethene	18	U	25	18	ug/L			03/21/23 19:45	25
Trichloroethene	22	U	25	22	ug/L			03/21/23 19:45	25
Vinyl chloride	**460**		25	18	ug/L			03/21/23 19:45	25

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146		03/21/23 19:45	25
4-Bromofluorobenzene (Surr)	99		41 - 142		03/21/23 19:45	25
Dibromofluoromethane (Surr)	105		53 - 146		03/21/23 19:45	25

Client Sample ID: MLPV-IW0006IR-030.5-20230308 Lab Sample ID: 670-15879-13

Date Collected: 03/08/23 13:40 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 17:12	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 17:12	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 17:12	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 17:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		40 - 146		03/21/23 17:12	1
4-Bromofluorobenzene (Surr)	91		41 - 142		03/21/23 17:12	1
Dibromofluoromethane (Surr)	105		53 - 146		03/21/23 17:12	1

Client Sample ID: MLPV-IW0046-040.0-20230308 Lab Sample ID: 670-15879-15

Date Collected: 03/08/23 10:44 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 13:20	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:20	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 13:20	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 13:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 13:20*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 13:20*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/22/23 13:20*	*1*

Client Sample ID: MLPV-TB02-20230308 Lab Sample ID: 670-15879-16

Date Collected: 03/08/23 00:00 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 14:13	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 14:13	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 14:13	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 14:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/21/23 14:13*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/21/23 14:13*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 14:13*	*1*

Client Sample ID: MLPV-IW0057-045.0-20230308 Lab Sample ID: 670-15879-19

Date Collected: 03/08/23 10:19 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 18:24	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 18:24	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 18:24	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 18:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/21/23 18:24*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/21/23 18:24*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*03/21/23 18:24*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV Biosparge Area

Job ID: 670-15879-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	TOL (40-146)	BFB (41-142)	DBFM (53-146)
400-234398-A-11 DU - DL	Duplicate	103	99	100
670-15879-5	MLPV-ASMW0004-037.5-20230308	102	100	107
670-15879-8	MLPV-IW0031-030.0-20230308	97	96	103
670-15879-9	MLPV-IW0061-040.0-20230308	100	104	103
670-15879-10	MLPV-IW0062-042.5-20230308	101	95	101
670-15879-11 - DL	MLPV-IW0063-037.5-20230308	102	118	103
670-15879-11 MS - DL	MLPV-IW0063-037.5-20230308	103	102	107
670-15879-11 MSD - DL	MLPV-IW0063-037.5-20230308	104	97	108
670-15879-12 - DL	MLPV-IW0064-042.5-20230308	97	99	105
670-15879-13	MLPV-IW0006IR-030.5-20230308	103	91	105
670-15879-15	MLPV-IW0046-040.0-20230308	100	91	102
670-15879-16	MLPV-TB02-20230308	100	100	102
670-15879-19	MLPV-IW0057-045.0-20230308	103	98	104
670-16001-E-3 MS - DL	Matrix Spike	99	85	99
LCS 670-27051/5	Lab Control Sample	106	104	104
LCS 670-27218/4	Lab Control Sample	101	91	101
MB 670-27051/8	Method Blank	105	105	102
MB 670-27218/7	Method Blank	101	93	100

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27051/8
Matrix: Water
Analysis Batch: 27051

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 11:51	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 11:51	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 11:51	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 11:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/21/23 11:51*	*1*
4-Bromofluorobenzene (Surr)	*105*		*41 - 142*		*03/21/23 11:51*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 11:51*	*1*

Lab Sample ID: LCS 670-27051/5
Matrix: Water
Analysis Batch: 27051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	20.5		ug/L		103	56 - 128
trans-1,2-Dichloroethene	20.0	22.5		ug/L		113	54 - 134
Trichloroethene	20.0	21.3		ug/L		107	62 - 135
Vinyl chloride	20.0	24.3		ug/L		122	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*106*		*40 - 146*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*
Dibromofluoromethane (Surr)	*104*		*53 - 146*

Lab Sample ID: MB 670-27218/7
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 11:17	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 11:17	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 11:17	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 11:17	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 11:17*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 11:17*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/22/23 11:17*	*1*

Lab Sample ID: LCS 670-27218/4
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.1		ug/L		90	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		94	54 - 134
Trichloroethene	20.0	19.0		ug/L		95	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 670-27218/4 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 27218

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Vinyl chloride			20.0	25.5		ug/L		127	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 670-15879-11 MS **Client Sample ID: MLPV-IW0063-037.5-20230308**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 27051

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	7.7	I	200	249		ug/L		121	56 - 128		
trans-1,2-Dichloroethene - DL	7.3	U	200	246		ug/L		123	54 - 134		
Trichloroethene - DL	8.9	U	200	243		ug/L		121	62 - 135		
Vinyl chloride - DL	190		200	480		ug/L		145	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*103*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*102*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*107*		*53 - 146*

Lab Sample ID: 670-15879-11 MSD **Client Sample ID: MLPV-IW0063-037.5-20230308**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 27051

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene - DL	7.7	I	200	256		ug/L		124	56 - 128	3	17
trans-1,2-Dichloroethene - DL	7.3	U	200	255		ug/L		128	54 - 134	3	20
Trichloroethene - DL	8.9	U	200	254		ug/L		127	62 - 135	5	20
Vinyl chloride - DL	190		200	499		ug/L		155	20 - 167	4	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*104*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*97*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*108*		*53 - 146*

Lab Sample ID: 670-16001-E-3 MS **Client Sample ID: Matrix Spike**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 27218

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*99*		*40 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL (Continued)

Lab Sample ID: 670-16001-E-3 MS
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*99*		*53 - 146*

Lab Sample ID: 400-234398-A-11 DU
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene - DL	240			254		ug/L				4	30
trans-1,2-Dichloroethene - DL	9.4	I		8.94	I	ug/L				5	20
Trichloroethene - DL	19			20.8		ug/L				10	30
Vinyl chloride - DL	170			184		ug/L				7	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr) - DL	*103*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*99*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*100*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Job ID: 670-15879-2
Project/Site: NASA KSC MLPV Biosparge Area

GC/MS VOA

Analysis Batch: 27051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-15879-5	MLPV-ASMW0004-037.5-20230308	Total/NA	Water	8260D	
670-15879-8	MLPV-IW0031-030.0-20230308	Total/NA	Water	8260D	
670-15879-9	MLPV-IW0061-040.0-20230308	Total/NA	Water	8260D	
670-15879-10	MLPV-IW0062-042.5-20230308	Total/NA	Water	8260D	
670-15879-11 - DL	MLPV-IW0063-037.5-20230308	Total/NA	Water	8260D	
670-15879-12 - DL	MLPV-IW0064-042.5-20230308	Total/NA	Water	8260D	
670-15879-13	MLPV-IW0006IR-030.5-20230308	Total/NA	Water	8260D	
670-15879-16	MLPV-TB02-20230308	Total/NA	Water	8260D	
670-15879-19	MLPV-IW0057-045.0-20230308	Total/NA	Water	8260D	
MB 670-27051/8	Method Blank	Total/NA	Water	8260D	
LCS 670-27051/5	Lab Control Sample	Total/NA	Water	8260D	
670-15879-11 MS - DL	MLPV-IW0063-037.5-20230308	Total/NA	Water	8260D	
670-15879-11 MSD - DL	MLPV-IW0063-037.5-20230308	Total/NA	Water	8260D	

Analysis Batch: 27218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-15879-15	MLPV-IW0046-040.0-20230308	Total/NA	Water	8260D	
MB 670-27218/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27218/4	Lab Control Sample	Total/NA	Water	8260D	
670-16001-E-3 MS - DL	Matrix Spike	Total/NA	Water	8260D	
400-234398-A-11 DU - DL	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV Biosparge Area

Job ID: 670-15879-2

Client Sample ID: MLPV-ASMW0004-037.5-20230308
Lab Sample ID: 670-15879-5
Date Collected: 03/08/23 14:17
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 15:43

Client Sample ID: MLPV-IW0031-030.0-20230308
Lab Sample ID: 670-15879-8
Date Collected: 03/08/23 11:24
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 16:36

Client Sample ID: MLPV-IW0061-040.0-20230308
Lab Sample ID: 670-15879-9
Date Collected: 03/08/23 12:55
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 16:54

Client Sample ID: MLPV-IW0062-042.5-20230308
Lab Sample ID: 670-15879-10
Date Collected: 03/08/23 12:22
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 19:03

Client Sample ID: MLPV-IW0063-037.5-20230308
Lab Sample ID: 670-15879-11
Date Collected: 03/08/23 12:47
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	10	27051	T1Y	EET ORL	03/21/23 13:01

Client Sample ID: MLPV-IW0064-042.5-20230308
Lab Sample ID: 670-15879-12
Date Collected: 03/08/23 12:08
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	25	27051	T1Y	EET ORL	03/21/23 19:45

Client Sample ID: MLPV-IW0006IR-030.5-20230308
Lab Sample ID: 670-15879-13
Date Collected: 03/08/23 13:40
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 17:12

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-15879-2
Project/Site: NASA KSC MLPV Biosparge Area

Client Sample ID: MLPV-IW0046-040.0-20230308
Lab Sample ID: 670-15879-15

Date Collected: 03/08/23 10:44
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 13:20

Client Sample ID: MLPV-TB02-20230308
Lab Sample ID: 670-15879-16

Date Collected: 03/08/23 00:00
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 14:13

Client Sample ID: MLPV-IW0057-045.0-20230308
Lab Sample ID: 670-15879-19

Date Collected: 03/08/23 10:19
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 18:24

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-15879-2
Project/Site: NASA KSC MLPV Biosparge Area

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV Biosparge Area

Job ID: 670-15879-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV Biosparge Area

Job ID: 670-15879-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-15879-5	MLPV-ASMW0004-037.5-20230308	Water	03/08/23 14:17	03/08/23 14:55
670-15879-8	MLPV-IW0031-030.0-20230308	Water	03/08/23 11:24	03/08/23 14:55
670-15879-9	MLPV-IW0061-040.0-20230308	Water	03/08/23 12:55	03/08/23 14:55
670-15879-10	MLPV-IW0062-042.5-20230308	Water	03/08/23 12:22	03/08/23 14:55
670-15879-11	MLPV-IW0063-037.5-20230308	Water	03/08/23 12:47	03/08/23 14:55
670-15879-12	MLPV-IW0064-042.5-20230308	Water	03/08/23 12:08	03/08/23 14:55
670-15879-13	MLPV-IW0006IR-030.5-20230308	Water	03/08/23 13:40	03/08/23 14:55
670-15879-15	MLPV-IW0046-040.0-20230308	Water	03/08/23 10:44	03/08/23 14:55
670-15879-16	MLPV-TB02-20230308	Water	03/08/23 00:00	03/08/23 14:55
670-15879-19	MLPV-IW0057-045.0-20230308	Water	03/08/23 10:19	03/08/23 14:55

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-5825-2538.1
Client Contact: Caroline Bekins	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin:	Page: Page 1 of 2
Company: AECOM Technical Services Inc.	PWSID:	Analysis Requested		Job #:
Address: 150 North Orange Avenue Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
City: Orlando	TAT Requested (days):			
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No			
Phone: 919-461-1282(Tel)	PO #: 148569			
Email: caroline.bekins@aecom.com	WO #: 60615493.4			
Project Name: NASA KSC MLPV Biosparge Area & VAB	Project #: 67001428			Other:
Site: BSA & VAB	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D - VOCs WKST #15-14	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		
MLPV-IW0057 MW0080-52.0-20230308	3/8/23	1230	G	Water			X	3	
MLPV-IW0058 MW0077-30.0-20230308	3/8/23	1329	G	Water			X	3	
MLPV-IW0059 SATV-QC?E-2A5-20230308	3/8/23	1114	G	Water			X	3	
MLPV-IW0060 MW0082-A20 20230308	3/8/23	1403	G	Water			X	3	
MLPV-ASMW0004 -037.5-20230308	3/8/23	1417	G	Water			X	3	
MLPV-ASMW0005 MW0094 040.0-20230308	3/8/23	1004	G	Water			X	3	
MLPV-ASMW0006 MW0075-032.5-20230308	3/8/23	0917	G	Water			X	3	
MLPW-IW0031 -032.5-20230308	3/8/23	1124	G	Water			X	3	
MLPW-IW0061 -040.0-20230308	3/8/23	1255	G	Water			X	3	
MLPW-IW0062 -042.5-20230308	3/8/23	1222	G	Water			X	3	
MLPW-IW0063 -037.5-20230308	3/8/23	1247	G	Water			X	3	

670-15879 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	Meejan Dunkle	3823	AECOM	Jessica Gregory	3/8/23 1455	EET
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.3/0.8

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-5825-2538.2
Client Contact: Caroline Bekins	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: AECOM Technical Services Inc.	PWSID:			Job #:

Address: 150 North Orange Avenue Suite 200	Due Date Requested:
City: Orlando	TAT Requested (days):
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No
Phone: 919-461-1282(Tel)	PO #: 148569
Email: caroline.bekins@aecom.com	WO #: 60615493.4
Project Name: NASA KSC MLPV Biosparge Area	Project #: 67001428
Site:	SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D - VOCs WKST #15-14	Total Number of containers	Special Instructions/Note:
Preservation Code:							A		
MLPW-IW0064 - 042.5-20230308	3/8/23	1208	G	Water			X	3	
MLPW-IW0006IR - 032.5-20230308	3/8/22	1350	G	Water			X	3	
~~MLPW-IW0026I~~				Water					
MLPW-IW0046 - 090.-20230308	3/8/23	1042	G	Water			X	3	
MLPV-TB02-	3/8/23			Water				1	
MLPV-IW0021R-032.5-20230308	3/8/23	1127	G	W			X	3	
MLPV-MW0026-0900-20230308	3/8/23	1048	G	W			X	3	
MLPV-IW0057-045.0-20230308	3/8/23	1419	G	W			X	3	
MLPV-MW0037-52.0-20230308	3/8/23	1220	G	W			X	3	
MLPV-MW0078-90.0-20230308	3/8/23	1135	G	W			X	3	
MLPV-MW0078-30.0-20230308	3/8/23	1305	G	W			X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Megan Daniels	3/8/23	AECOM	James Gregory	3/8/23 1455	EET
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.3/0.1

Ver: 06/08/2021

MLPV-MW0083-52.0-20230308 @ 1340 G. W.

Page 21 of 22

3/22/2023

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-15879-2

Login Number: 15879
List Number: 1
Creator: Wehr, Alex C

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/23/2023 3:12:06 PM

JOB DESCRIPTION

NASA KSC MLPV BSA

JOB NUMBER

670-16007-3

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Generated
3/23/2023 3:12:06 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16007-3

Job ID: 670-16007-3

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16007-3

Receipt

The samples were received on 3/9/2023 3:00 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.5°C

GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc. Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

Client Sample ID: MLPV-IW0058-047.5-20230309 Lab Sample ID: 670-16007-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	5.7		5.0	2.7	ug/L	5		8260D	Total/NA
Vinyl chloride	90		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-ASMW0005-037.5-20230309 Lab Sample ID: 670-16007-6

No Detections.

Client Sample ID: MLPV-ASMW0006-037.5-20230309 Lab Sample ID: 670-16007-7

No Detections.

Client Sample ID: MLPV-IW0060-045.0-20230309 Lab Sample ID: 670-16007-9

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.88	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	4.6		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0059-047.5-20230309 Lab Sample ID: 670-16007-14

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	8.4		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0058-047.5-20230309 Lab Sample ID: 670-16007-5

Date Collected: 03/09/23 09:09 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**5.7**		5.0	2.7	ug/L			03/23/23 13:10	5
trans-1,2-Dichloroethene	3.7	U	5.0	3.7	ug/L			03/23/23 13:10	5
Trichloroethene	4.5	U	5.0	4.5	ug/L			03/23/23 13:10	5
Vinyl chloride	**90**		5.0	3.6	ug/L			03/23/23 13:10	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/23/23 13:10*	*5*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/23/23 13:10*	*5*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/23/23 13:10*	*5*

Client Sample ID: MLPV-ASMW0005-037.5-20230309 Lab Sample ID: 670-16007-6

Date Collected: 03/09/23 10:58 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 16:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 16:50	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 16:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 16:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 16:50*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 16:50*	*1*
Dibromofluoromethane (Surr)	*115*		*53 - 146*		*03/22/23 16:50*	*1*

Client Sample ID: MLPV-ASMW0006-037.5-20230309 Lab Sample ID: 670-16007-7

Date Collected: 03/09/23 10:15 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 17:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 17:08	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 17:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 17:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 17:08*	*1*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*		*03/22/23 17:08*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/22/23 17:08*	*1*

Client Sample ID: MLPV-IW0060-045.0-20230309 Lab Sample ID: 670-16007-9

Date Collected: 03/09/23 09:37 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.88**	**I**	1.0	0.53	ug/L			03/22/23 17:42	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 17:42	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 17:42	1
Vinyl chloride	**4.6**		1.0	0.71	ug/L			03/22/23 17:42	1

Client Sample ID: MLPV-IW0060-045.0-20230309 Lab Sample ID: 670-16007-9

Date Collected: 03/09/23 09:37 **Matrix: Water**
Date Received: 03/09/23 15:00

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/22/23 17:42*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 17:42*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 17:42*	*1*

Client Sample ID: MLPV-IW0059-047.5-20230309 Lab Sample ID: 670-16007-14

Date Collected: 03/09/23 09:51 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 18:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 18:50	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 18:50	1
Vinyl chloride	**8.4**		1.0	0.71	ug/L			03/22/23 18:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*91*		*40 - 146*		*03/22/23 18:50*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/22/23 18:50*	*1*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/22/23 18:50*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16007-3

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)								
		TOL	BFB	DBFM						
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)						
670-16007-5	MLPV-IW0058-047.5-20230309	105	98	109						
670-16007-5 MS	MLPV-IW0058-047.5-20230309	100	95	106						
670-16007-6	MLPV-ASMW0005-037.5-20230309	100	92	115						
670-16007-7	MLPV-ASMW0006-037.5-20230309	100	90	106						
670-16007-9	MLPV-IW0060-045.0-20230309	99	91	111						
670-16007-14	MLPV-IW0059-047.5-20230309	91	95	109						
670-16007-A-1 DU	Duplicate	102	98	103						
670-16007-A-3 MS	Matrix Spike	97	98	100						
670-16007-C-2 DU	Duplicate	100	95	107						
LCS 670-27214/5	Lab Control Sample	100	99	97						
LCS 670-27383/6	Lab Control Sample	110	99	110						
MB 670-27214/8	Method Blank	98	94	105						
MB 670-27383/9	Method Blank	103	99	103						

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27214/8
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 13:47	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:47	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 13:47	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 13:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/22/23 13:47*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*03/22/23 13:47*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/22/23 13:47*	*1*

Lab Sample ID: LCS 670-27214/5
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.9		ug/L		94	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Trichloroethene			20.0	19.0		ug/L		95	62 - 135		
Vinyl chloride			20.0	20.0		ug/L		100	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*97*		*53 - 146*

Lab Sample ID: 670-16007-A-3 MS
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.54	I	20.0	22.9		ug/L		112	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	22.6		ug/L		113	54 - 134		
Trichloroethene	0.89	U	20.0	22.1		ug/L		111	62 - 135		
Vinyl chloride	0.71	U	20.0	27.6		ug/L		138	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*40 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

Lab Sample ID: 670-16007-C-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.93	I		0.965	I	ug/L				4	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-C-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Vinyl chloride	0.72	I	0.863	I	ug/L		18	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*107*		*53 - 146*

Lab Sample ID: MB 670-27383/9
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 12:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 12:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 12:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 12:16*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/23/23 12:16*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/23/23 12:16*	*1*

Lab Sample ID: LCS 670-27383/6
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	20.8		ug/L		104	54 - 134
Trichloroethene	20.0	19.4		ug/L		97	62 - 135
Vinyl chloride	20.0	23.1		ug/L		116	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*110*		*53 - 146*

Lab Sample ID: 670-16007-5 MS
Matrix: Water
Analysis Batch: 27383

Client Sample ID: MLPV-IW0058-047.5-20230309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.7		100	82.9		ug/L		77	56 - 128
trans-1,2-Dichloroethene	3.7	U	100	82.6		ug/L		83	54 - 134
Trichloroethene	4.5	U	100	81.5		ug/L		81	62 - 135
Vinyl chloride	90		100	199		ug/L		108	20 - 167

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-5 MS
Matrix: Water
Analysis Batch: 27383

Client Sample ID: MLPV-IW0058-047.5-20230309
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*106*		*53 - 146*

Lab Sample ID: 670-16007-A-1 DU
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	2.1			1.63		ug/L				24	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30
Vinyl chloride	78			73.4		ug/L				6	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*102*		*40 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*
Dibromofluoromethane (Surr)	*103*		*53 - 146*

Client: AECOM Technical Services Inc.
Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

GC/MS VOA

Analysis Batch: 27214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-6	MLPV-ASMW0005-037.5-20230309	Total/NA	Water	8260D	
670-16007-7	MLPV-ASMW0006-037.5-20230309	Total/NA	Water	8260D	
670-16007-9	MLPV-IW0060-045.0-20230309	Total/NA	Water	8260D	
670-16007-14	MLPV-IW0059-047.5-20230309	Total/NA	Water	8260D	
MB 670-27214/8	Method Blank	Total/NA	Water	8260D	
LCS 670-27214/5	Lab Control Sample	Total/NA	Water	8260D	
670-16007-A-3 MS	Matrix Spike	Total/NA	Water	8260D	
670-16007-C-2 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-5	MLPV-IW0058-047.5-20230309	Total/NA	Water	8260D	
MB 670-27383/9	Method Blank	Total/NA	Water	8260D	
LCS 670-27383/6	Lab Control Sample	Total/NA	Water	8260D	
670-16007-5 MS	MLPV-IW0058-047.5-20230309	Total/NA	Water	8260D	
670-16007-A-1 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

Client Sample ID: MLPV-IW0058-047.5-20230309 Lab Sample ID: 670-16007-5

Date Collected: 03/09/23 09:09 **Matrix: Water**
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	27383	KG	EET ORL	03/23/23 13:10

Client Sample ID: MLPV-ASMW0005-037.5-20230309 Lab Sample ID: 670-16007-6

Date Collected: 03/09/23 10:58 **Matrix: Water**
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 16:50

Client Sample ID: MLPV-ASMW0006-037.5-20230309 Lab Sample ID: 670-16007-7

Date Collected: 03/09/23 10:15 **Matrix: Water**
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 17:08

Client Sample ID: MLPV-IW0060-045.0-20230309 Lab Sample ID: 670-16007-9

Date Collected: 03/09/23 09:37 **Matrix: Water**
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 17:42

Client Sample ID: MLPV-IW0059-047.5-20230309 Lab Sample ID: 670-16007-14

Date Collected: 03/09/23 09:51 **Matrix: Water**
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 18:50

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16007-3

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16007-3
Project/Site: NASA KSC MLPV BSA

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16007-5	MLPV-IW0058-047.5-20230309	Water	03/09/23 09:09	03/09/23 15:00
670-16007-6	MLPV-ASMW0005-037.5-20230309	Water	03/09/23 10:58	03/09/23 15:00
670-16007-7	MLPV-ASMW0006-037.5-20230309	Water	03/09/23 10:15	03/09/23 15:00
670-16007-9	MLPV-IW0060-045.0-20230309	Water	03/09/23 09:37	03/09/23 15:00
670-16007-14	MLPV-IW0059-047.5-20230309	Water	03/09/23 09:51	03/09/23 15:00

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 3
Site Location: Biosparge Area 1/VAB/Hot Spot 2/ West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
		Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)	

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl / Total No. of Containers	Select VOCs by SW8260B	Comments
	MLPV-IW0057 35-045.0-20230309	MLPV-IW0057	20230309	1155	WG	N	G	3	3	
	MLPV-IW0058 40-035.0-20230309	MLPV-IW0058	20230309	1250	WG	N	G	3	3	
	MLPV-IW0059 34-035.0-20230309	MLPV-IW0059	20230309	1108	WG	N	G	3	3	
	MLPV-IW0060 10-052.5-20230307	MLPV-IW0060	20230309	0846	WG	N	G	3	3	
	MLPV-ASMW0004 IW0058 - 47.5-20230321	MLPV-ASMW0004	20230309	0909	WG	N	G	3	3	
	MLPV-ASMW0005 - 047.5-20230307	MLPV-ASMW0005	20230309	1058	WG	N	G	3	3	
	MLPV-ASMW0006 - 037.5-20230307	MLPV-ASMW0006	20230309	1015	WG	N	G	3	3	
	MLPV-IW0031 27I-032.5-20230309	MLPV-IW0031	20230309	1137	WG	N	G	3	3	
	MLPV-IW0061 - 045.0-20230307	MLPV-IW0061	20230309	0937	WG	N	G	3	3	
	MLPV-IW0062 41-045.0-20230309	MLPV-IW0062	20230309	1321	WG	N	G	3	3	
	MLPV-IW0063 51-50-20230309	MLPV-IW0063	20230309	1033	WG	N	G	3	3	
	MLPV-IW0064 52-045.0-20230309	MLPV-IW0064	20230309	1302	WG	N	G	3	3	



***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Duncan	3/9/23	1500	James W Driggers	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0/2.5

3/23/2023

SO 58215

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 2 of 3
Site Location: Biosparge Area 1/VAB1/Hot Spot 2/West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA #	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl										Comments
	MLPV-~~IW0006IR~~ MW0100-D-20230307	MLPV-IW006IR	20230307	1239	WG	N	G	3	3										
	MLPV-IW0028I 59-47.5-20230307	MLPV-IW0028I	20230307	0951	WG	N	G	3	3										
	WCPS-IW0015R-7.5-20230307 MLPV-~~IW0046~~	MLPV-IW0046	20230307	1318	WG	N	G	3	3										
	MLPV-TB02	MLPV-TB02	20230307		WQ	TB	G	2	2										
	MLPV-MW0108-037.5-20230307		20230307	0912															
	MLPV-MW0077-037.5-20230307		20230307	1004	WG	N	G	3	3										
	MLPV-VAB-IW0005D-54.5-20230307		20230307	1302	WG	N	G	3	3										
	MLPV-MW0084-52-20230307		20230307	0942	WG	N	G	3	3										
	MLPV-MW0085-52-20230307		20230307	1123	WG	N	G	3	3										
	PRES-IW0007-45-20230307		20230307	1201	WG	N	G	3	3										
	WCPS-IW0025R-6-20230307		20230307	1208	WG	N	G	3	3										
	MLPV-IW0047-37.5-20230307		20230307	1031	WG	N	G	3	3										

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Meagan Dunkle	3/9/23	1500	Jamall Gregory	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0 / 2.5

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 3 of 3
Site Location: Former Hot Spot 2 (Biosparge Area / JAB West Crawler Pit)		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 / Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	MLPV-[illegible]-0320-20230309	MLPV-IW0011I	20230309		WG	N	G	3	3	
	MLPV-IW0032	MLPV-IW0032	202303		WG	N	G	3	3	
	MLPV-IW0033	MLPV-IW0033	202303		WG	N	G	3	3	
	MLPV-IW0034	MLPV-IW0034	202303		WG	N	G	3	3	
	MLPV-IW0035	MLPV-IW0035	202303		WG	N	G	3	3	
	MLPV-IW0036	MLPV-IW0036	202303		WG	N	G	3	3	
	MLPV-IW0037	MLPV-IW0037	202303		WG	N	G	3	3	
	MLPV-IW0038	MLPV-IW0038	202303		WG	N	G	3	3	
	MLPV-IW0039	MLPV-IW0039	202303		WG	N	G	3	3	
	MLPV-IW0040	MLPV-IW0040	202303		WG	N	G	3	3	
	MLPV-IW0041	MLPV-IW0041	202303		WG	N	G	3	3	
	MLPV-IW0042	MLPV-IW0042	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Dunkle	3/9/23	1500	Janet W Gregory	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

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3,0/2,5

3/23/2023

SD 5824

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16007-3

Login Number: 16007

List Number: 1

Creator: Bittle, David W

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/28/2023 9:47:17 AM

JOB DESCRIPTION

NASA KSC MLPV BSA

JOB NUMBER

670-16320-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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3/28/2023 9:47:17 AM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16320-2
Project/Site: NASA KSC MLPV BSA

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Job ID: 670-16320-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16320-2

Receipt

The samples were received on 3/15/2023 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C

GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16320-2
Project/Site: NASA KSC MLPV BSA

Client Sample ID: MLPV-IW0028I-030.5-20230315
Lab Sample ID: 670-16320-1

No Detections.

Client Sample ID: MLPV-TB01-20230315
Lab Sample ID: 670-16320-12

No Detections.

This Detection Summary does not include radiochemical test results.

Client: AECOM Technical Services Inc. Job ID: 670-16320-2
Project/Site: NASA KSC MLPV BSA

Client Sample ID: MLPV-IW0028I-030.5-20230315 Lab Sample ID: 670-16320-1

Date Collected: 03/15/23 13:05 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 01:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 01:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 01:59	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 01:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/28/23 01:59*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*03/28/23 01:59*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/28/23 01:59*	*1*

Client Sample ID: MLPV-TB01-20230315 Lab Sample ID: 670-16320-12

Date Collected: 03/15/23 00:00 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 01:41	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 01:41	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 01:41	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 01:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/28/23 01:41*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/28/23 01:41*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/28/23 01:41*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
670-16219-C-12 DU	Duplicate	100	102	100
670-16219-C-13 MS	Matrix Spike	101	96	101
670-16320-1	MLPV-IW0028I-030.5-20230315	100	102	101
670-16320-12	MLPV-TB01-20230315	101	98	100
LCS 670-27858/4	Lab Control Sample	103	96	99
MB 670-27858/7	Method Blank	99	98	100

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27858/7
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 22:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 22:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 22:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 22:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 22:28*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 22:28*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 22:28*	*1*

Lab Sample ID: LCS 670-27858/4
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	19.5		ug/L		97	56 - 128		
trans-1,2-Dichloroethene			20.0	22.5		ug/L		113	54 - 134		
Trichloroethene			20.0	18.8		ug/L		94	62 - 135		
Vinyl chloride			20.0	21.4		ug/L		107	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-16219-C-13 MS
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	21.0		ug/L		105	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	25.5		ug/L		128	54 - 134		
Trichloroethene	0.89	U	20.0	21.2		ug/L		106	62 - 135		
Vinyl chloride	0.98	I	20.0	29.5		ug/L		143	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

Lab Sample ID: 670-16219-C-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16219-C-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

GC/MS VOA

Analysis Batch: 27858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16320-1	MLPV-IW0028I-030.5-20230315	Total/NA	Water	8260D	
670-16320-12	MLPV-TB01-20230315	Total/NA	Water	8260D	
MB 670-27858/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27858/4	Lab Control Sample	Total/NA	Water	8260D	
670-16219-C-13 MS	Matrix Spike	Total/NA	Water	8260D	
670-16219-C-12 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Client Sample ID: MLPV-IW0028I-030.5-20230315

Lab Sample ID: 670-16320-1

Date Collected: 03/15/23 13:05
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 01:59

Client Sample ID: MLPV-TB01-20230315

Lab Sample ID: 670-16320-12

Date Collected: 03/15/23 00:00
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 01:41

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-16320-2
Project/Site: NASA KSC MLPV BSA

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV BSA

Job ID: 670-16320-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16320-1	MLPV-IW0028I-030.5-20230315	Water	03/15/23 13:05	03/15/23 15:30
670-16320-12	MLPV-TB01-20230315	Water	03/15/23 00:00	03/15/23 15:30

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of	
Site Location: LCP Monitoring			PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager:	Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000 Devin Kehoe 914-943-3249	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins		Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl	Comments
	~~MLPV-MW0102~~ MLPV-IW0028I-030.5-20230315	~~MLPV-MW0102~~	202303 15	1305	WG	N	G	3	3	
	~~MLPV-MW0106~~ MLPV-IW0054-045.0-20230315	~~MLPV-MW0106~~	202303 15	1056	WG	N	G	3	3	
	~~MLPV-IW0021R~~ MLPV-IW0018D-052.5-20230315	~~MLPV-IW0021R~~	202303 15	1317	WG	N	G	3	3	
	~~MLPV-MW0109~~ MLPV-MW0086-020.0-20230314	~~MLPV-MW0109~~	202303 14	1557	WG	N	G	3	3	
	~~MLPV-MW0078~~ MLPV-MW0093-040.0-20230315	~~MLPV-MW0078~~	202303 15	1013	WG	N	G	3	3	
	~~MLPV-MW0077~~ MLPV-IW0081-030.5-20230314	~~MLPV-MW0077~~	202303 14	1701	WG	N	G	3	3	
	~~MLPV-MW0081~~ MLPV-IW0044-045.0-20230314	~~MLPV-MW0081~~	202303 14	1654	WG	N	G	3	3	
	~~MLPV-MW0079~~ MLPV-IW0017I-037.5-20230314	~~MLPV-MW0079~~	202303 14	1735	WG	N	G	3	3	
	~~MLPV-MW0098~~ MLPV-IW0022D-050.5-20230315	~~MLPV-MW0098~~	202303 15	1223	WG	N	G	3	3	
	~~MLPV-MW0096~~ MLPV-IW0049-043.0-20230315	~~MLPV-MW0096~~	202303 15	1138	WG	N	G	3	3	
	~~MLPV-MW0094~~ MLPV-IW0029D-044.5-20230315	~~MLPV-MW0094~~	202303 15	1453	WG	N	G	3	3	
	~~MLPV-MW0103~~	~~MLPV-MW0103~~	202303		WG	N	G	3	3	

670-16320 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1 Devin Kehoe	3-15-23	1530	1 James W Shegay	3/15/23	1530
2			2		
3			3		

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2,311,8

3/28/2023

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16320-2

Login Number: 16320

List Source: Eurofins Orlando

List Number: 1

Creator: Wehr, Alex C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 5/5/2023 4:53:17 PM

JOB DESCRIPTION

NASA KSC MLPV - Biosparge Area

JOB NUMBER

670-18639-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

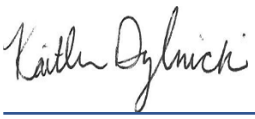
my EOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

Table of Contents

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-18639-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-18639-1

Receipt
The samples were received on 4/26/2023 6:08 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 11.9°C

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0057-045.0-20230426 (670-18639-3) and MLPV-IW0062-042.5-20230426 (670-18639-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Client Sample ID: MLPV-IW0031-030.0-20230426 Lab Sample ID: 670-18639-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	5.6		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0046-040.0-20230426 Lab Sample ID: 670-18639-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.8		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	7.0		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0057-045.0-20230426 Lab Sample ID: 670-18639-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride - DL	280		10	7.1	ug/L	10		8260D	Total/NA

Client Sample ID: MLPV-IW0061-037.5-20230426 Lab Sample ID: 670-18639-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.58	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	8.7		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0062-042.5-20230426 Lab Sample ID: 670-18639-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride - DL	120		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-ASMW0004-037.5-20230426 Lab Sample ID: 670-18639-6

No Detections.

Client Sample ID: MLPV-ASMW0005-037.5-20230426 Lab Sample ID: 670-18639-7

No Detections.

Client Sample ID: MLPV-ASMW0006-037.5-20230426 Lab Sample ID: 670-18639-8

No Detections.

Client Sample ID: MLPV-TB02-20230426 Lab Sample ID: 670-18639-9

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0031-030.0-20230426 Lab Sample ID: 670-18639-1

Date Collected: 04/26/23 13:30 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 13:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 13:03	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 13:03	1
Vinyl chloride	**5.6**		1.0	0.71	ug/L			05/04/23 13:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*05/04/23 13:03*	*1*
4-Bromofluorobenzene (Surr)	*106*		*41 - 142*		*05/04/23 13:03*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*05/04/23 13:03*	*1*

Client Sample ID: MLPV-IW0046-040.0-20230426 Lab Sample ID: 670-18639-2

Date Collected: 04/26/23 13:02 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.8**		1.0	0.53	ug/L			05/04/23 12:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 12:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 12:28	1
Vinyl chloride	**7.0**		1.0	0.71	ug/L			05/04/23 12:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 12:28*	*1*
4-Bromofluorobenzene (Surr)	*105*		*41 - 142*		*05/04/23 12:28*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*05/04/23 12:28*	*1*

Client Sample ID: MLPV-IW0057-045.0-20230426 Lab Sample ID: 670-18639-3

Date Collected: 04/26/23 14:14 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	5.3	U	10	5.3	ug/L			05/04/23 17:21	10
trans-1,2-Dichloroethene	7.3	U	10	7.3	ug/L			05/04/23 17:21	10
Trichloroethene	8.9	U	10	8.9	ug/L			05/04/23 17:21	10
Vinyl chloride	**280**		10	7.1	ug/L			05/04/23 17:21	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 17:21*	*10*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*05/04/23 17:21*	*10*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 17:21*	*10*

Client Sample ID: MLPV-IW0061-037.5-20230426 Lab Sample ID: 670-18639-4

Date Collected: 04/26/23 12:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.58**	**I**	1.0	0.53	ug/L			05/04/23 12:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 12:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 12:46	1
Vinyl chloride	**8.7**		1.0	0.71	ug/L			05/04/23 12:46	1

Client Sample ID: MLPV-IW0061-037.5-20230426 Lab Sample ID: 670-18639-4

Date Collected: 04/26/23 12:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 12:46*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 12:46*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 12:46*	*1*

Client Sample ID: MLPV-IW0062-042.5-20230426 Lab Sample ID: 670-18639-5

Date Collected: 04/26/23 11:36 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	2.7	U	5.0	2.7	ug/L			05/04/23 11:01	5
trans-1,2-Dichloroethene	3.7	U	5.0	3.7	ug/L			05/04/23 11:01	5
Trichloroethene	4.5	U	5.0	4.5	ug/L			05/04/23 11:01	5
Vinyl chloride	**120**		5.0	3.6	ug/L			05/04/23 11:01	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*40 - 146*		*05/04/23 11:01*	*5*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*05/04/23 11:01*	*5*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 11:01*	*5*

Client Sample ID: MLPV-ASMW0004-037.5-20230426 Lab Sample ID: 670-18639-6

Date Collected: 04/26/23 09:54 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 13:21	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 13:21	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 13:21	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 13:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 13:21*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*05/04/23 13:21*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*05/04/23 13:21*	*1*

Client Sample ID: MLPV-ASMW0005-037.5-20230426 Lab Sample ID: 670-18639-7

Date Collected: 04/26/23 10:26 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 13:39	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 13:39	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 13:39	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 13:39	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 13:39*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 13:39*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 13:39*	*1*

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Client Sample ID: MLPV-ASMW0006-037.5-20230426 Lab Sample ID: 670-18639-8

Date Collected: 04/26/23 10:54 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 13:57	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 13:57	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 13:57	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 13:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 13:57*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*05/04/23 13:57*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*05/04/23 13:57*	*1*

Client Sample ID: MLPV-TB02-20230426 Lab Sample ID: 670-18639-9

Date Collected: 04/26/23 08:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 11:36	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 11:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 11:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 11:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 11:36*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 11:36*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*05/04/23 11:36*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)							
		TOL	BFB	DBFM					
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)					
670-18639-1	MLPV-IW0031-030.0-20230426	103	106	100					
670-18639-2	MLPV-IW0046-040.0-20230426	102	105	102					
670-18639-3 - DL	MLPV-IW0057-045.0-20230426	102	100	101					
670-18639-3 MS - DL	MLPV-IW0057-045.0-20230426	101	99	101					
670-18639-4	MLPV-IW0061-037.5-20230426	101	101	101					
670-18639-5 - DL	MLPV-IW0062-042.5-20230426	103	103	101					
670-18639-5 DU - DL	MLPV-IW0062-042.5-20230426	103	102	101					
670-18639-6	MLPV-ASMW0004-037.5-20230426	102	102	100					
670-18639-7	MLPV-ASMW0005-037.5-20230426	102	101	101					
670-18639-8	MLPV-ASMW0006-037.5-20230426	101	103	100					
670-18639-9	MLPV-TB02-20230426	102	101	102					
LCS 670-33117/4	Lab Control Sample	102	100	100					
MB 670-33117/7	Method Blank	101	101	99					

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-33117/7 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 33117

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 10:43	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 10:43	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 10:43	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 10:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 10:43*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 10:43*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*05/04/23 10:43*	*1*

Lab Sample ID: LCS 670-33117/4 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 33117

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.5		ug/L		97	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		95	54 - 134
Trichloroethene	20.0	19.0		ug/L		95	62 - 135
Vinyl chloride	20.0	15.5		ug/L		77	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 670-18639-3 MS **Client Sample ID: MLPV-IW0057-045.0-20230426**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 33117

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene - DL	5.3	U	200	209		ug/L		105	56 - 128
trans-1,2-Dichloroethene - DL	7.3	U	200	203		ug/L		102	54 - 134
Trichloroethene - DL	8.9	U	200	206		ug/L		103	62 - 135
Vinyl chloride - DL	280		200	488		ug/L		103	20 - 167

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*101*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*99*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL (Continued)

Lab Sample ID: 670-18639-5 DU
Client Sample ID: MLPV-IW0062-042.5-20230426
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 33117

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene - DL	2.7	U		2.7	U	ug/L				NC	30
trans-1,2-Dichloroethene - DL	3.7	U		3.7	U	ug/L				NC	20
Trichloroethene - DL	4.5	U		4.5	U	ug/L				NC	30
Vinyl chloride - DL	120			113		ug/L				4	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*103*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*102*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

GC/MS VOA

Analysis Batch: 33117

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18639-1	MLPV-IW0031-030.0-20230426	Total/NA	Water	8260D	
670-18639-2	MLPV-IW0046-040.0-20230426	Total/NA	Water	8260D	
670-18639-3 - DL	MLPV-IW0057-045.0-20230426	Total/NA	Water	8260D	
670-18639-4	MLPV-IW0061-037.5-20230426	Total/NA	Water	8260D	
670-18639-5 - DL	MLPV-IW0062-042.5-20230426	Total/NA	Water	8260D	
670-18639-6	MLPV-ASMW0004-037.5-20230426	Total/NA	Water	8260D	
670-18639-7	MLPV-ASMW0005-037.5-20230426	Total/NA	Water	8260D	
670-18639-8	MLPV-ASMW0006-037.5-20230426	Total/NA	Water	8260D	
670-18639-9	MLPV-TB02-20230426	Total/NA	Water	8260D	
MB 670-33117/7	Method Blank	Total/NA	Water	8260D	
LCS 670-33117/4	Lab Control Sample	Total/NA	Water	8260D	
670-18639-3 MS - DL	MLPV-IW0057-045.0-20230426	Total/NA	Water	8260D	
670-18639-5 DU - DL	MLPV-IW0062-042.5-20230426	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Client Sample ID: MLPV-IW0031-030.0-20230426 — Lab Sample ID: 670-18639-1

Date Collected: 04/26/23 13:30 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 13:03

Client Sample ID: MLPV-IW0046-040.0-20230426 — Lab Sample ID: 670-18639-2

Date Collected: 04/26/23 13:02 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 12:28

Client Sample ID: MLPV-IW0057-045.0-20230426 — Lab Sample ID: 670-18639-3

Date Collected: 04/26/23 14:14 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	10	33117	T1Y	EET ORL	05/04/23 17:21

Client Sample ID: MLPV-IW0061-037.5-20230426 — Lab Sample ID: 670-18639-4

Date Collected: 04/26/23 12:00 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 12:46

Client Sample ID: MLPV-IW0062-042.5-20230426 — Lab Sample ID: 670-18639-5

Date Collected: 04/26/23 11:36 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	5	33117	T1Y	EET ORL	05/04/23 11:01

Client Sample ID: MLPV-ASMW0004-037.5-20230426 — Lab Sample ID: 670-18639-6

Date Collected: 04/26/23 09:54 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 13:21

Client Sample ID: MLPV-ASMW0005-037.5-20230426 — Lab Sample ID: 670-18639-7

Date Collected: 04/26/23 10:26 — **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 13:39

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Client Sample ID: MLPV-ASMW0006-037.5-20230426 Lab Sample ID: 670-18639-8

Date Collected: 04/26/23 10:54 **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 13:57

Client Sample ID: MLPV-TB02-20230426 Lab Sample ID: 670-18639-9

Date Collected: 04/26/23 08:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 11:36

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-24

Method Summary

Client: AECOM Technical Services Inc.
Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Job ID: 670-18639-1
Project/Site: NASA KSC MLPV - Biosparge Area

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-18639-1	MLPV-IW0031-030.0-20230426	Water	04/26/23 13:30	04/26/23 18:08
670-18639-2	MLPV-IW0046-040.0-20230426	Water	04/26/23 13:02	04/26/23 18:08
670-18639-3	MLPV-IW0057-045.0-20230426	Water	04/26/23 14:14	04/26/23 18:08
670-18639-4	MLPV-IW0061-037.5-20230426	Water	04/26/23 12:00	04/26/23 18:08
670-18639-5	MLPV-IW0062-042.5-20230426	Water	04/26/23 11:36	04/26/23 18:08
670-18639-6	MLPV-ASMW0004-037.5-20230426	Water	04/26/23 09:54	04/26/23 18:08
670-18639-7	MLPV-ASMW0005-037.5-20230426	Water	04/26/23 10:26	04/26/23 18:08
670-18639-8	MLPV-ASMW0006-037.5-20230426	Water	04/26/23 10:54	04/26/23 18:08
670-18639-9	MLPV-TB02-20230426	Water	04/26/23 08:00	04/26/23 18:08

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of 1	
Site Location: Biosparge Area			PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**		Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
			Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Patrick Bendle 724-591-6324, Devin Kehoe 9419-943-3797		Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-14
Lab Name: Eurofins		Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)		

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	Select VOCs by SW8260B	Comments
	MLPV-IW0031-030.0-20230426	MLPV-IW0031	20230426	1330	WG	N	G	3	3	
	MLPV-IW0046-040.0-20230426	MLPV-IW0046	20230426	1302	WG	N	G	3	3	
	MLPV-IW0057-045.0-20230426	MLPV-IW0057	20230426	1414	WG	N	G	3	3	
	MLPV-IW0061-037.5-20230426	MLPV-IW0061	20230426	1200	WG	N	G	3	3	
	MLPV-IW0062-042.5-20230426	MLPV-IW0062	20230426	1136	WG	N	G	3	3	
	MLPV-ASMW0004-037.5-20230426	MLPV-ASMW0004	20230426	0954	WG	N	G	3	3	
	MLPV-ASMW0005-037.5-20230426	MLPV-ASMW0005	20230426	1026	WG	N	G	3	3	
	MLPV-ASMW0006-037.5-20230426	MLPV-ASMW0006	20230426	1054	WG	N	G	3	3	
	MLPV-TB02-20230426	MLPV-TB02	20230426	800	WQ	TB	G	2	2	

670-18639 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment: 1

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		4/26/23	1808	MC	4/26/23	18:08
2						
3						

Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

12.4/11-9

5/5/2023

596

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-18639-1

Login Number: 18639

List Source: Eurofins Orlando

List Number: 1

Creator: Wehr, Alex C

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/30/2023 12:33:41 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV HS2

JOB NUMBER

670-16141-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

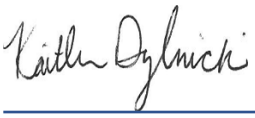
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Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Authorized for release by
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Revision 1

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16141-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16141-2

REVISION

The report being provided is a revision of the original report sent on 3/27/2023. The report (revision 1) is being revised due to missing chain of custody in original report..

Receipt
The samples were received on 3/13/2023 4:33 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

GC/MS VOA
Method 8260D: Surrogate recovery for Dibromofluoromethane for the following sample was high just outside the upper control limit: (670-16141-C-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Client Sample ID: MLPV-IW0036-037.5-20230313 — Lab Sample ID: 670-16141-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.88	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	54		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-SAMW0004D-047.5-20230313 — Lab Sample ID: 670-16141-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.9		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	1.2		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	18		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-SAMW0004I-037.5-20230313 — Lab Sample ID: 670-16141-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.74	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	12		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Client Sample ID: MLPV-IW0036-037.5-20230313

Lab Sample ID: 670-16141-2

Date Collected: 03/13/23 10:35
Date Received: 03/13/23 16:33

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.88	I	1.0	0.53	ug/L			03/27/23 14:38	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 14:38	1
Vinyl chloride	54		1.0	0.71	ug/L			03/27/23 14:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 14:38*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 14:38*	*1*
4-Bromofluorobenzene (Surr)	*68*		*41 - 142*		*03/27/23 14:38*	*1*

Client Sample ID: MLPV-SAMW0004D-047.5-20230313

Lab Sample ID: 670-16141-3

Date Collected: 03/13/23 12:01
Date Received: 03/13/23 16:33

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1.9		1.0	0.53	ug/L			03/27/23 14:55	1
trans-1,2-Dichloroethene	1.2		1.0	0.73	ug/L			03/27/23 14:55	1
Vinyl chloride	18		1.0	0.71	ug/L			03/27/23 14:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 14:55*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 14:55*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 14:55*	*1*

Client Sample ID: MLPV-SAMW0004I-037.5-20230313

Lab Sample ID: 670-16141-4

Date Collected: 03/13/23 11:21
Date Received: 03/13/23 16:33

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.74	I	1.0	0.53	ug/L			03/27/23 15:13	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 15:13	1
Vinyl chloride	12		1.0	0.71	ug/L			03/27/23 15:13	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 15:13*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 15:13*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/27/23 15:13*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16141-2	MLPV-IW0036-037.5-20230313	100	100	68
670-16141-3	MLPV-SAMW0004D-047.5-20230313	99	101	98
670-16141-4	MLPV-SAMW0004I-037.5-20230313	100	101	97
670-16141-A-8 MS	Matrix Spike	100	103	90
670-16141-C-7 DU	Duplicate	100	100	96
LCS 670-27765/4	Lab Control Sample	103	99	99
MB 670-27765/7	Method Blank	100	102	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27765/7
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:35	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:35	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:35*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 12:35*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 12:35*	*1*

Lab Sample ID: LCS 670-27765/4
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.6		ug/L		93	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Vinyl chloride			20.0	24.9		ug/L		124	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16141-A-8 MS
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	26.2		ug/L		131	54 - 134		
Vinyl chloride	0.71	U	20.0	28.2		ug/L		141	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

GC/MS VOA

Analysis Batch: 27765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16141-2	MLPV-IW0036-037.5-20230313	Total/NA	Water	8260D	
670-16141-3	MLPV-SAMW0004D-047.5-20230313	Total/NA	Water	8260D	
670-16141-4	MLPV-SAMW0004I-037.5-20230313	Total/NA	Water	8260D	
MB 670-27765/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27765/4	Lab Control Sample	Total/NA	Water	8260D	
670-16141-A-8 MS	Matrix Spike	Total/NA	Water	8260D	
670-16141-C-7 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Client Sample ID: MLPV-IW0036-037.5-20230313
Lab Sample ID: 670-16141-2
Date Collected: 03/13/23 10:35
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 14:38

Client Sample ID: MLPV-SAMW0004D-047.5-20230313
Lab Sample ID: 670-16141-3
Date Collected: 03/13/23 12:01
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 14:55

Client Sample ID: MLPV-SAMW0004I-037.5-20230313
Lab Sample ID: 670-16141-4
Date Collected: 03/13/23 11:21
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 15:13

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16141-2
Project/Site: NASA KSC MLPV HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16141-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16141-2	MLPV-IW0036-037.5-20230313	Water	03/13/23 10:35	03/13/23 16:33
670-16141-3	MLPV-SAMW0004D-047.5-20230313	Water	03/13/23 12:01	03/13/23 16:33
670-16141-4	MLPV-SAMW0004I-037.5-20230313	Water	03/13/23 11:21	03/13/23 16:33

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of	
Site Location: LCP Monitoring	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000 Devin Kehoe 919-943-3797	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-IW0079~~ MLPV-IW0009D-047.5-20230313	MLPV-IW0009D-047.5-20230313	20230313	1331	WG	N	G	3	3	
	~~MLPV-IW0056~~ MLPV-IW0036-37.5-20230313	~~MLPV-IW0056~~	202303 13	1035	WG	N	G	3	3	
	~~MLPV-IW0022D~~ MLPV-SAMW0004D-20230313	MLPV-IW0022D	202303 13		WG	N	G	3	3	
	~~MLPV-IW0030~~ MLPV-SAMW0004D-047.5-20230313	~~MLPV-IW0030~~	202303 13	1201	WG	N	G	3	3	
	~~MLPV-IW0051~~ MLPV-SAMW0004I-037.5-20230313	~~MLPV-IW0051~~	202303 13	1121	WG	N	G	3	3	
	~~MLPV-IW0054~~ MLPV-MW0087-052.5-20230313	~~MLPV-IW0054~~	202303 13	1240	WG	N	G	3	3	
	~~MLPV-IW0055~~ MLPV-MW0089-040.0-20230313	~~MLPV-IW0055~~	202303 13	1426	WG	N	G	3	3	
	~~MLPV-MW0110~~ MLPV-MW0098-025.0-20230313	~~MLPV-MW0110~~	202303 13	1034	WG	N	G	3	3	
	~~WCPS-IW0002SRR~~ MLPV-MW0094-045.0-20230313	~~WCPS-IW0002SRR~~	202303 13	1125	WG	N	G	3	3	
	~~MLPV-MW0100~~ MLPV-IW0053-040.0-20230313	~~MLPV-MW0100~~	202303 13	1439	WG	N	G	3	3	
	MLPV-MW0086	MLPV-MW0086	202303		WG	N	G	3	3	
	MLPV-MW0095	MLPV-MW0095	202303		WG	N	G	3	3	

670-16141 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-13-23	1515	James W Gregory	3/13/23	1515
2						
3				Craig Berg	3/13/23	1633 1.0/0.5°

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDW**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16141-2

Login Number: 16141
List Number: 1
Creator: Ferguson, Craig

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

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JOB DESCRIPTION

NASA KSC MLPV HS2

JOB NUMBER

670-16219-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16219-1
Project/Site: NASA KSC MLPV HS2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Job ID: 670-16219-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16219-1

Receipt
The samples were received on 3/14/2023 4:43 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.6°C

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0033-045.0 20230314 (670-16219-1) and MLPV-IW0043-045.0-20230314 (670-16219-7). Elevated reporting limits (RLs) are provided.

Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0045-045.0-20230314 (670-16219-5). Elevated reporting limits (RLs) are provided.

Method 8260D: Surrogate recovery for Dibromofluoromethane for the following sample was high just outside the upper control limit: (670-16141-C-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Client Sample ID: MLPV-IW0033-045.0 20230314 — Lab Sample ID: 670-16219-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	57		25	13	ug/L	25		8260D	Total/NA
Vinyl chloride - DL	560		25	18	ug/L	25		8260D	Total/NA

Client Sample ID: MLPV-IW0042-036.0-20230314 — Lab Sample ID: 670-16219-3

No Detections.

Client Sample ID: MLPV-IW0045-045.0-20230314 — Lab Sample ID: 670-16219-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	11		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	1.6		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride - DL	59		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0043-045.0-20230314 — Lab Sample ID: 670-16219-7

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	170		5.0	2.7	ug/L	5		8260D	Total/NA
Vinyl chloride - DL	280		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0032-035.5-20230314 — Lab Sample ID: 670-16219-9

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	1.3		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0033-045.0 20230314 Lab Sample ID: 670-16219-1

Date Collected: 03/14/23 14:31 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	57		25	13	ug/L			03/27/23 18:12	25
trans-1,2-Dichloroethene	18	U	25	18	ug/L			03/27/23 18:12	25
Vinyl chloride	560		25	18	ug/L			03/27/23 18:12	25

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*83*		*40 - 146*		*03/27/23 18:12*	*25*
Dibromofluoromethane (Surr)	*98*		*53 - 146*		*03/27/23 18:12*	*25*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/27/23 18:12*	*25*

Client Sample ID: MLPV-IW0042-036.0-20230314 Lab Sample ID: 670-16219-3

Date Collected: 03/14/23 09:27 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 18:47	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 18:47	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 18:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/27/23 18:47*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 18:47*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/27/23 18:47*	*1*

Client Sample ID: MLPV-IW0045-045.0-20230314 Lab Sample ID: 670-16219-5

Date Collected: 03/14/23 13:16 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	11		1.0	0.53	ug/L			03/27/23 19:22	1
trans-1,2-Dichloroethene	1.6		1.0	0.73	ug/L			03/27/23 19:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/27/23 19:22*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 19:22*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 19:22*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	59		5.0	3.6	ug/L			03/28/23 11:53	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 11:53*	*5*
Dibromofluoromethane (Surr)	*112*		*53 - 146*		*03/28/23 11:53*	*5*
4-Bromofluorobenzene (Surr)	*89*		*41 - 142*		*03/28/23 11:53*	*5*

Client: AECOM Technical Services Inc. Job ID: 670-16219-1
Project/Site: NASA KSC MLPV HS2

Client Sample ID: MLPV-IW0043-045.0-20230314 Lab Sample ID: 670-16219-7

Date Collected: 03/14/23 09:59 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**170**		5.0	2.7	ug/L			03/27/23 20:00	5
trans-1,2-Dichloroethene	3.7	U	5.0	3.7	ug/L			03/27/23 20:00	5
Vinyl chloride	**280**		5.0	3.6	ug/L			03/27/23 20:00	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 20:00*	*5*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 20:00*	*5*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/27/23 20:00*	*5*

Client Sample ID: MLPV-IW0032-035.5-20230314 Lab Sample ID: 670-16219-9

Date Collected: 03/14/23 13:59 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 00:48	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 00:48	1
Vinyl chloride	**1.3**		1.0	0.71	ug/L			03/28/23 00:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 00:48*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 00:48*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/28/23 00:48*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16141-A-8 MS	Matrix Spike	100	103	90
670-16141-C-7 DU	Duplicate	100	100	96
670-16219-1 - DL	MLPV-IW0033-045.0 20230314	83	98	99
670-16219-3	MLPV-IW0042-036.0-20230314	102	100	99
670-16219-5	MLPV-IW0045-045.0-20230314	101	101	98
670-16219-5 - DL	MLPV-IW0045-045.0-20230314	99	112	89
670-16219-7 - DL	MLPV-IW0043-045.0-20230314	100	102	99
670-16219-9	MLPV-IW0032-035.5-20230314	99	102	99
670-16219-C-12 DU	670-16219-C-12 DU	100	100	102
670-16219-C-13 MS	670-16219-C-13 MS	101	101	96
670-16735-C-1 DU	Duplicate	97	112	90
674-3829-C-5 MS	Matrix Spike	97	110	93
LCS 670-27765/4	Lab Control Sample	103	99	99
LCS 670-27858/4	Lab Control Sample	103	99	96
LCS 670-27886/4	Lab Control Sample	98	107	89
MB 670-27765/7	Method Blank	100	102	98
MB 670-27858/7	Method Blank	99	100	98
MB 670-27886/7	Method Blank	99	112	87

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27765/7
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:35	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:35	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:35*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 12:35*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 12:35*	*1*

Lab Sample ID: LCS 670-27765/4
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.6		ug/L		93	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Vinyl chloride			20.0	24.9		ug/L		124	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16141-A-8 MS
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	26.2		ug/L		131	54 - 134		
Vinyl chloride	0.71	U	20.0	28.2		ug/L		141	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: MB 670-27858/7
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 22:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 22:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 22:28	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 22:28*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 22:28*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 22:28*	*1*

Lab Sample ID: LCS 670-27858/4
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.5		ug/L		97	56 - 128
trans-1,2-Dichloroethene	20.0	22.5		ug/L		113	54 - 134
Vinyl chloride	20.0	21.4		ug/L		107	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: 670-16219-C-13 MS
Matrix: Water
Analysis Batch: 27858

Client Sample ID: 670-16219-C-13 MS
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.53	U	20.0	21.0		ug/L		105	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	25.5		ug/L		128	54 - 134
Vinyl chloride	0.98	I	20.0	29.5		ug/L		143	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16219-C-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: 670-16219-C-12 DU
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*

Lab Sample ID: MB 670-27886/7
Matrix: Water
Analysis Batch: 27886

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 10:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 10:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 10:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 10:08*	*1*
Dibromofluoromethane (Surr)	*112*		*53 - 146*		*03/28/23 10:08*	*1*
4-Bromofluorobenzene (Surr)	*87*		*41 - 142*		*03/28/23 10:08*	*1*

Lab Sample ID: LCS 670-27886/4
Matrix: Water
Analysis Batch: 27886

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			2.50	2.66		ug/L		107	56 - 128		
trans-1,2-Dichloroethene			2.50	2.79		ug/L		112	54 - 134		
Vinyl chloride			2.50	2.51		ug/L		100	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*40 - 146*
Dibromofluoromethane (Surr)	*107*		*53 - 146*
4-Bromofluorobenzene (Surr)	*89*		*41 - 142*

Lab Sample ID: 674-3829-C-5 MS
Matrix: Water
Analysis Batch: 27886

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	2.50	2.11		ug/L		84	56 - 128		
trans-1,2-Dichloroethene	0.73	U	2.50	2.07		ug/L		83	54 - 134		
Vinyl chloride	0.71	U	2.50	2.04		ug/L		82	20 - 167		

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 674-3829-C-5 MS
Matrix: Water
Analysis Batch: 27886

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*97*		*40 - 146*
Dibromofluoromethane (Surr)	*110*		*53 - 146*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*

Lab Sample ID: 670-16735-C-1 DU
Matrix: Water
Analysis Batch: 27886

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*97*		*40 - 146*
Dibromofluoromethane (Surr)	*112*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

GC/MS VOA

Analysis Batch: 27765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16219-1 - DL	MLPV-IW0033-045.0 20230314	Total/NA	Water	8260D	
670-16219-3	MLPV-IW0042-036.0-20230314	Total/NA	Water	8260D	
670-16219-5	MLPV-IW0045-045.0-20230314	Total/NA	Water	8260D	
670-16219-7 - DL	MLPV-IW0043-045.0-20230314	Total/NA	Water	8260D	
MB 670-27765/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27765/4	Lab Control Sample	Total/NA	Water	8260D	
670-16141-A-8 MS	Matrix Spike	Total/NA	Water	8260D	
670-16141-C-7 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16219-9	MLPV-IW0032-035.5-20230314	Total/NA	Water	8260D	
MB 670-27858/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27858/4	Lab Control Sample	Total/NA	Water	8260D	
670-16219-C-13 MS	670-16219-C-13 MS	Total/NA	Water	8260D	
670-16219-C-12 DU	670-16219-C-12 DU	Total/NA	Water	8260D	

Analysis Batch: 27886

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16219-5 - DL	MLPV-IW0045-045.0-20230314	Total/NA	Water	8260D	
MB 670-27886/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27886/4	Lab Control Sample	Total/NA	Water	8260D	
674-3829-C-5 MS	Matrix Spike	Total/NA	Water	8260D	
670-16735-C-1 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Client Sample ID: MLPV-IW0033-045.0 20230314

Lab Sample ID: 670-16219-1

Date Collected: 03/14/23 14:31
Date Received: 03/14/23 16:43

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	25	27765	ES	EET ORL	03/27/23 18:12

Client Sample ID: MLPV-IW0042-036.0-20230314

Lab Sample ID: 670-16219-3

Date Collected: 03/14/23 09:27
Date Received: 03/14/23 16:43

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 18:47

Client Sample ID: MLPV-IW0045-045.0-20230314

Lab Sample ID: 670-16219-5

Date Collected: 03/14/23 13:16
Date Received: 03/14/23 16:43

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 19:22
Total/NA	Analysis	8260D	DL	5	27886	KG	EET ORL	03/28/23 11:53

Client Sample ID: MLPV-IW0043-045.0-20230314

Lab Sample ID: 670-16219-7

Date Collected: 03/14/23 09:59
Date Received: 03/14/23 16:43

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	5	27765	ES	EET ORL	03/27/23 20:00

Client Sample ID: MLPV-IW0032-035.5-20230314

Lab Sample ID: 670-16219-9

Date Collected: 03/14/23 13:59
Date Received: 03/14/23 16:43

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 00:48

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-16219-1
Project/Site: NASA KSC MLPV HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16219-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16219-1	MLPV-IW0033-045.0 20230314	Water	03/14/23 14:31	03/14/23 16:43
670-16219-3	MLPV-IW0042-036.0-20230314	Water	03/14/23 09:27	03/14/23 16:43
670-16219-5	MLPV-IW0045-045.0-20230314	Water	03/14/23 13:16	03/14/23 16:43
670-16219-7	MLPV-IW0043-045.0-20230314	Water	03/14/23 09:59	03/14/23 16:43
670-16219-9	MLPV-IW0032-035.5-20230314	Water	03/14/23 13:59	03/14/23 16:43

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	~~Caroline Bekins 714-943-9928~~ ~~Madan Parsotan 321-696-6000~~ Devn Kehoe 919-943-5947	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-MW0099~~ MLPV-IW0033-045.0-20230314	~~MLPV-MW0099~~	202303 14	1431	WG	N	G	3	3	
	~~MLPV-MW0101~~ MLPV-MW0088-040.0-20230314	~~MLPV-MW0101~~	202303 14	1044	WG	N	G	3	3	
	~~MLPV-MW0085~~ MLPV-IW0042-035.0-20230314	~~MLPV-MW0085~~	202303 14	0927	WG	N	G	3	3	
	~~MLPV-MW0084~~ WCPS-IW00155-008.0-20230314	~~MLPV-MW0084~~	202303 14	1412	WG	N	G	3	3	
	~~MLPV-MW0076~~ MLPV-IW0048-045.0-20230314	~~MLPV-MW0076~~	202303 14	1316	WG	N	G	3	3	
	~~MLPV-MW0080~~ MLPV-IW0052-045.0-20230314	~~MLPV-MW0080~~	202303 14	1057	WG	N	G	3	3	
	~~MLPV-MW0083~~ MLPV-IW0043-045.0-20230314	~~MLPV-MW0083~~	202303	0959	WG	N	G	3	3	
	MLPV-MW0090 ~~0857.5-20230314~~	~~MLPV-MW0090~~	202303 14	1001	WG	N	G	3	3	
	~~MLPV-TB01~~ MLPV-IW0032-035.0-20230314	~~MLPV-TB01~~	202303 14	1359	WG	N	G	3	3	
	MLPV-IW0055-045.0-20230314			0918						
	MLPV-IW0012D-045.0-20230314			1236						

670-16219 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-13

	Relinquished by (signature)	Date	Time
1		3-14-23	1512
2			
3			

***Lab* Comments:**

	Received by (signature)	Date	Time
1	James W Diggs	3/14/23	1512
2	MC	3/14/23	16 43
3			

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2 1 1 6

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # ~~Caroline Bekins 714-943-9928~~	~~Madan Parsotan 321-696-6000~~ Devin Kehoe 919-943-3747	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
		Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Lab Name: Eurofins — Turnaround Time(specify): Standard 14 day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-MW0107~~ MLPV-SAMW-0001-043.0-20230314	~~MLPV-MW0107~~	202303 14	1147	WG	N	G	3	3	
	~~MLPV-MW0100~~ MLPV-IW0014I-037.6-20230314	~~MLPV-MW0100~~	202303 14	1137	WG	N	G	3	3	
	MLPV-MW0088	MLPV-MW0088	202303		WG	N	G	3	3	
	MLPV-MW0089	MLPV-MW0089	202303		WG	N	G	3	3	
	MLPV-MW0093	MLPV-MW0093	202303		WG	N	G	3	3	
	MLPV-MW0097	MLPV-MW0097	202303		WG	N	G	3	3	
	MLPV-MW0082	MLPV-MW0082	202303		WG	N	G	3	3	
	MLPV-MW0104	MLPV-MW0104	202303		WG	N	G	3	3	
	MLPV-MW0105	MLPV-MW0105	202303		WG	N	G	3	3	
	MLPV-MW0091	MLPV-MW0091	202303		WG	N	G	3	3	
	MLPV-MW0087	MLPV-MW0087	202303		WG	N	G	3	3	
	MLPV-MW0092	MLPV-MW0092	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Denton	3-14-23	1512	James W Gregory	3/14/23	1512
2				rmc	3/14/23	1643
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2.1/1.6

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

COC No. | Page: 1 of

Project Name: NASA KSC - MLPV | PO No. 148569 | Project No. 60615493.4 | Phase:

Site Location: LCP Monitoring | Send Invoice To: Instructions in MSA | EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings

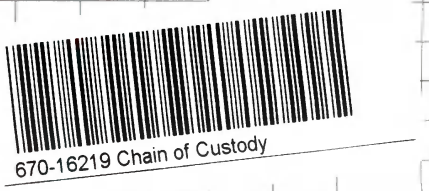
TO No.: 80KSC019F0075 | AECOM Project Manager: Linnea King Clark; Caroline Bekins | Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando | Report to: Jennifer Chastain Cc: Teresa Amentt Jennings

Sampler/Phone # | ~~Caroline Bekins 714-943-0928~~ ~~Madan Parseton 321-696-6000~~ Devm Kehoe 919-943-3947 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-13

Lab Name: Eurofins | Turnaround Time(specify): Standard 14 day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	Select VOCs by SW8260B	Comments
	~~MLPV-MW0099~~ MLPV-IW0033-045.0-20230314	~~MLPV-MW0099~~	202303 14	1431	WG	N	G	3	3	
	~~MLPV-MW0101~~ MLPV-MW0088-040.0-20230314	~~MLPV-MW0101~~	202303 14	1044	WG	N	G	3	3	
	~~MLPV-MW0085~~ MLPV-IW0042-035.0-20230314	~~MLPV-MW0085~~	202303 14	0927	WG	N	G	3	3	
	~~MLPV-MW0084~~ WCPS-IW0015S-068.0-20230314	~~MLPV-MW0084~~	202303 14	1412	WG	N	G	3	3	
	~~MLPV-MW0076~~ MLPV-IW0048-045.0-20230314	~~MLPV-MW0076~~	202303 14	1316	WG	N	G	3	3	
	~~MLPV-MW0080~~ MLPV-IW0052-045.0-20230314	~~MLPV-MW0080~~	202303 14	1057	WG	N	G	3	3	
	~~MLPV-MW0083~~ MLPV-IW0043-045.0-20230314	~~MLPV-MW0083~~	202303	0959	WG	N	G	3	3	
	MLPV-MW0090 ~~0982.5~~-20230314	~~MLPV-MW0090~~	202303 14	1001	WG	N	G	3	3	
	~~MLPV-TB01~~ MLPV-IW0082-~~MW0088~~ 035.0 -20230314	~~MLPV-TB01~~	202303 14	1359	WG	N	G	3	3	
	MLPV-IW0055-045.0-20230314			0918						
	MLPV-IW0012D-045.0-20230314			1236						



***Field* Comments:**

Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes✓ No____

Shipping Company:

Tracking No:

Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devm Kehoe	3-14-23	1512	James W Driggo	3/14/23	1512
2				MC	3/14/23	1643
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2/1/16

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of	
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # ~~Caroline Bekins 714-943-9928~~	~~Madan Parsotan 321-696-6000~~ Devin Kehoe 919-943-3747	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-MW0107~~ MLPV-SAMW-0001-043.0-20230314	~~MLPV-MW0107~~	202303 14	1147	WG	N	G	3	3	
	~~MLPV-MW0100~~ MLPV-IW0014I-037.8-20230314	~~MLPV-MW0100~~	202303 14	1137	WG	N	G	3	3	
	MLPV-MW0088	MLPV-MW0088	202303		WG	N	G	3	3	
	MLPV-MW0089	MLPV-MW0089	202303		WG	N	G	3	3	
	MLPV-MW0093	MLPV-MW0093	202303		WG	N	G	3	3	
	MLPV-MW0097	MLPV-MW0097	202303		WG	N	G	3	3	
	MLPV-MW0082	MLPV-MW0082	202303		WG	N	G	3	3	
	MLPV-MW0104	MLPV-MW0104	202303		WG	N	G	3	3	
	MLPV-MW0105	MLPV-MW0105	202303		WG	N	G	3	3	
	MLPV-MW0091	MLPV-MW0091	202303		WG	N	G	3	3	
	MLPV-MW0087	MLPV-MW0087	202303		WG	N	G	3	3	
	MLPV-MW0092	MLPV-MW0092	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-14-23	1572	James W Gregory MAC	3/14/23	1562
2					3/14/23	1643
3						

Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2-1-1-6

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16219-1

Login Number: 16219

List Source: Eurofins Orlando

List Number: 1

Creator: Clerisier, Meline

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/30/2023 12:38:16 PM

JOB DESCRIPTION

NASA KSC MLPV HS2

JOB NUMBER

670-16320-3

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Generated
3/30/2023 12:38:16 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Job ID: 670-16320-3
Project/Site: NASA KSC MLPV HS2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
L	Off-scale high. Actual value is known to be greater than the value given.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16320-3

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16320-3

Receipt
The samples were received on 3/15/2023 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C

GC/MS VOA
Method 8260D: For the matrix spike (MS) associated with analytical batch 670-27904, due to the additional level of Vinyl Chloride present in the spiked samples, the concentration in the MS was above the instrument calibration range and not able to be quantified above the calibration range due to curve fit used in calibration.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Client Sample ID: MLPV-IW0044-045.0-20230314 — Lab Sample ID: 670-16320-7

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	22		10	5.3	ug/L	10		8260D	Total/NA
Vinyl chloride	620		10	7.1	ug/L	10		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Client Sample ID: MLPV-IW0044-045.0-20230314
Date Collected: 03/14/23 16:54
Date Received: 03/15/23 15:30

Lab Sample ID: 670-16320-7
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**22**		10	5.3	ug/L			03/28/23 15:13	10
trans-1,2-Dichloroethene	7.3	U	10	7.3	ug/L			03/28/23 15:13	10
Vinyl chloride	**620**		10	7.1	ug/L			03/28/23 15:13	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 15:13*	*10*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 15:13*	*10*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/28/23 15:13*	*10*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16320-7	MLPV-IW0044-045.0-20230314	99	102	96
670-16320-A-11 MS	Matrix Spike	101	99	99
670-16320-C-10 DU	Duplicate	103	100	96
LCS 670-27904/4	Lab Control Sample	102	100	99
MB 670-27904/7	Method Blank	100	101	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27904/7
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 13:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 13:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 13:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/28/23 13:08*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/28/23 13:08*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/28/23 13:08*	*1*

Lab Sample ID: LCS 670-27904/4
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	21.1		ug/L		106	56 - 128		
trans-1,2-Dichloroethene			20.0	19.8		ug/L		99	54 - 134		
Vinyl chloride			20.0	19.6		ug/L		98	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16320-A-11 MS
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.88	I	20.0	22.2		ug/L		106	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	24.5		ug/L		122	54 - 134		
Vinyl chloride	39		20.0	NQ	L	ug/L			20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16320-C-10 DU
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16320-C-10 DU
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

GC/MS VOA

Analysis Batch: 27904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16320-7	MLPV-IW0044-045.0-20230314	Total/NA	Water	8260D	
MB 670-27904/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27904/4	Lab Control Sample	Total/NA	Water	8260D	
670-16320-A-11 MS	Matrix Spike	Total/NA	Water	8260D	
670-16320-C-10 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Client Sample ID: MLPV-IW0044-045.0-20230314

Date Collected: 03/14/23 16:54
Date Received: 03/15/23 15:30

Lab Sample ID: 670-16320-7

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		10	27904	ES	EET ORL	03/28/23 15:13

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16320-3
Project/Site: NASA KSC MLPV HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16320-3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16320-7	MLPV-IW0044-045.0-20230314	Water	03/14/23 16:54	03/15/23 15:30

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of	
Site Location: LCP Monitoring	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000 Devin Kehoe 914-943-3249	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl	Comments
	~~MLPV-MW0102~~ MLPV-IW0028I-030.5-20230315	~~MLPV-MW0102~~	202303 15	1305	WG	N	G	3	3	
	~~MLPV-MW0106~~ MLPV-IW0054-045.0-20230315	~~MLPV-MW0106~~	202303 15	1056	WG	N	G	3	3	
	~~MLPV-IW0021R~~ MLPV-IW0018D-052.5-20230315	~~MLPV-IW0021R~~	202303 15	1317	WG	N	G	3	3	
	~~MLPV-MW0109~~ MLPV-MW0086-020.0-20230314	~~MLPV-MW0109~~	202303 14	1557	WG	N	G	3	3	
	~~MLPV-MW0078~~ MLPV-MW0093-040.0-20230315	~~MLPV-MW0078~~	202303 15	1013	WG	N	G	3	3	
	~~MLPV-MW0077~~ MLPV-IW0081-030.5-20230314	~~MLPV-MW0077~~	202303 14	1701	WG	N	G	3	3	
	~~MLPV-MW0081~~ MLPV-IW0044-045.0-20230314	~~MLPV-MW0081~~	202303 14	1654	WG	N	G	3	3	
	~~MLPV-MW0079~~ MLPV-IW0017I-037.5-20230314	~~MLPV-MW0079~~	202303 14	1735	WG	N	G	3	3	
	~~MLPV-MW0098~~ MLPV-IW0022D-050.5-20230315	~~MLPV-MW0098~~	202303 15	1223	WG	N	G	3	3	
	~~MLPV-MW0096~~ MLPV-IW0049-043.0-20230315	~~MLPV-MW0096~~	202303 15	1138	WG	N	G	3	3	
	~~MLPV-MW0094~~ MLPV-IW0029D-044.5-20230315	~~MLPV-MW0094~~	202303 15	1453	WG	N	G	3	3	
	~~MLPV-MW0103~~	~~MLPV-MW0103~~	202303		WG	N	G	3	3	

670-16320 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-15-23	1530	James W Shegay	3/15/23	1530
2						
3						

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2,311,8

3/30/2023

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16320-3

Login Number: 16320
List Number: 1
Creator: Wehr, Alex C

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 5/10/2023 3:23:42 PM

JOB DESCRIPTION

NASA KSC MLPV - Former HS2

JOB NUMBER

670-18637-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

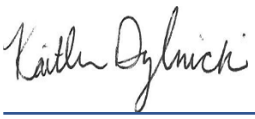
See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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Authorization



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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-18637-1
Project/Site: NASA KSC MLPV - Former HS2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

GC VOA

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
L	Off-scale high. Actual value is known to be greater than the value given.
U	Indicates that the compound was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-18637-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-18637-1

Receipt
The samples were received on 4/26/2023 6:08 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 11.9°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0039-045.0-20230426 (670-18637-3). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
Method 5310C: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-33167 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Former HS2

Job ID: 670-18637-1

Client Sample ID: MLPV-IW0036-042.5-20230426 — Lab Sample ID: 670-18637-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.84	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	29		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0038-035.0-20230426 — Lab Sample ID: 670-18637-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.85	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	1.8		1.0	0.71	ug/L	1		8260D	Total/NA
Methane	240		1.0	0.50	ug/L	1		RSK-175	Total/NA
Sulfate	190000	J3	5000	2500	ug/L	5		300.0	Total/NA
Iron	1100		56	28	ug/L	1		6010D	Total Recoverable
Iron, Dissolved	840		56	28	ug/L	1		6010D	Dissolved
Total Organic Carbon	3000		2000	1000	ug/L	1		SM 5310C	Total/NA

Client Sample ID: MLPV-IW0039-045.0-20230426 — Lab Sample ID: 670-18637-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	150		5.0	2.7	ug/L	5		8260D	Total/NA
trans-1,2-Dichloroethene - DL	4.2	I	5.0	3.7	ug/L	5		8260D	Total/NA
Vinyl chloride - DL	270		5.0	3.6	ug/L	5		8260D	Total/NA
Methane	100		1.0	0.50	ug/L	1		RSK-175	Total/NA
Ethene	1.9		1.0	0.55	ug/L	1		RSK-175	Total/NA
Sulfate	510000	J3	20000	10000	ug/L	20		300.0	Total/NA
Iron	1200		56	28	ug/L	1		6010D	Total Recoverable
Iron, Dissolved	1100		56	28	ug/L	1		6010D	Dissolved
Total Organic Carbon	4000		2000	1000	ug/L	1		SM 5310C	Total/NA

Client Sample ID: MLPV-TB03-20230426 — Lab Sample ID: 670-18637-4

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0036-042.5-20230426 Lab Sample ID: 670-18637-1

Date Collected: 04/26/23 15:15 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.84	I	1.0	0.53	ug/L			04/27/23 18:27	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			04/27/23 18:27	1
Vinyl chloride	29		1.0	0.71	ug/L			04/27/23 18:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*04/27/23 18:27*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*04/27/23 18:27*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*04/27/23 18:27*	*1*

Client Sample ID: MLPV-IW0038-035.0-20230426 Lab Sample ID: 670-18637-2

Date Collected: 04/26/23 15:55 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.85	I	1.0	0.53	ug/L			04/27/23 18:44	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			04/27/23 18:44	1
Vinyl chloride	1.8		1.0	0.71	ug/L			04/27/23 18:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*04/27/23 18:44*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*04/27/23 18:44*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*04/27/23 18:44*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	240		1.0	0.50	ug/L			05/09/23 10:40	1
Ethane	0.75	U	1.0	0.75	ug/L			05/09/23 10:40	1
Ethene	0.55	U	1.0	0.55	ug/L			05/09/23 10:40	1

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	190000	J3	5000	2500	ug/L			04/28/23 15:34	5

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1100		56	28	ug/L		04/27/23 11:15	04/27/23 16:59	1

Method: SW846 6010D - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	840		56	28	ug/L		04/27/23 11:15	04/27/23 17:02	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (SM 5310C)	3000		2000	1000	ug/L			05/03/23 22:42	1

Client Sample ID: MLPV-IW0039-045.0-20230426 Lab Sample ID: 670-18637-3

Date Collected: 04/26/23 15:43 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	150		5.0	2.7	ug/L			04/27/23 19:03	5
trans-1,2-Dichloroethene	4.2	I	5.0	3.7	ug/L			04/27/23 19:03	5
Vinyl chloride	270		5.0	3.6	ug/L			04/27/23 19:03	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*04/27/23 19:03*	*5*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*04/27/23 19:03*	*5*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*04/27/23 19:03*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	100		1.0	0.50	ug/L			05/09/23 10:50	1
Ethane	0.75	U	1.0	0.75	ug/L			05/09/23 10:50	1
Ethene	1.9		1.0	0.55	ug/L			05/09/23 10:50	1

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	510000	J3	20000	10000	ug/L			04/28/23 15:55	20

Method: SW846 6010D - Metals (ICP) - Total Recoverable

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1200		56	28	ug/L		04/27/23 11:15	04/27/23 16:56	1

Method: SW846 6010D - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron, Dissolved	1100		56	28	ug/L		04/27/23 11:15	04/27/23 16:52	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon (SM 5310C)	4000		2000	1000	ug/L			05/03/23 23:04	1

Client Sample ID: MLPV-TB03-20230426 Lab Sample ID: 670-18637-4

Date Collected: 04/26/23 08:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			04/27/23 18:10	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			04/27/23 18:10	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/27/23 18:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*04/27/23 18:10*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*04/27/23 18:10*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*04/27/23 18:10*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Former HS2

Job ID: 670-18637-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
670-18558-A-2 MS	Matrix Spike	106	96	104
670-18558-B-1 DU	Duplicate	99	96	103
670-18637-1	MLPV-IW0036-042.5-20230426	103	102	101
670-18637-2	MLPV-IW0038-035.0-20230426	103	94	105
670-18637-3 - DL	MLPV-IW0039-045.0-20230426	102	101	103
670-18637-4	MLPV-TB03-20230426	100	95	101
LCS 670-32173/4	Lab Control Sample	103	98	101
MB 670-32173/7	Method Blank	106	95	101

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-32173/7
Matrix: Water
Analysis Batch: 32173

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			04/27/23 12:31	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			04/27/23 12:31	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/27/23 12:31	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*40 - 146*		*04/27/23 12:31*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*04/27/23 12:31*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*04/27/23 12:31*	*1*

Lab Sample ID: LCS 670-32173/4
Matrix: Water
Analysis Batch: 32173

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	19.3		ug/L		97	56 - 128		
trans-1,2-Dichloroethene			20.0	20.1		ug/L		101	54 - 134		
Vinyl chloride			20.0	20.3		ug/L		101	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

Lab Sample ID: 670-18558-A-2 MS
Matrix: Water
Analysis Batch: 32173

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	23.2		ug/L		116	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	23.3		ug/L		117	54 - 134		
Vinyl chloride	0.71	U	20.0	24.3		ug/L		121	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*106*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*104*		*53 - 146*

Lab Sample ID: 670-18558-B-1 DU
Matrix: Water
Analysis Batch: 32173

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-18558-B-1 DU
Matrix: Water
Analysis Batch: 32173

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*103*		*53 - 146*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 400-624017/3
Matrix: Water
Analysis Batch: 624017

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	0.50	U	1.0	0.50	ug/L			05/09/23 09:22	1
Ethane	0.75	U	1.0	0.75	ug/L			05/09/23 09:22	1
Ethene	0.55	U	1.0	0.55	ug/L			05/09/23 09:22	1

Lab Sample ID: LCS 400-624017/4
Matrix: Water
Analysis Batch: 624017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	389	419		ug/L		108	82 - 117
Ethane	736	817		ug/L		111	85 - 116
Ethene	687	755		ug/L		110	83 - 121

Lab Sample ID: LCSD 400-624017/5
Matrix: Water
Analysis Batch: 624017

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	389	424		ug/L		109	82 - 117	1	20
Ethane	736	833		ug/L		113	85 - 116	2	20
Ethene	687	769		ug/L		112	83 - 121	2	20

Lab Sample ID: 400-236819-D-1 DU
Matrix: Water
Analysis Batch: 624017

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Methane	7000	L	7740	L	ug/L		10	20
Ethane	0.75	U	0.75	U	ug/L		NC	20
Ethene	2.0		2.68	J3	ug/L		30	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-32412/6
Matrix: Water
Analysis Batch: 32412

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	500	U	1000	500	ug/L			04/28/23 12:41	1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: LCS 670-32412/1004
Matrix: Water
Analysis Batch: 32412

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Sulfate			4000	4070		ug/L		102	90 - 110		

Lab Sample ID: LCSD 670-32412/5
Matrix: Water
Analysis Batch: 32412

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfate			4000	3980	J3	ug/L		99	90 - 110	200	20

Lab Sample ID: 670-18526-G-1 MS
Matrix: Water
Analysis Batch: 32412

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Sulfate	35000	J3	5000	40100		ug/L		93	80 - 120		

Lab Sample ID: 670-18526-G-1 MSD
Matrix: Water
Analysis Batch: 32412

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Sulfate	35000	J3	5000	40000		ug/L		93	80 - 120	0	20

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 670-32242/3-A
Matrix: Water
Analysis Batch: 32393

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 32242

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	25	U	50	25	ug/L		04/27/23 11:15	04/27/23 16:43	1
Iron, Dissolved	25	U	50	25	ug/L		04/27/23 11:15	04/27/23 16:43	1

Lab Sample ID: LCS 670-32242/1-A
Matrix: Water
Analysis Batch: 32393

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 32242

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Iron			10000	10600		ug/L		106	80 - 120		
Iron, Dissolved			10000	10600		ug/L		106	80 - 120		

Lab Sample ID: LCSD 670-32242/2-A
Matrix: Water
Analysis Batch: 32393

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 32242

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron			10000	10800		ug/L		108	80 - 120	1	20
Iron, Dissolved			10000	10800		ug/L		108	80 - 120	1	20

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 670-18637-3 MS
Matrix: Water
Analysis Batch: 32393

Client Sample ID: MLPV-IW0039-045.0-20230426
Prep Type: Dissolved
Prep Batch: 32242

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	1100		11100	13000		ug/L		117	70 - 120
Iron, Dissolved	1100		11100	13000		ug/L		117	70 - 120

Lab Sample ID: 670-18637-3 MSD
Matrix: Water
Analysis Batch: 32393

Client Sample ID: MLPV-IW0039-045.0-20230426
Prep Type: Dissolved
Prep Batch: 32242

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Iron	1100		11100	13200		ug/L		119	70 - 120	2	20
Iron, Dissolved	1100		11100	13200		ug/L		119	70 - 120	2	20

Method: SM 5310C - TOC

Lab Sample ID: MB 670-33167/7
Matrix: Water
Analysis Batch: 33167

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	1000	U	2000	1000	ug/L			05/03/23 19:52	1

Lab Sample ID: LCS 670-33167/5
Matrix: Water
Analysis Batch: 33167

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	9980	11100		ug/L		111	80 - 120

Lab Sample ID: LCSD 670-33167/6
Matrix: Water
Analysis Batch: 33167

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Organic Carbon	9980	11100		ug/L		111	80 - 120	0	20

Lab Sample ID: 660-128889-H-1 MS
Matrix: Water
Analysis Batch: 33167

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	1000	U J3	9980	3420	J3	ug/L		34	85 - 115

Lab Sample ID: 660-128889-H-1 MSD
Matrix: Water
Analysis Batch: 33167

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Organic Carbon	1000	U J3	9980	3430	J3	ug/L		34	85 - 115	0	20

GC/MS VOA

Analysis Batch: 32173

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-1	MLPV-IW0036-042.5-20230426	Total/NA	Water	8260D	
670-18637-2	MLPV-IW0038-035.0-20230426	Total/NA	Water	8260D	
670-18637-3 - DL	MLPV-IW0039-045.0-20230426	Total/NA	Water	8260D	
670-18637-4	MLPV-TB03-20230426	Total/NA	Water	8260D	
MB 670-32173/7	Method Blank	Total/NA	Water	8260D	
LCS 670-32173/4	Lab Control Sample	Total/NA	Water	8260D	
670-18558-A-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-18558-B-1 DU	Duplicate	Total/NA	Water	8260D	

GC VOA

Analysis Batch: 624017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-2	MLPV-IW0038-035.0-20230426	Total/NA	Water	RSK-175	
670-18637-3	MLPV-IW0039-045.0-20230426	Total/NA	Water	RSK-175	
MB 400-624017/3	Method Blank	Total/NA	Water	RSK-175	
LCS 400-624017/4	Lab Control Sample	Total/NA	Water	RSK-175	
LCSD 400-624017/5	Lab Control Sample Dup	Total/NA	Water	RSK-175	
400-236819-D-1 DU	Duplicate	Total/NA	Water	RSK-175	

HPLC/IC

Analysis Batch: 32412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-2	MLPV-IW0038-035.0-20230426	Total/NA	Water	300.0	
670-18637-3	MLPV-IW0039-045.0-20230426	Total/NA	Water	300.0	
MB 670-32412/6	Method Blank	Total/NA	Water	300.0	
LCS 670-32412/1004	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-32412/5	Lab Control Sample Dup	Total/NA	Water	300.0	
670-18526-G-1 MS	Matrix Spike	Total/NA	Water	300.0	
670-18526-G-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

Metals

Prep Batch: 32242

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-2	MLPV-IW0038-035.0-20230426	Dissolved	Water	3005A	
670-18637-2	MLPV-IW0038-035.0-20230426	Total Recoverable	Water	3005A	
670-18637-3	MLPV-IW0039-045.0-20230426	Dissolved	Water	3005A	
670-18637-3	MLPV-IW0039-045.0-20230426	Total Recoverable	Water	3005A	
MB 670-32242/3-A	Method Blank	Total Recoverable	Water	3005A	
LCS 670-32242/1-A	Lab Control Sample	Total Recoverable	Water	3005A	
LCSD 670-32242/2-A	Lab Control Sample Dup	Total Recoverable	Water	3005A	
670-18637-3 MS	MLPV-IW0039-045.0-20230426	Dissolved	Water	3005A	
670-18637-3 MSD	MLPV-IW0039-045.0-20230426	Dissolved	Water	3005A	

Analysis Batch: 32393

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-2	MLPV-IW0038-035.0-20230426	Dissolved	Water	6010D	32242
670-18637-2	MLPV-IW0038-035.0-20230426	Total Recoverable	Water	6010D	32242
670-18637-3	MLPV-IW0039-045.0-20230426	Dissolved	Water	6010D	32242
670-18637-3	MLPV-IW0039-045.0-20230426	Total Recoverable	Water	6010D	32242

Metals (Continued)

Analysis Batch: 32393 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 670-32242/3-A	Method Blank	Total Recoverable	Water	6010D	32242
LCS 670-32242/1-A	Lab Control Sample	Total Recoverable	Water	6010D	32242
LCSD 670-32242/2-A	Lab Control Sample Dup	Total Recoverable	Water	6010D	32242
670-18637-3 MS	MLPV-IW0039-045.0-20230426	Dissolved	Water	6010D	32242
670-18637-3 MSD	MLPV-IW0039-045.0-20230426	Dissolved	Water	6010D	32242

General Chemistry

Analysis Batch: 33167

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18637-2	MLPV-IW0038-035.0-20230426	Total/NA	Water	SM 5310C	
670-18637-3	MLPV-IW0039-045.0-20230426	Total/NA	Water	SM 5310C	
MB 670-33167/7	Method Blank	Total/NA	Water	SM 5310C	
LCS 670-33167/5	Lab Control Sample	Total/NA	Water	SM 5310C	
LCSD 670-33167/6	Lab Control Sample Dup	Total/NA	Water	SM 5310C	
660-128889-H-1 MS	Matrix Spike	Total/NA	Water	SM 5310C	
660-128889-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310C	

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-18637-1
Project/Site: NASA KSC MLPV - Former HS2

Client Sample ID: MLPV-IW0036-042.5-20230426
Lab Sample ID: 670-18637-1
Date Collected: 04/26/23 15:15
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	32173	ES	EET ORL	04/27/23 18:27

Client Sample ID: MLPV-IW0038-035.0-20230426
Lab Sample ID: 670-18637-2
Date Collected: 04/26/23 15:55
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	32173	ES	EET ORL	04/27/23 18:44
Total/NA	Analysis	RSK-175		1	624017	BJ	EET PEN	05/09/23 10:40
Total/NA	Analysis	300.0		5	32412	YS	EET ORL	04/28/23 15:34
Dissolved	Prep	3005A			32242	JR	EET ORL	04/27/23 11:15
Dissolved	Analysis	6010D		1	32393	NR	EET ORL	04/27/23 17:02
Total Recoverable	Prep	3005A			32242	JR	EET ORL	04/27/23 11:15
Total Recoverable	Analysis	6010D		1	32393	NR	EET ORL	04/27/23 16:59
Total/NA	Analysis	SM 5310C		1	33167	PW	EET ORL	05/03/23 22:42

Client Sample ID: MLPV-IW0039-045.0-20230426
Lab Sample ID: 670-18637-3
Date Collected: 04/26/23 15:43
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	5	32173	ES	EET ORL	04/27/23 19:03
Total/NA	Analysis	RSK-175		1	624017	BJ	EET PEN	05/09/23 10:50
Total/NA	Analysis	300.0		20	32412	YS	EET ORL	04/28/23 15:55
Dissolved	Prep	3005A			32242	JR	EET ORL	04/27/23 11:15
Dissolved	Analysis	6010D		1	32393	NR	EET ORL	04/27/23 16:52
Total Recoverable	Prep	3005A			32242	JR	EET ORL	04/27/23 11:15
Total Recoverable	Analysis	6010D		1	32393	NR	EET ORL	04/27/23 16:56
Total/NA	Analysis	SM 5310C		1	33167	PW	EET ORL	05/03/23 23:04

Client Sample ID: MLPV-TB03-20230426
Lab Sample ID: 670-18637-4
Date Collected: 04/26/23 08:00
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	32173	ES	EET ORL	04/27/23 18:10

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-18637-1
Project/Site: NASA KSC MLPV - Former HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-24

Laboratory: Eurofins Pensacola

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	40150	06-30-23
ANAB	ISO/IEC 17025	L2471	02-22-26
Arkansas DEQ	State	88-0689	09-01-23
California	State	2510	06-30-23
Florida	NELAP	E81010	06-30-23
Georgia	State	E81010(FL)	06-30-23
Illinois	NELAP	200041	10-09-23
Kansas	NELAP	E-10253	10-31-23
Kentucky (UST)	State	53	06-30-23
Louisiana (All)	NELAP	30976	06-30-23
Louisiana (DW)	State	LA017	12-31-23
Maryland	State	233	09-30-23
Michigan	State	9912	06-30-23
North Carolina (WW/SW)	State	314	12-31-23
Oklahoma	NELAP	9810	08-31-23
Pennsylvania	NELAP	68-00467	01-31-24
South Carolina	State	96026	06-30-23
Tennessee	State	TN02907	06-30-23
Texas	NELAP	T104704286	09-30-23
US Fish & Wildlife	US Federal Programs	A22340	06-30-23
USDA	US Federal Programs	FLGNV23001	01-08-26
USDA	US Federal Programs	P330-21-00056	05-17-24
Virginia	NELAP	460166	06-14-23
West Virginia DEP	State	136	03-31-24

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Former HS2

Job ID: 670-18637-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
RSK-175	Dissolved Gases (GC)	RSK	EET PEN
300.0	Anions, Ion Chromatography	EPA	EET ORL
6010D	Metals (ICP)	SW846	EET ORL
SM 5310C	TOC	SM	EET ORL
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

EPA = US Environmental Protection Agency

RSK = Sample Prep And Calculations For Dissolved Gas Analysis In Water Samples Using A GC Headspace Equilibration Technique, RSKSOP-175, Rev. 0, 8/11/94, USEPA Research Lab

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

EET PEN = Eurofins Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Former HS2

Job ID: 670-18637-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-18637-1	MLPV-IW0036-042.5-20230426	Water	04/26/23 15:15	04/26/23 18:08
670-18637-2	MLPV-IW0038-035.0-20230426	Water	04/26/23 15:55	04/26/23 18:08
670-18637-3	MLPV-IW0039-045.0-20230426	Water	04/26/23 15:43	04/26/23 18:08
670-18637-4	MLPV-TB03-20230426	Water	04/26/23 08:00	04/26/23 18:08

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of 1 PO	
Site Location: Former Hot Spot 2	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075 AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Patrick Bendle 724-591-6324, Devin Kehoe 9419-943-3797	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B	300 ORGFM 28D Sulfate (4 DEG C)	6010 D Iron (HNO3)	6010 D Iron, Dissolved (HNO3)	5310C-TOC (H2SO4)	Comments
	MLPV-IW0036-042.5-20230426	MLPV-IW0036	20230426	1531 1515 PB	WG	N	G	3	3					
	MLPV-IW0038-035.0-20230426	MLPV-IW0038	20230426	1555	WG	N	G	8 3 PB	3	2 PB	1	1	2	SHORT HOLD 24 hr
	MLPV-IW0039-045.0-20230426	MLPV-IW0039	20230426	1543	WG	N	G	8 3 PB	3	1 PB	1	1	2	SHORT HOLD 24 hr
	MLPV-TB03-20230426	MLPV-TB03	20230426	800	WQ	TB	G	2	2					

670-18637 Chain of Custody

***Field* Comments:** 38,39 short hold 24 HR
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment: 1

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		4/26/23	1808	MC	4/26/23	18:08
2						
3						

Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: **AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

12.4/11.9

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-8415.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 1
Company: Eurofins Environment Testing Southeast,		Accreditations Required (See note): NELAP - Florida		Job #: 670-18637-1
Address: 3355 McLemore Drive, ,	Due Date Requested: 5/5/2023			
City: Pensacola	TAT Requested (days):			
State, Zip: FL, 32514				
Phone: 850-474-1001(Tel) 850-478-2671(Fax)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV - Former HS2	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ MEE (Dissolved Gases)	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MLPV-IW0038-035.0-20230426 (670-18637-2)	4/26/23	15:55 Eastern		Water			X	3	
MLPV-IW0039-045.0-20230426 (670-18637-3)	4/26/23	15:43 Eastern		Water			X	3	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				4-29-23 744	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 3-C IR10

Ver: 06/08/2021

5/10/2023

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-18637-1

Login Number: 18637
List Number: 1
Creator: Clerisier, Meline

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-18637-1

Login Number: 18637
List Number: 2
Creator: Peckinpaugh, Marshall

List Source: Eurofins Pensacola
List Creation: 04/29/23 10:45 AM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.0°C IR10
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/23/2023 4:35:53 PM

JOB DESCRIPTION

NASA KSC MLPV HS2

JOB NUMBER

670-16007-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Authorized for release by
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Definitions/Glossary

Client: AECOM Technical Services Inc.
Job ID: 670-16007-1
Project/Site: NASA KSC MLPV HS2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16007-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16007-1

Receipt
The samples were received on 3/9/2023 3:00 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.5°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0041-045.0-20230309 (670-16007-10). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Client Sample ID: MLPV-IW0035-045.0-20230309 — Lab Sample ID: 670-16007-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.1		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	78		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0040-035.0-20230309 — Lab Sample ID: 670-16007-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.93	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	0.72	I	1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0034-035.0-20230309 — Lab Sample ID: 670-16007-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.54	I	1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0041-045.0-20230309 — Lab Sample ID: 670-16007-10

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	53		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	1.4		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride - DL	130		10	7.1	ug/L	10		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0035-045.0-20230309

Lab Sample ID: 670-16007-1

Date Collected: 03/09/23 11:55

Matrix: Water

Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	2.1		1.0	0.53	ug/L			03/23/23 12:34	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:34	1
Vinyl chloride	78		1.0	0.71	ug/L			03/23/23 12:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 12:34*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/23/23 12:34*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*03/23/23 12:34*	*1*

Client Sample ID: MLPV-IW0040-035.0-20230309

Lab Sample ID: 670-16007-2

Date Collected: 03/09/23 12:50

Matrix: Water

Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.93	I	1.0	0.53	ug/L			03/22/23 14:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 14:16	1
Vinyl chloride	0.72	I	1.0	0.71	ug/L			03/22/23 14:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/22/23 14:16*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/22/23 14:16*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 14:16*	*1*

Client Sample ID: MLPV-IW0034-035.0-20230309

Lab Sample ID: 670-16007-3

Date Collected: 03/09/23 11:08

Matrix: Water

Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.54	I	1.0	0.53	ug/L			03/22/23 14:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 14:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 14:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 14:50*	*1*
Dibromofluoromethane (Surr)	*108*		*53 - 146*		*03/22/23 14:50*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/22/23 14:50*	*1*

Client Sample ID: MLPV-IW0041-045.0-20230309

Lab Sample ID: 670-16007-10

Date Collected: 03/09/23 13:21

Matrix: Water

Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	53		1.0	0.53	ug/L			03/23/23 14:04	1
trans-1,2-Dichloroethene	1.4		1.0	0.73	ug/L			03/23/23 14:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/23/23 14:04*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*03/23/23 14:04*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/23/23 14:04*	*1*

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Client Sample ID: MLPV-IW0041-045.0-20230309
Date Collected: 03/09/23 13:21
Date Received: 03/09/23 15:00

Lab Sample ID: 670-16007-10
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	130		10	7.1	ug/L			03/23/23 15:37	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/23/23 15:37*	*10*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/23/23 15:37*	*10*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/23/23 15:37*	*10*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16007-1	MLPV-IW0035-045.0-20230309	103	102	103
670-16007-1 DU	MLPV-IW0035-045.0-20230309	102	103	98
670-16007-2	MLPV-IW0040-035.0-20230309	99	106	93
670-16007-2 DU	MLPV-IW0040-035.0-20230309	100	107	95
670-16007-3	MLPV-IW0034-035.0-20230309	100	108	96
670-16007-3 MS	MLPV-IW0034-035.0-20230309	97	100	98
670-16007-10	MLPV-IW0041-045.0-20230309	102	107	101
670-16007-10 - DL	MLPV-IW0041-045.0-20230309	102	106	96
670-16007-C-5 MS	Matrix Spike	100	106	95
LCS 670-27214/5	Lab Control Sample	100	97	99
LCS 670-27383/6	Lab Control Sample	110	110	99
MB 670-27214/8	Method Blank	98	105	94
MB 670-27383/9	Method Blank	103	103	99

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27214/8
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 13:47	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:47	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 13:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/22/23 13:47*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/22/23 13:47*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*03/22/23 13:47*	*1*

Lab Sample ID: LCS 670-27214/5
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.9		ug/L		94	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Vinyl chloride			20.0	20.0		ug/L		100	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*97*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16007-3 MS
Matrix: Water
Analysis Batch: 27214

Client Sample ID: MLPV-IW0034-035.0-20230309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.54	I	20.0	22.9		ug/L		112	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	22.6		ug/L		113	54 - 134		
Vinyl chloride	0.71	U	20.0	27.6		ug/L		138	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*

Lab Sample ID: 670-16007-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: MLPV-IW0040-035.0-20230309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.93	I		0.965	I	ug/L				4	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.72	I		0.863	I	ug/L				18	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: MLPV-IW0040-035.0-20230309
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*107*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Lab Sample ID: MB 670-27383/9
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 12:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 12:16	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 12:16*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/23/23 12:16*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/23/23 12:16*	*1*

Lab Sample ID: LCS 670-27383/6
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	20.8		ug/L		104	54 - 134
Vinyl chloride	20.0	23.1		ug/L		116	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*110*		*40 - 146*
Dibromofluoromethane (Surr)	*110*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16007-C-5 MS
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.7		100	82.9		ug/L		77	56 - 128
trans-1,2-Dichloroethene	3.7	U	100	82.6		ug/L		83	54 - 134
Vinyl chloride	90		100	199		ug/L		108	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*106*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-1 DU
Matrix: Water
Analysis Batch: 27383

Client Sample ID: MLPV-IW0035-045.0-20230309
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	2.1			1.63		ug/L				24	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	78			73.4		ug/L				6	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

GC/MS VOA

Analysis Batch: 27214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-2	MLPV-IW0040-035.0-20230309	Total/NA	Water	8260D	
670-16007-3	MLPV-IW0034-035.0-20230309	Total/NA	Water	8260D	
MB 670-27214/8	Method Blank	Total/NA	Water	8260D	
LCS 670-27214/5	Lab Control Sample	Total/NA	Water	8260D	
670-16007-3 MS	MLPV-IW0034-035.0-20230309	Total/NA	Water	8260D	
670-16007-2 DU	MLPV-IW0040-035.0-20230309	Total/NA	Water	8260D	

Analysis Batch: 27383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-1	MLPV-IW0035-045.0-20230309	Total/NA	Water	8260D	
670-16007-10	MLPV-IW0041-045.0-20230309	Total/NA	Water	8260D	
670-16007-10 - DL	MLPV-IW0041-045.0-20230309	Total/NA	Water	8260D	
MB 670-27383/9	Method Blank	Total/NA	Water	8260D	
LCS 670-27383/6	Lab Control Sample	Total/NA	Water	8260D	
670-16007-C-5 MS	Matrix Spike	Total/NA	Water	8260D	
670-16007-1 DU	MLPV-IW0035-045.0-20230309	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Client Sample ID: MLPV-IW0035-045.0-20230309
Lab Sample ID: 670-16007-1
Date Collected: 03/09/23 11:55
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 12:34

Client Sample ID: MLPV-IW0040-035.0-20230309
Lab Sample ID: 670-16007-2
Date Collected: 03/09/23 12:50
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 14:16

Client Sample ID: MLPV-IW0034-035.0-20230309
Lab Sample ID: 670-16007-3
Date Collected: 03/09/23 11:08
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 14:50

Client Sample ID: MLPV-IW0041-045.0-20230309
Lab Sample ID: 670-16007-10
Date Collected: 03/09/23 13:21
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 14:04
Total/NA	Analysis	8260D	DL	10	27383	KG	EET ORL	03/23/23 15:37

Laboratory References:
EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16007-1
Project/Site: NASA KSC MLPV HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16007-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16007-1	MLPV-IW0035-045.0-20230309	Water	03/09/23 11:55	03/09/23 15:00
670-16007-2	MLPV-IW0040-035.0-20230309	Water	03/09/23 12:50	03/09/23 15:00
670-16007-3	MLPV-IW0034-035.0-20230309	Water	03/09/23 11:08	03/09/23 15:00
670-16007-10	MLPV-IW0041-045.0-20230309	Water	03/09/23 13:21	03/09/23 15:00

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 3
Site Location: Biosparge Area 1/VAB/Hot Spot 2/ West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
		Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)	

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl / Total No. of Containers	Select VOCs by SW8260B	Comments
	MLPV-IW0057 35-045.0-20230309	MLPV-IW0057	20230309	1155	WG	N	G	3	3	
	MLPV-IW0058 40-035.0-20230309	MLPV-IW0058	20230309	1250	WG	N	G	3	3	
	MLPV-IW0059 34-035.0-20230309	MLPV-IW0059	20230309	1108	WG	N	G	3	3	
	MLPV-IW0060 10-052.5-20230307	MLPV-IW0060	20230309	0846	WG	N	G	3	3	
	MLPV-ASMW0004 IW0058 - 47.5-20230321	MLPV-ASMW0004	20230309	0909	WG	N	G	3	3	
	MLPV-ASMW0005 - 047.5-20230307	MLPV-ASMW0005	20230309	1058	WG	N	G	3	3	
	MLPV-ASMW0006 - 037.5-20230307	MLPV-ASMW0006	20230309	1015	WG	N	G	3	3	
	MLPV-IW0031 27I-032.5-20230309	MLPV-IW0031	20230309	1137	WG	N	G	3	3	
	MLPV-IW0061 - 045.0-20230307	MLPV-IW0061	20230309	0937	WG	N	G	3	3	
	MLPV-IW0062 41-045.0-20230309	MLPV-IW0062	20230309	1321	WG	N	G	3	3	
	MLPV-IW0063 51-50-20230309	MLPV-IW0063	20230309	1033	WG	N	G	3	3	
	MLPV-IW0064 52-045.0-20230309	MLPV-IW0064	20230309	1302	WG	N	G	3	3	



***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Duncan	3/9/23	1500	James W Driggers	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0/2.5

3/23/2023

SO 58215

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 2 of 3
Site Location: Biosparge Area 1/VAB1/Hot Spot 2/West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA #	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl										Comments
	MLPV-~~IW0006IR~~ MW0100-D-20230307	MLPV-IW006IR	20230307	1239	WG	N	G	3	3										
	MLPV-IW0028I 59-47.5-20230307	MLPV-IW0028I	20230307	0951	WG	N	G	3	3										
	WCPS-IW0015R-7.5-20230307 MLPV-~~IW0046~~	MLPV-IW0046	20230307	1318	WG	N	G	3	3										
	MLPV-TB02	MLPV-TB02	20230307		WQ	TB	G	2	2										
	MLPV-MW0108-037.5-20230307		20230307	0912															
	MLPV-MW0077-037.5-20230307		20230307	1004	WG	N	G	3	3										
	MLPV-VAB-IW0005D-54.5-20230307		20230307	1302	WG	N	G	3	3										
	MLPV-MW0084-52-20230307		20230307	0942	WG	N	G	3	3										
	MLPV-MW0085-52-20230307		20230307	1123	WG	N	G	3	3										
	PRES-IW0007-45-20230307		20230307	1201	WG	N	G	3	3										
	WCPS-IW0025R-6-20230307		20230307	1208	WG	N	G	3	3										
	MLPV-IW0047-37.5-20230307		20230307	1031	WG	N	G	3	3										

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Meagan Dunkle	3/9/23	1500	Jamall Gregory	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0 / 2.5

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 3 of 3
Site Location: Former Hot Spot 2 (Biosparge Area / JAB West Crawler Pit)		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 / Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	MLPV-[illegible]-0320-20230309	MLPV-IW0011I	20230309		WG	N	G	3	3	
	MLPV-IW0032	MLPV-IW0032	202303		WG	N	G	3	3	
	MLPV-IW0033	MLPV-IW0033	202303		WG	N	G	3	3	
	MLPV-IW0034	MLPV-IW0034	202303		WG	N	G	3	3	
	MLPV-IW0035	MLPV-IW0035	202303		WG	N	G	3	3	
	MLPV-IW0036	MLPV-IW0036	202303		WG	N	G	3	3	
	MLPV-IW0037	MLPV-IW0037	202303		WG	N	G	3	3	
	MLPV-IW0038	MLPV-IW0038	202303		WG	N	G	3	3	
	MLPV-IW0039	MLPV-IW0039	202303		WG	N	G	3	3	
	MLPV-IW0040	MLPV-IW0040	202303		WG	N	G	3	3	
	MLPV-IW0041	MLPV-IW0041	202303		WG	N	G	3	3	
	MLPV-IW0042	MLPV-IW0042	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Dunkle	3/9/23	1500	Janet W Gregory	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

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(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphonic acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3,0/2,5

3/23/2023

SD 5824

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16007-1

Login Number: 16007
List Number: 1
Creator: Bittle, David W

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/30/2023 5:09:59 PM Revision 2

JOB DESCRIPTION

NASA KSC MLPV HS2

JOB NUMBER

670-16083-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

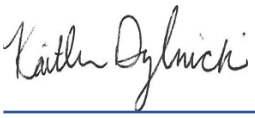
my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Generated
3/30/2023 5:09:59 PM
Revision 2

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

Table of Contents

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Surrogate Summary 9
QC Sample Results 10
QC Association Summary 17
Lab Chronicle 18
Certification Summary 19
Method Summary 20
Sample Summary 21
Chain of Custody 22
Receipt Checklists 24

Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16083-2
Project/Site: NASA KSC MLPV HS2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
Q	Sample held beyond the accepted holding time.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16083-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16083-2

Receipt
The samples were received on 3/10/2023 4:15 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.0º C.

Revision
The report being provided is a revision of the original report sent on 3/28/2023. The report (revision 2) is being revised due to: update of QC section to include target analytes for 670-16220-E-6 MS that were not originally reported..

Report revision history
Revision 1 - 3/28/2023 - Reason: Report (revision 1) is being revised due to: update of narrative to include comments for MLPV-IW0037-045.0-20230309 (670-16083-11) reanalyzed out of hold..

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 670-27165 recovered above the upper control limit for Vinyl chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCVIS 670-27165/3).

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-27165 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8260D: Surrogate recovery for Dibromofluoromethane for the following sample was high just outside the upper control limit: (670-16141-C-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

Method 8260D: Initial analysis was analyzed in hold. Results for select target analytes were over the calibration range of the instrument. Sample was reanalyzed at a dilution. Reanalysis of the following sample(s) was performed outside of the analytical holding time: MLPV-IW0038-035.0-20230310 (670-16083-2), MLPV-IW0037-045.0-20230309 (670-16083-11).

Method 8260D: The matrix duplicate (DUP) recoveries and precision for analytical batch 670-27165 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample and matrix spike precision was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Client Sample ID: MLPV-IW0038-035.0-20230310 — Lab Sample ID: 670-16083-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	150	Q	10	5.3	ug/L	10		8260D	Total/NA
trans-1,2-Dichloroethene	4.4		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	270	Q	10	7.1	ug/L	10		8260D	Total/NA

Client Sample ID: MLPV-IW0011I-037.5-20230309 — Lab Sample ID: 670-16083-6

No Detections.

Client Sample ID: MLPV-IW0039-045.0-20230310 — Lab Sample ID: 670-16083-8

No Detections.

Client Sample ID: MLPV-IW0037-045.0-20230309 — Lab Sample ID: 670-16083-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	79	Q	10	5.3	ug/L	10		8260D	Total/NA
Vinyl chloride	170	Q	10	7.1	ug/L	10		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0038-035.0-20230310

Lab Sample ID: 670-16083-2
Date Collected: 03/10/23 08:56
Matrix: Water
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**150**	**Q**	10	5.3	ug/L			03/27/23 17:16	10
trans-1,2-Dichloroethene	**4.4**		1.0	0.73	ug/L			03/21/23 18:51	1
Vinyl chloride	**270**	**Q**	10	7.1	ug/L			03/27/23 17:16	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/21/23 18:51*	*1*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 17:16*	*10*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 18:51*	*1*
Dibromofluoromethane (Surr)	*98*		*53 - 146*		*03/27/23 17:16*	*10*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/21/23 18:51*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/27/23 17:16*	*10*

Client Sample ID: MLPV-IW0011I-037.5-20230309

Lab Sample ID: 670-16083-6
Date Collected: 03/09/23 13:58
Matrix: Water
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 19:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 19:46	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 19:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/21/23 19:46*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 19:46*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/21/23 19:46*	*1*

Client Sample ID: MLPV-IW0039-045.0-20230310

Lab Sample ID: 670-16083-8
Date Collected: 03/10/23 08:49
Matrix: Water
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 22:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 22:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 22:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/21/23 22:50*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 22:50*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/21/23 22:50*	*1*

Client Sample ID: MLPV-IW0037-045.0-20230309

Lab Sample ID: 670-16083-11
Date Collected: 03/09/23 14:25
Matrix: Water
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**79**	**Q**	10	5.3	ug/L			03/24/23 01:21	10
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:57	1
Vinyl chloride	**170**	**Q**	10	7.1	ug/L			03/24/23 01:21	10

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Client Sample ID: MLPV-IW0037-045.0-20230309
Date Collected: 03/09/23 14:25
Date Received: 03/10/23 16:15

Lab Sample ID: 670-16083-11
Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		03/22/23 13:57	1
Toluene-d8 (Surr)	104		40 - 146		03/24/23 01:21	10
Dibromofluoromethane (Surr)	99		53 - 146		03/22/23 13:57	1
Dibromofluoromethane (Surr)	104		53 - 146		03/24/23 01:21	10
4-Bromofluorobenzene (Surr)	92		41 - 142		03/22/23 13:57	1
4-Bromofluorobenzene (Surr)	90		41 - 142		03/24/23 01:21	10

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146		03/23/23 20:22	1
Dibromofluoromethane (Surr)	105		53 - 146		03/23/23 20:22	1
4-Bromofluorobenzene (Surr)	92		41 - 142		03/23/23 20:22	1

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
400-234398-A-11 DU	Duplicate	103	100	99
400-234398-B-11 MS - DL	Matrix Spike	100	100	85
670-16001-E-3 MS	Matrix Spike	99	99	85
670-16083-2	MLPV-IW0038-035.0-20230310	102	102	93
670-16083-2	MLPV-IW0038-035.0-20230310	100	98	97
670-16083-6	MLPV-IW0011I-037.5-20230309	103	102	95
670-16083-8	MLPV-IW0039-045.0-20230310	105	102	98
670-16083-8 DU	MLPV-IW0039-045.0-20230310	103	101	94
670-16083-11	MLPV-IW0037-045.0-20230309	101	99	92
670-16083-11 - DL	MLPV-IW0037-045.0-20230309	102	105	92
670-16083-11	MLPV-IW0037-045.0-20230309	104	104	90
670-16083-C-13 DU	Duplicate	104	102	92
670-16083-C-14 MS - DL	Matrix Spike	100	101	85
670-16141-A-8 MS	Matrix Spike	100	103	90
670-16141-C-7 DU	Duplicate	100	100	96
670-16220-E-6 MS	Matrix Spike	101	102	84
670-16220-G-5 DU	Duplicate	104	104	91
670-16325-A-1 DU	Duplicate	101	97	99
670-16325-A-2 MS	Matrix Spike	102	100	92
LCS 670-27061/4	Lab Control Sample	103	100	93
LCS 670-27165/4	Lab Control Sample	101	100	90
LCS 670-27218/4	Lab Control Sample	101	101	91
LCS 670-27396/4	Lab Control Sample	99	102	86
LCS 670-27483/4	Lab Control Sample	101	104	85
LCS 670-27765/4	Lab Control Sample	103	99	99
MB 670-27061/7	Method Blank	101	99	97
MB 670-27165/7	Method Blank	101	101	95
MB 670-27218/7	Method Blank	101	100	93
MB 670-27396/7	Method Blank	100	102	91
MB 670-27483/7	Method Blank	102	103	92
MB 670-27765/7	Method Blank	100	102	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27061/7
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 12:54	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 12:54	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 12:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/21/23 12:54*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*03/21/23 12:54*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/21/23 12:54*	*1*

Lab Sample ID: LCS 670-27061/4
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	17.4		ug/L		87	56 - 128		
trans-1,2-Dichloroethene			20.0	17.9		ug/L		90	54 - 134		
Vinyl chloride			20.0	22.6		ug/L		113	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*

Lab Sample ID: 670-16325-A-2 MS
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	5.3	U	200	216		ug/L		108	56 - 128		
trans-1,2-Dichloroethene	7.3	U	200	222		ug/L		111	54 - 134		
Vinyl chloride	7.1	U	200	319		ug/L		160	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*

Lab Sample ID: 670-16325-A-1 DU
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16325-A-1 DU
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*97*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: MB 670-27165/7
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 22:32	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 22:32	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 22:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/21/23 22:32*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 22:32*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/21/23 22:32*	*1*

Lab Sample ID: LCS 670-27165/4
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.6		ug/L		93	56 - 128		
trans-1,2-Dichloroethene			20.0	18.8		ug/L		94	54 - 134		
Vinyl chloride			20.0	22.1		ug/L		110	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16083-8 DU
Matrix: Water
Analysis Batch: 27165

Client Sample ID: MLPV-IW0039-045.0-20230310
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.802	I	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		1.49		ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 670-27218/7
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 11:17	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 11:17	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 11:17	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 11:17*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/22/23 11:17*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 11:17*	*1*

Lab Sample ID: LCS 670-27218/4
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.1		ug/L		90	56 - 128		
trans-1,2-Dichloroethene			20.0	18.9		ug/L		94	54 - 134		
Vinyl chloride			20.0	25.5		ug/L		127	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*

Lab Sample ID: 670-16001-E-3 MS
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	100		100	217		ug/L		113	56 - 128		
trans-1,2-Dichloroethene	3.7	U	100	122		ug/L		122	54 - 134		
Vinyl chloride	12		100	173		ug/L		161	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*85*		*41 - 142*

Lab Sample ID: 400-234398-A-11 DU
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	240			254		ug/L				4	30
trans-1,2-Dichloroethene	9.4	I		8.94	I	ug/L				5	20
Vinyl chloride	170			184		ug/L				7	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-234398-A-11 DU
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: MB 670-27396/7
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 12:19	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:19	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 12:19	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/23/23 12:19*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/23/23 12:19*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/23/23 12:19*	*1*

Lab Sample ID: LCS 670-27396/4
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	17.3		ug/L		87	56 - 128
trans-1,2-Dichloroethene	20.0	18.2		ug/L		91	54 - 134
Vinyl chloride	20.0	24.4		ug/L		122	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*86*		*41 - 142*

Lab Sample ID: 670-16083-C-13 DU
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
cis-1,2-Dichloroethene	13	U	13	U	ug/L		NC	30
trans-1,2-Dichloroethene	18	U	18	U	ug/L		NC	20
Vinyl chloride	440		18	U	ug/L		NC	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*104*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 670-27483/7
Matrix: Water
Analysis Batch: 27483

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 22:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 22:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 22:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/23/23 22:50*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/23/23 22:50*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/23/23 22:50*	*1*

Lab Sample ID: LCS 670-27483/4
Matrix: Water
Analysis Batch: 27483

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.1		ug/L		91	56 - 128		
trans-1,2-Dichloroethene			20.0	18.5		ug/L		93	54 - 134		
Vinyl chloride			20.0	25.9		ug/L		130	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*104*		*53 - 146*
4-Bromofluorobenzene (Surr)	*85*		*41 - 142*

Lab Sample ID: 670-16220-E-6 MS
Matrix: Water
Analysis Batch: 27483

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	20.9		ug/L		104	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	21.5		ug/L		108	54 - 134		
Vinyl chloride	0.71	U	20.0	30.0		ug/L		150	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*84*		*41 - 142*

Lab Sample ID: 670-16220-G-5 DU
Matrix: Water
Analysis Batch: 27483

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16220-G-5 DU
Matrix: Water
Analysis Batch: 27483

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*104*		*40 - 146*
Dibromofluoromethane (Surr)	*104*		*53 - 146*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*

Lab Sample ID: MB 670-27765/7
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:35	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:35	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:35	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:35*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 12:35*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 12:35*	*1*

Lab Sample ID: LCS 670-27765/4
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	19.2		ug/L		96	54 - 134
Vinyl chloride	20.0	24.9		ug/L		124	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16141-A-8 MS
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	26.2		ug/L		131	54 - 134
Vinyl chloride	0.71	U	20.0	28.2		ug/L		141	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 400-234398-B-11 MS
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	220		200	435		ug/L		108	56 - 128		
trans-1,2-Dichloroethene - DL	7.8	I	200	232		ug/L		112	54 - 134		
Vinyl chloride - DL	160		200	478		ug/L		157	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*100*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*

Lab Sample ID: 670-16083-C-14 MS
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	27	I	1000	1070		ug/L		105	56 - 128		
trans-1,2-Dichloroethene - DL	37	U	1000	1140		ug/L		114	54 - 134		
Vinyl chloride - DL	1000		1000	2590		ug/L		159	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*

GC/MS VOA

Analysis Batch: 27061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-2	MLPV-IW0038-035.0-20230310	Total/NA	Water	8260D	
670-16083-6	MLPV-IW0011I-037.5-20230309	Total/NA	Water	8260D	
MB 670-27061/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27061/4	Lab Control Sample	Total/NA	Water	8260D	
670-16325-A-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-16325-A-1 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-8	MLPV-IW0039-045.0-20230310	Total/NA	Water	8260D	
MB 670-27165/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27165/4	Lab Control Sample	Total/NA	Water	8260D	
400-234398-B-11 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-16083-8 DU	MLPV-IW0039-045.0-20230310	Total/NA	Water	8260D	

Analysis Batch: 27218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-11	MLPV-IW0037-045.0-20230309	Total/NA	Water	8260D	
MB 670-27218/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27218/4	Lab Control Sample	Total/NA	Water	8260D	
670-16001-E-3 MS	Matrix Spike	Total/NA	Water	8260D	
400-234398-A-11 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-11 - DL	MLPV-IW0037-045.0-20230309	Total/NA	Water	8260D	
MB 670-27396/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27396/4	Lab Control Sample	Total/NA	Water	8260D	
670-16083-C-14 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-16083-C-13 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27483

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-11	MLPV-IW0037-045.0-20230309	Total/NA	Water	8260D	
MB 670-27483/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27483/4	Lab Control Sample	Total/NA	Water	8260D	
670-16220-E-6 MS	Matrix Spike	Total/NA	Water	8260D	
670-16220-G-5 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-2	MLPV-IW0038-035.0-20230310	Total/NA	Water	8260D	
MB 670-27765/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27765/4	Lab Control Sample	Total/NA	Water	8260D	
670-16141-A-8 MS	Matrix Spike	Total/NA	Water	8260D	
670-16141-C-7 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Client Sample ID: MLPV-IW0038-035.0-20230310
Lab Sample ID: 670-16083-2
Date Collected: 03/10/23 08:56
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		10	27765	ES	EET ORL	03/27/23 17:16
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 18:51

Client Sample ID: MLPV-IW0011I-037.5-20230309
Lab Sample ID: 670-16083-6
Date Collected: 03/09/23 13:58
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 19:46

Client Sample ID: MLPV-IW0039-045.0-20230310
Lab Sample ID: 670-16083-8
Date Collected: 03/10/23 08:49
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27165	T1Y	EET ORL	03/21/23 22:50

Client Sample ID: MLPV-IW0037-045.0-20230309
Lab Sample ID: 670-16083-11
Date Collected: 03/09/23 14:25
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 13:57
Total/NA	Analysis	8260D	DL	1	27396	T1Y	EET ORL	03/23/23 20:22
Total/NA	Analysis	8260D		10	27483	KG	EET ORL	03/24/23 01:21

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16083-2
Project/Site: NASA KSC MLPV HS2

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV HS2

Job ID: 670-16083-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16083-2	MLPV-IW0038-035.0-20230310	Water	03/10/23 08:56	03/10/23 16:15
670-16083-6	MLPV-IW0011I-037.5-20230309	Water	03/09/23 13:58	03/10/23 16:15
670-16083-8	MLPV-IW0039-045.0-20230310	Water	03/10/23 08:49	03/10/23 16:15
670-16083-11	MLPV-IW0037-045.0-20230309	Water	03/09/23 14:25	03/10/23 16:15

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

COC No. | Page: 1 of 2

Project Name: NASA KSC - MLPV | PO No. 148569 | Project No. 60615493.4 | Phase:

Site Location: LCP Monitoring - BSA / Hot Spot 2 / VAB | Send Invoice To: Instructions in MSA | EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings

TO No.: 80KSC019F0075 | AECOM Project Manager: **Linnea King Clark; Caroline Bekins** | Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando | Report to: Jennifer Chastain Cc: Teresa Amentt Jennings

Sampler/Phone # | Caroline Bekins 714-943-9928 | Madan Parsotan 321-696-6000 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-13

Lab Name: Eurofins | Turnaround Time(specify): Standard 14 day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl: Total No. of Containers	(3) HCl: Select VOCs by SW8260B	Comments
	WCPS-IW0016-020.0-20230309 MLPV-IW0009D	~~MLPV-IW0009D~~	20230309	1348	WG	N	G	3	3	
	MLPV-IW0038-035.0-20230310	~~MLPV-IW0009I~~	20230310	0856	WG	N	G	3	3	
	MW110-035.0-20230309 MLPV-~~IW0012D~~	~~MLPV-IW0012D~~	20230309	1612	WG	N	G	3	3	
	MW109-025.0-20230309 MLPV-~~IW0018D~~	~~MLPV-IW0018D~~	20230309	1536	WG	N	G	3	3	
	MW091-052.5-20230309 MLPV-~~IW0020D~~	~~MLPV-IW0020D~~	20230309	1625	WG	N	G	3	3	
	OUF-037.5-20230309 MLPV-IW~~0029D~~	~~MLPV-IW0029D~~	20230309	1358	WG	N	G	3	3	
	VABU-IW0001I-025.0-20230310 ~~MLPV-IW0047~~	~~MLPV-IW0047~~	20230310	1045	WG	N	G	3	3	
	IW0039-045.0-20230310 MLPV-~~IW0052~~	~~MLPV-IW0052~~	20230310	0849	WG	N	G	3	3	
	WCPS-IW0055-057.5-20230309 ~~MLPV-IW0053~~	~~MLPV-IW0053~~	20230309	1437	WG	N	G	3	3	
	MW101-045.0-20230309 MLPV-~~SAMW0001~~	~~MLPV-SAMW0001~~	20230309	1349	WG	N	G	3	3	
	IW0037-045.0-20230309 MLPV-~~SAMW0003~~	~~MLPV-SAMW0003~~	20230309	1425	WG	N	G	3	3	
	MLPV-MW092-052.5-20230309 ~~PREC-IW0009~~	~~PREC-IW0009~~	20230309	1544	WG	N	G	3	3	

670-16083 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		3-10-23	1453		3/7/23	0730
2				James W Bruggy	3/7/23	1453
3					3/10/23	1615

1.5/1.0°C

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3/30/2023 (Rev. 2)

SS 5829

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 2 of 2
Site Location: LCP Monitoring – BSA / Hot Spot 2 / VAB		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl											Comments
	~~SATV-IW0009I~~ MLPV-MW0102-030.0-20230310	~~SATV-IW0009I~~	202303 10	1159	WG	N	G	3	3											
	~~MLPV-VAB-IW0005D~~ MLPV-MW0103-040.0-20230310	~~MLPV-VAB-IW0005D~~	202303 10	1238	WG	N	G	3	3											
	~~VABU-IW0001I~~ MLPV-MW0105-052.5-20230310	~~VABU-IW0001I~~	202303 10	1106	WG	N	G	3	3											
	~~WCPS-IW0001SR~~ MLPV-MW0106-030.0-20230310	~~WCPS-IW0001SR~~	202303 10	1148	WG	N	G	3	3											
	~~WCPS-IW0015~~ MLPV-MW0107-040.0-20230310	~~WCPS-IW0016~~	202303 10	1105	WG	N	G	3	3											
	MLPV-~~IW0021R~~ MW0104-052.5-20230310	~~MLPV-IW0021R~~	202303 10	1215	WG	N	G	3	3											
	MLPV-IW0001D	**MLPV-IW0001D**	**202303**		**WG**	**N**	**G**	**3**	**3**											
	WCPS-IW0005S	**WCPS-IW0005S**	**202303**		**WG**	**N**	**G**	**3**	**3**											
	WCPS-IW0015S	**WCPS-IW0015S**	**202303**		**WG**	**N**	**G**	**3**	**3**											
	MLPV-IW0027I	**MLPV-IW0027I**	**202303**		**WG**	**N**	**G**	**3**	**3**											
	MLPV-IW0014I	**MLPV-IW0014I**	**202303**		**WG**	**N**	**G**	**3**	**3**											
	MLPV-IW0017I	**MLPV-IW0017I**	**202303**		**WG**	**N**	**G**	**3**	**3**											

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes____ No____
Shipping Company:
Tracking No: 1.5 oc
Date Shipped: 7.0

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		3-10-23	1453		3/7/23	0730
2				James W Gregory	3/10/23	1453
3					3/10/23	1615

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16083-2

Login Number: 16083
List Number: 1
Creator: Ferguson, Craig

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 6/30/2023 3:07:30 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV LCP Monitoring

JOB NUMBER

670-15879-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

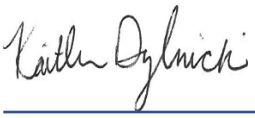
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Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-15879-1
Project/Site: NASA KSC MLPV LCP Monitoring

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-15879-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-15879-1

Revision
The report being provided is a revision of the original report sent on 3/22/2023. The report (revision 1) is being revised to include results for Trichloroethene per client request..

Receipt
The samples were received on 3/8/2023 2:55 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.8°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: (670-15879-A-11). Elevated reporting limits (RLs) are provided.

Method 8260D: The matrix spike duplicate (MSD) recoveries for analytical batch 670-27051 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-27165 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Client Sample ID: MLPV-MW0080-052.0-20230308 — Lab Sample ID: 670-15879-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.71	I	1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0077-030.0-20230308 — Lab Sample ID: 670-15879-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.8		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	1.2		1.0	0.73	ug/L	1		8260D	Total/NA

Client Sample ID: SATV-IW0009I-024.5-20230308 — Lab Sample ID: 670-15879-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	14		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	9.0		1.0	0.73	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0082-040.0-20230308 — Lab Sample ID: 670-15879-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	19		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	7.0		1.0	0.73	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0094-040.0-20230308 — Lab Sample ID: 670-15879-6

No Detections.

Client Sample ID: MLPV-MW0095-030.0-20230308 — Lab Sample ID: 670-15879-7

No Detections.

Client Sample ID: MLPV-MW0083-052.0-20230308 — Lab Sample ID: 670-15879-14

No Detections.

Client Sample ID: MLPV-IW00021R-030.5-20230308 — Lab Sample ID: 670-15879-17

No Detections.

Client Sample ID: MLPV-MW0096-040.0-20230308 — Lab Sample ID: 670-15879-18

No Detections.

Client Sample ID: MLPV-MW0076-052.0-20230308 — Lab Sample ID: 670-15879-20

No Detections.

Client Sample ID: MLPV-MW0079-030.0-20230308 — Lab Sample ID: 670-15879-21

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	6.2		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	3.0		1.0	0.73	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0078-030.0-20230308 — Lab Sample ID: 670-15879-22

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.74	I	1.0	0.53	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-MW0080-052.0-20230308 Lab Sample ID: 670-15879-1

Date Collected: 03/08/23 12:30 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.71**	**I**	1.0	0.53	ug/L			03/21/23 14:31	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 14:31	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 14:31	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 14:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/21/23 14:31*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 14:31*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*03/21/23 14:31*	*1*

Client Sample ID: MLPV-MW0077-030.0-20230308 Lab Sample ID: 670-15879-2

Date Collected: 03/08/23 13:27 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.8**		1.0	0.53	ug/L			03/21/23 14:49	1
trans-1,2-Dichloroethene	**1.2**		1.0	0.73	ug/L			03/21/23 14:49	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 14:49	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 14:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*40 - 146*		*03/21/23 14:49*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/21/23 14:49*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/21/23 14:49*	*1*

Client Sample ID: SATV-IW0009I-024.5-20230308 Lab Sample ID: 670-15879-3

Date Collected: 03/08/23 11:19 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**14**		1.0	0.53	ug/L			03/21/23 15:07	1
trans-1,2-Dichloroethene	**9.0**		1.0	0.73	ug/L			03/21/23 15:07	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 15:07	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 15:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/21/23 15:07*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 15:07*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/21/23 15:07*	*1*

Client Sample ID: MLPV-MW0082-040.0-20230308 Lab Sample ID: 670-15879-4

Date Collected: 03/08/23 14:03 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**19**		1.0	0.53	ug/L			03/21/23 15:25	1
trans-1,2-Dichloroethene	**7.0**		1.0	0.73	ug/L			03/21/23 15:25	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 15:25	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 15:25	1

Client Sample ID: MLPV-MW0082-040.0-20230308 Lab Sample ID: 670-15879-4

Date Collected: 03/08/23 14:03 **Matrix: Water**
Date Received: 03/08/23 14:55

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/21/23 15:25*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/21/23 15:25*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*03/21/23 15:25*	*1*

Client Sample ID: MLPV-MW0094-040.0-20230308 Lab Sample ID: 670-15879-6

Date Collected: 03/08/23 10:04 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 16:01	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 16:01	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 16:01	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 16:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*104*		*40 - 146*		*03/21/23 16:01*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*03/21/23 16:01*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*03/21/23 16:01*	*1*

Client Sample ID: MLPV-MW0095-030.0-20230308 Lab Sample ID: 670-15879-7

Date Collected: 03/08/23 09:17 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 16:19	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 16:19	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 16:19	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 16:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*96*		*40 - 146*		*03/21/23 16:19*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 16:19*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/21/23 16:19*	*1*

Client Sample ID: MLPV-MW0083-052.0-20230308 Lab Sample ID: 670-15879-14

Date Collected: 03/08/23 13:40 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 17:30	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 17:30	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 17:30	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 17:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/21/23 17:30*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/21/23 17:30*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/21/23 17:30*	*1*

Client Sample ID: MLPV-IW00021R-030.5-20230308 Lab Sample ID: 670-15879-17

Date Collected: 03/08/23 11:27 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 17:48	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 17:48	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 17:48	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 17:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/21/23 17:48*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 17:48*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/21/23 17:48*	*1*

Client Sample ID: MLPV-MW0096-040.0-20230308 Lab Sample ID: 670-15879-18

Date Collected: 03/08/23 10:48 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 18:06	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 18:06	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 18:06	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 18:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/21/23 18:06*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/21/23 18:06*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/21/23 18:06*	*1*

Client Sample ID: MLPV-MW0076-052.0-20230308 Lab Sample ID: 670-15879-20

Date Collected: 03/08/23 12:20 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 18:42	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 18:42	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 18:42	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 18:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/21/23 18:42*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 18:42*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/21/23 18:42*	*1*

Client Sample ID: MLPV-MW0079-030.0-20230308 Lab Sample ID: 670-15879-21

Date Collected: 03/08/23 11:35 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**6.2**		1.0	0.53	ug/L			03/22/23 01:36	1
trans-1,2-Dichloroethene	**3.0**		1.0	0.73	ug/L			03/22/23 01:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 01:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 01:36	1

Client Sample ID: MLPV-MW0079-030.0-20230308 Lab Sample ID: 670-15879-21

Date Collected: 03/08/23 11:35 **Matrix: Water**
Date Received: 03/08/23 14:55

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 01:36*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/22/23 01:36*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 01:36*	*1*

Client Sample ID: MLPV-MW0078-030.0-20230308 Lab Sample ID: 670-15879-22

Date Collected: 03/08/23 13:05 **Matrix: Water**
Date Received: 03/08/23 14:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.74**	**I**	1.0	0.53	ug/L			03/22/23 01:18	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 01:18	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 01:18	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 01:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 01:18*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/22/23 01:18*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 01:18*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
400-234398-B-11 MS - DL	Matrix Spike	100	100	85
670-15879-1	MLPV-MW0080-052.0-20230308	99	101	102
670-15879-2	MLPV-MW0077-030.0-20230308	104	106	98
670-15879-3	SATV-IW0009I-024.5-20230308	98	101	97
670-15879-4	MLPV-MW0082-040.0-20230308	102	106	94
670-15879-6	MLPV-MW0094-040.0-20230308	104	107	102
670-15879-7	MLPV-MW0095-030.0-20230308	96	103	98
670-15879-14	MLPV-MW0083-052.0-20230308	100	100	101
670-15879-17	MLPV-IW00021R-030.5-20230308	99	102	99
670-15879-18	MLPV-MW0096-040.0-20230308	100	105	97
670-15879-20	MLPV-MW0076-052.0-20230308	100	103	95
670-15879-21	MLPV-MW0079-030.0-20230308	102	102	92
670-15879-22	MLPV-MW0078-030.0-20230308	102	103	91
670-15879-A-11 MS - DL	Matrix Spike	103	107	102
670-15879-A-11 MSD - DL	Matrix Spike Duplicate	104	108	97
670-16083-A-8 DU	Duplicate	103	101	94
LCS 670-27051/5	Lab Control Sample	106	104	104
LCS 670-27165/4	Lab Control Sample	101	100	90
MB 670-27051/8	Method Blank	105	102	105
MB 670-27165/7	Method Blank	101	101	95

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27051/8
Matrix: Water
Analysis Batch: 27051

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 11:51	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 11:51	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 11:51	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 11:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/21/23 11:51*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/21/23 11:51*	*1*
4-Bromofluorobenzene (Surr)	*105*		*41 - 142*		*03/21/23 11:51*	*1*

Lab Sample ID: LCS 670-27051/5
Matrix: Water
Analysis Batch: 27051

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	20.5		ug/L		103	56 - 128
trans-1,2-Dichloroethene	20.0	22.5		ug/L		113	54 - 134
Vinyl chloride	20.0	24.3		ug/L		122	20 - 167
Trichloroethene	20.0	21.3		ug/L		107	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*106*		*40 - 146*
Dibromofluoromethane (Surr)	*104*		*53 - 146*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*

Lab Sample ID: MB 670-27165/7
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 22:32	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 22:32	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 22:32	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 22:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/21/23 22:32*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 22:32*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/21/23 22:32*	*1*

Lab Sample ID: LCS 670-27165/4
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	18.8		ug/L		94	54 - 134
Vinyl chloride	20.0	22.1		ug/L		110	20 - 167

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 670-27165/4 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 27165

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Trichloroethene			20.0	19.0		ug/L		95	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16083-A-8 DU — **Client Sample ID: Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 27165

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.802	I	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 670-15879-A-11 MS — **Client Sample ID: Matrix Spike**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 27051

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	7.7	I	200	249		ug/L		121	56 - 128		
trans-1,2-Dichloroethene - DL	7.3	U	200	246		ug/L		123	54 - 134		
Vinyl chloride - DL	190		200	480		ug/L		145	20 - 167		
Trichloroethene - DL	8.9	U	200	243		ug/L		121	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*103*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*107*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*102*		*41 - 142*

Lab Sample ID: 670-15879-A-11 MSD — **Client Sample ID: Matrix Spike Duplicate**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 27051

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene - DL	7.7	I	200	256		ug/L		124	56 - 128	3	17
trans-1,2-Dichloroethene - DL	7.3	U	200	255		ug/L		128	54 - 134	3	20
Vinyl chloride - DL	190		200	499		ug/L		155	20 - 167	4	24
Trichloroethene - DL	8.9	U	200	254		ug/L		127	62 - 135	5	20

Method: 8260D - Volatile Organic Compounds by GC/MS - DL (Continued)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr) - DL	*104*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*108*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*97*		*41 - 142*

Lab Sample ID: 400-234398-B-11 MS
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene - DL	220		200	435		ug/L		108	56 - 128
trans-1,2-Dichloroethene - DL	7.8	I	200	232		ug/L		112	54 - 134
Vinyl chloride - DL	160		200	478		ug/L		157	20 - 167
Trichloroethene - DL	19		200	239		ug/L		110	62 - 135

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*100*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

GC/MS VOA

Analysis Batch: 27051

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-15879-1	MLPV-MW0080-052.0-20230308	Total/NA	Water	8260D	
670-15879-2	MLPV-MW0077-030.0-20230308	Total/NA	Water	8260D	
670-15879-3	SATV-IW0009I-024.5-20230308	Total/NA	Water	8260D	
670-15879-4	MLPV-MW0082-040.0-20230308	Total/NA	Water	8260D	
670-15879-6	MLPV-MW0094-040.0-20230308	Total/NA	Water	8260D	
670-15879-7	MLPV-MW0095-030.0-20230308	Total/NA	Water	8260D	
670-15879-14	MLPV-MW0083-052.0-20230308	Total/NA	Water	8260D	
670-15879-17	MLPV-IW00021R-030.5-20230308	Total/NA	Water	8260D	
670-15879-18	MLPV-MW0096-040.0-20230308	Total/NA	Water	8260D	
670-15879-20	MLPV-MW0076-052.0-20230308	Total/NA	Water	8260D	
MB 670-27051/8	Method Blank	Total/NA	Water	8260D	
LCS 670-27051/5	Lab Control Sample	Total/NA	Water	8260D	
670-15879-A-11 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-15879-A-11 MSD - DL	Matrix Spike Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-15879-21	MLPV-MW0079-030.0-20230308	Total/NA	Water	8260D	
670-15879-22	MLPV-MW0078-030.0-20230308	Total/NA	Water	8260D	
MB 670-27165/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27165/4	Lab Control Sample	Total/NA	Water	8260D	
400-234398-B-11 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-16083-A-8 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Client Sample ID: MLPV-MW0080-052.0-20230308
Lab Sample ID: 670-15879-1
Date Collected: 03/08/23 12:30
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 14:31

Client Sample ID: MLPV-MW0077-030.0-20230308
Lab Sample ID: 670-15879-2
Date Collected: 03/08/23 13:27
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 14:49

Client Sample ID: SATV-IW0009I-024.5-20230308
Lab Sample ID: 670-15879-3
Date Collected: 03/08/23 11:19
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 15:07

Client Sample ID: MLPV-MW0082-040.0-20230308
Lab Sample ID: 670-15879-4
Date Collected: 03/08/23 14:03
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 15:25

Client Sample ID: MLPV-MW0094-040.0-20230308
Lab Sample ID: 670-15879-6
Date Collected: 03/08/23 10:04
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 16:01

Client Sample ID: MLPV-MW0095-030.0-20230308
Lab Sample ID: 670-15879-7
Date Collected: 03/08/23 09:17
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 16:19

Client Sample ID: MLPV-MW0083-052.0-20230308
Lab Sample ID: 670-15879-14
Date Collected: 03/08/23 13:40
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 17:30

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Client Sample ID: MLPV-IW00021R-030.5-20230308
Lab Sample ID: 670-15879-17
Date Collected: 03/08/23 11:27
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 17:48

Client Sample ID: MLPV-MW0096-040.0-20230308
Lab Sample ID: 670-15879-18
Date Collected: 03/08/23 10:48
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 18:06

Client Sample ID: MLPV-MW0076-052.0-20230308
Lab Sample ID: 670-15879-20
Date Collected: 03/08/23 12:20
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27051	T1Y	EET ORL	03/21/23 18:42

Client Sample ID: MLPV-MW0079-030.0-20230308
Lab Sample ID: 670-15879-21
Date Collected: 03/08/23 11:35
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27165	T1Y	EET ORL	03/22/23 01:36

Client Sample ID: MLPV-MW0078-030.0-20230308
Lab Sample ID: 670-15879-22
Date Collected: 03/08/23 13:05
Matrix: Water
Date Received: 03/08/23 14:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27165	T1Y	EET ORL	03/22/23 01:18

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-15879-1
Project/Site: NASA KSC MLPV LCP Monitoring

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP Monitoring

Job ID: 670-15879-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-15879-1	MLPV-MW0080-052.0-20230308	Water	03/08/23 12:30	03/08/23 14:55
670-15879-2	MLPV-MW0077-030.0-20230308	Water	03/08/23 13:27	03/08/23 14:55
670-15879-3	SATV-IW0009I-024.5-20230308	Water	03/08/23 11:19	03/08/23 14:55
670-15879-4	MLPV-MW0082-040.0-20230308	Water	03/08/23 14:03	03/08/23 14:55
670-15879-6	MLPV-MW0094-040.0-20230308	Water	03/08/23 10:04	03/08/23 14:55
670-15879-7	MLPV-MW0095-030.0-20230308	Water	03/08/23 09:17	03/08/23 14:55
670-15879-14	MLPV-MW0083-052.0-20230308	Water	03/08/23 13:40	03/08/23 14:55
670-15879-17	MLPV-IW00021R-030.5-20230308	Water	03/08/23 11:27	03/08/23 14:55
670-15879-18	MLPV-MW0096-040.0-20230308	Water	03/08/23 10:48	03/08/23 14:55
670-15879-20	MLPV-MW0076-052.0-20230308	Water	03/08/23 12:20	03/08/23 14:55
670-15879-21	MLPV-MW0079-030.0-20230308	Water	03/08/23 11:35	03/08/23 14:55
670-15879-22	MLPV-MW0078-030.0-20230308	Water	03/08/23 13:05	03/08/23 14:55

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-5825-2538.1
Client Contact: Caroline Bekins	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin:	Page: Page 1 of 2
Company: AECOM Technical Services Inc.	PWSID:	Analysis Requested		Job #:
Address: 150 North Orange Avenue Suite 200	Due Date Requested:			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
City: Orlando	TAT Requested (days):			
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No			
Phone: 919-461-1282(Tel)	PO #: 148569			
Email: caroline.bekins@aecom.com	WO #: 60615493.4			
Project Name: NASA KSC MLPV Biosparge Area & VAB	Project #: 67001428			Other:
Site: BSA & VAB	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D - VOCs WKST #15-14	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		
MLPV-IW0057 MW0080-52.0-20230308	3/8/23	1230	G	Water			X	3	
MLPV-IW0058 MW0077-30.0-20230308	3/8/23	1329	G	Water			X	3	
~~MLPV-IW0059~~ SATV-QUCTE-24.5-20230308	3/8/23	1114	G	Water			X	3	
MLPV-~~IW0060~~ MW0082-42.0 20230308	3/8/23	1403	G	Water			X	3	
MLPV-ASMW0004 -037.5- 20230308	3/8/23	1417	G	Water			X	3	
MLPV-ASMW0005 MW0094 040.0-20230308	3/8/23	1004	G	Water			X	3	
MLPV-ASMW0006 MW0095 -032.5-20230308	3/8/23	0917	G	Water			X	3	
MLPW-IW0031 - 032.0 - 20230308	3/8/23	1124	G	Water			X	3	
MLPW-IW0061 -040.0- 20230308	3/8/23	1255	G	Water			X	3	
MLPW-IW0062 -042.5- 20230308	3/8/23	1222	G	Water			X	3	
MLPW-IW0063 - 037.5 - 20230308	3/8/23	1247	G	Water			X	3	

670-15879 Chain of Custody

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify)	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Meejan Dunkle	3823	AECOM	Jessica Gregory	3/8/23 1455	EET
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.3/0.8

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-5825-2538.2
Client Contact: Caroline Bekins	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin:	Page: Page 2 of 2
Company: AECOM Technical Services Inc.	PWSID:			Job #:

Address: 150 North Orange Avenue Suite 200	Due Date Requested:
City: Orlando	TAT Requested (days):
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No
Phone: 919-461-1282(Tel)	PO #: 148569
Email: caroline.bekins@aecom.com	WO #: 60615493.4
Project Name: NASA KSC MLPV Biosparge Area	Project #: 67001428
Site:	SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D - VOCs WKST #15-14	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A		
MLPW-IW0064 - 042.5-20230308	3/8/23	1208	G	Water			X	3	
MLPW-IW0006IR - 032.5-20230308	3/8/23	1350	G	Water			X	3	
~~MLPW-IW0026I~~				Water					
MLPW-IW0046 - 090.-20230308	3/8/23	1042	G	Water			X	3	
MLPV-TB02-	3/8/23			Water				1	
MLPW-IW0021R-032.5-20230308	3/8/23	1127	G	W			X	3	
MLPW-MW026-0900-20230308	3/8/23	1048	G	W			X	3	
MLPW-IW0057-045.0-20230308	3/8/23	1419	G	W			X	3	
MLPW-MW007-52.0-20230308	3/8/23	1220	G	W			X	3	
MLPW-MW007-90.0-20230308	3/8/23	1135	G	W			X	3	
MLPW-MW007-30.0-20230308	3/8/23	1305	G	W			X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Meagan Daniels	3/8/23	AECOM	Jameah Gregory	3/8/23 1455	EET
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.3/0.1 8

Ver: 06/08/2021

MLPW-MW007-52.0-20230308 @ 1349 G, W.

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6/30/2023 (Rev. 1)

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-15879-1

Login Number: 15879
List Number: 1
Creator: Wehr, Alex C

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 6/30/2023 3:31:45 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16007-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

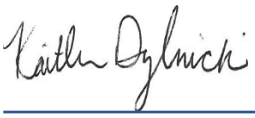
my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16007-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16007-2

Revision
The report being provided is a revision of the original report sent on 3/23/2023. The report (revision 1) is being revised due to: client request to include results for trichloroethene..

Receipt
The samples were received on 3/9/2023 3:00 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.5°C

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: MLPV-IW0001D-052.5-20230309 — Lab Sample ID: 670-16007-4

No Detections.

Client Sample ID: MLPV-IW0027I-030.5-20230309 — Lab Sample ID: 670-16007-8

No Detections.

Client Sample ID: MLPV-IW0051-050.0-20230309 — Lab Sample ID: 670-16007-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.7		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	1.7		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0050-045.0-20230309 — Lab Sample ID: 670-16007-12

No Detections.

Client Sample ID: MLPV-MW0100-020.0-20230309 — Lab Sample ID: 670-16007-13

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.9		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	1.3		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: WCPS-IW0001SR-007.5-20230309 — Lab Sample ID: 670-16007-15

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.0		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	1.2		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	38		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-TB02-20230309 — Lab Sample ID: 670-16007-16

No Detections.

Client Sample ID: MLPV-MW0108-037.5-20230309 — Lab Sample ID: 670-16007-17

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.1		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	25		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0097-037.5-20230309 — Lab Sample ID: 670-16007-18

No Detections.

Client Sample ID: MLPV-VAB-IW0005D-054.5-20230309 — Lab Sample ID: 670-16007-19

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.2		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	2.5		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0084-052.0-20230309 — Lab Sample ID: 670-16007-20

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.0		1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0085-052.0-20230309 — Lab Sample ID: 670-16007-21

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.3		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	1.9		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: PRES-IW0009-045.0-20230309 — Lab Sample ID: 670-16007-22

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.7		1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: WCPS-IW0002SRR-008.0-20230309 — Lab Sample ID: 670-16007-23

No Detections.

Client Sample ID: MLPV-IW0047-037.5-20230309 — Lab Sample ID: 670-16007-24

No Detections.

Client Sample ID: MLPV-MW0081-030.0-20230309 — Lab Sample ID: 670-16007-25

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	19		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	13		1.0	0.73	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0001D-052.5-20230309

Lab Sample ID: 670-16007-4

Date Collected: 03/09/23 08:46
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 16:33	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 16:33	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 16:33	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 16:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/22/23 16:33*	*1*
Dibromofluoromethane (Surr)	*108*		*53 - 146*		*03/22/23 16:33*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 16:33*	*1*

Client Sample ID: MLPV-IW0027I-030.5-20230309

Lab Sample ID: 670-16007-8

Date Collected: 03/09/23 11:37
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 17:25	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 17:25	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 17:25	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 17:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*40 - 146*		*03/22/23 17:25*	*1*
Dibromofluoromethane (Surr)	*112*		*53 - 146*		*03/22/23 17:25*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/22/23 17:25*	*1*

Client Sample ID: MLPV-IW0051-050.0-20230309

Lab Sample ID: 670-16007-11

Date Collected: 03/09/23 10:33
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.7**		1.0	0.53	ug/L			03/22/23 17:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 17:59	1
Vinyl chloride	**1.7**		1.0	0.71	ug/L			03/22/23 17:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 17:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 17:59*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 17:59*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 17:59*	*1*

Client Sample ID: MLPV-IW0050-045.0-20230309

Lab Sample ID: 670-16007-12

Date Collected: 03/09/23 13:02
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 18:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 18:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 18:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 18:16	1

Client Sample ID: MLPV-IW0050-045.0-20230309 Lab Sample ID: 670-16007-12

Date Collected: 03/09/23 13:02 **Matrix: Water**
Date Received: 03/09/23 15:00

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/22/23 18:16*	*1*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/22/23 18:16*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 18:16*	*1*

Client Sample ID: MLPV-MW0100-020.0-20230309 Lab Sample ID: 670-16007-13

Date Collected: 03/09/23 12:39 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.9**		1.0	0.53	ug/L			03/22/23 18:33	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 18:33	1
Vinyl chloride	**1.3**		1.0	0.71	ug/L			03/22/23 18:33	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 18:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*109*		*40 - 146*		*03/22/23 18:33*	*1*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/22/23 18:33*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 18:33*	*1*

Client Sample ID: WCPS-IW0001SR-007.5-20230309 Lab Sample ID: 670-16007-15

Date Collected: 03/09/23 13:18 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**2.0**		1.0	0.53	ug/L			03/23/23 14:22	1
trans-1,2-Dichloroethene	**1.2**		1.0	0.73	ug/L			03/23/23 14:22	1
Vinyl chloride	**38**		1.0	0.71	ug/L			03/23/23 14:22	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 14:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 14:22*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/23/23 14:22*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/23/23 14:22*	*1*

Client Sample ID: MLPV-TB02-20230309 Lab Sample ID: 670-16007-16

Date Collected: 03/09/23 00:00 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 15:42	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 15:42	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 15:42	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 15:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*97*		*40 - 146*		*03/22/23 15:42*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/22/23 15:42*	*1*
4-Bromofluorobenzene (Surr)	*86*		*41 - 142*		*03/22/23 15:42*	*1*

Client Sample ID: MLPV-MW0108-037.5-20230309

Lab Sample ID: 670-16007-17

Date Collected: 03/09/23 09:12
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.1**		1.0	0.53	ug/L			03/22/23 19:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 19:08	1
Vinyl chloride	**25**		1.0	0.71	ug/L			03/22/23 19:08	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 19:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 19:08*	*1*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/22/23 19:08*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 19:08*	*1*

Client Sample ID: MLPV-MW0097-037.5-20230309

Lab Sample ID: 670-16007-18

Date Collected: 03/09/23 10:04
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 19:25	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 19:25	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 19:25	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 19:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 19:25*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 19:25*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/22/23 19:25*	*1*

Client Sample ID: MLPV-VAB-IW0005D-054.5-20230309

Lab Sample ID: 670-16007-19

Date Collected: 03/09/23 13:02
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**3.2**		1.0	0.53	ug/L			03/22/23 19:42	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 19:42	1
Vinyl chloride	**2.5**		1.0	0.71	ug/L			03/22/23 19:42	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 19:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*40 - 146*		*03/22/23 19:42*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 19:42*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/22/23 19:42*	*1*

Client Sample ID: MLPV-MW0084-052.0-20230309

Lab Sample ID: 670-16007-20

Date Collected: 03/09/23 09:42
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.0**		1.0	0.53	ug/L			03/22/23 20:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 20:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 20:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 20:16	1

Client Sample ID: MLPV-MW0084-052.0-20230309 Lab Sample ID: 670-16007-20

Date Collected: 03/09/23 09:42 **Matrix: Water**
Date Received: 03/09/23 15:00

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/22/23 20:16*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 20:16*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 20:16*	*1*

Client Sample ID: MLPV-MW0085-052.0-20230309 Lab Sample ID: 670-16007-21

Date Collected: 03/09/23 11:12 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.3**		1.0	0.53	ug/L			03/22/23 20:33	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 20:33	1
Vinyl chloride	**1.9**		1.0	0.71	ug/L			03/22/23 20:33	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 20:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*92*		*40 - 146*		*03/22/23 20:33*	*1*
Dibromofluoromethane (Surr)	*110*		*53 - 146*		*03/22/23 20:33*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/22/23 20:33*	*1*

Client Sample ID: PRES-IW0009-045.0-20230309 Lab Sample ID: 670-16007-22

Date Collected: 03/09/23 12:01 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.7**		1.0	0.53	ug/L			03/22/23 19:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 19:59	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 19:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 19:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/22/23 19:59*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*03/22/23 19:59*	*1*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*		*03/22/23 19:59*	*1*

Client Sample ID: WCPS-IW0002SRR-008.0-20230309 Lab Sample ID: 670-16007-23

Date Collected: 03/09/23 12:08 **Matrix: Water**
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 14:40	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 14:40	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 14:40	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 14:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/23/23 14:40*	*1*
Dibromofluoromethane (Surr)	*108*		*53 - 146*		*03/23/23 14:40*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/23/23 14:40*	*1*

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: MLPV-IW0047-037.5-20230309

Lab Sample ID: 670-16007-24

Date Collected: 03/09/23 10:31
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 14:58	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 14:58	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 14:58	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 14:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 14:58*	*1*
Dibromofluoromethane (Surr)	*106*		*53 - 146*		*03/23/23 14:58*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/23/23 14:58*	*1*

Client Sample ID: MLPV-MW0081-030.0-20230309

Lab Sample ID: 670-16007-25

Date Collected: 03/09/23 00:00
Matrix: Water
Date Received: 03/09/23 15:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**19**		1.0	0.53	ug/L			03/23/23 15:16	1
trans-1,2-Dichloroethene	**13**		1.0	0.73	ug/L			03/23/23 15:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 15:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 15:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*104*		*40 - 146*		*03/23/23 15:16*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*03/23/23 15:16*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/23/23 15:16*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16007-4	MLPV-IW0001D-052.5-2023030	98	108	93
670-16007-8	MLPV-IW0027I-030.5-20230309	110	112	96
670-16007-11	MLPV-IW0051-050.0-20230309	100	111	93
670-16007-12	MLPV-IW0050-045.0-20230309	99	109	92
670-16007-13	MLPV-MW0100-020.0-20230309	109	109	93
670-16007-15	WCPS-IW0001SR-007.5-20230309	103	106	100
670-16007-16	MLPV-TB02-20230309	97	106	86
670-16007-17	MLPV-MW0108-037.5-20230309	101	109	93
670-16007-18	MLPV-MW0097-037.5-20230309	100	111	97
670-16007-19	MLPV-VAB-IW0005D-054.5-20230309	97	111	99
670-16007-20	MLPV-MW0084-052.0-20230309	100	111	92
670-16007-21	MLPV-MW0085-052.0-20230309	92	110	100
670-16007-22	PRES-IW0009-045.0-20230309	99	111	90
670-16007-23	WCPS-IW0002SRR-008.0-20230309	105	108	99
670-16007-24	MLPV-IW0047-037.5-20230309	103	106	100
670-16007-25	MLPV-MW0081-030.0-20230309	104	107	96
670-16007-A-1 DU	Duplicate	102	103	98
670-16007-A-3 MS	Matrix Spike	97	100	98
670-16007-C-2 DU	Duplicate	100	107	95
670-16007-C-5 MS	Matrix Spike	100	106	95
LCS 670-27214/5	Lab Control Sample	100	97	99
LCS 670-27383/6	Lab Control Sample	110	110	99
MB 670-27214/8	Method Blank	98	105	94
MB 670-27383/9	Method Blank	103	103	99

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27214/8
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 13:47	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:47	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 13:47	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 13:47	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/22/23 13:47*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/22/23 13:47*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*03/22/23 13:47*	*1*

Lab Sample ID: LCS 670-27214/5
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.9		ug/L		94	56 - 128
trans-1,2-Dichloroethene	20.0	19.2		ug/L		96	54 - 134
Vinyl chloride	20.0	20.0		ug/L		100	20 - 167
Trichloroethene	20.0	19.0		ug/L		95	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*97*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16007-A-3 MS
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.54	I	20.0	22.9		ug/L		112	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	22.6		ug/L		113	54 - 134
Vinyl chloride	0.71	U	20.0	27.6		ug/L		138	20 - 167
Trichloroethene	0.89	U	20.0	22.1		ug/L		111	62 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*

Lab Sample ID: 670-16007-C-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
cis-1,2-Dichloroethene	0.93	I	0.965	I	ug/L		4	30
trans-1,2-Dichloroethene	0.73	U	0.73	U	ug/L		NC	20
Vinyl chloride	0.72	I	0.863	I	ug/L		18	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-C-2 DU
Matrix: Water
Analysis Batch: 27214

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*107*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Lab Sample ID: MB 670-27383/9
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 12:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 12:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 12:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/23/23 12:16*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/23/23 12:16*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/23/23 12:16*	*1*

Lab Sample ID: LCS 670-27383/6
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	20.8		ug/L		104	54 - 134
Vinyl chloride	20.0	23.1		ug/L		116	20 - 167
Trichloroethene	20.0	19.4		ug/L		97	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*110*		*40 - 146*
Dibromofluoromethane (Surr)	*110*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16007-C-5 MS
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.7		100	82.9		ug/L		77	56 - 128
trans-1,2-Dichloroethene	3.7	U	100	82.6		ug/L		83	54 - 134
Vinyl chloride	90		100	199		ug/L		108	20 - 167
Trichloroethene	4.5	U	100	81.5		ug/L		81	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16007-C-5 MS
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*106*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Lab Sample ID: 670-16007-A-1 DU
Matrix: Water
Analysis Batch: 27383

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	2.1			1.63		ug/L				24	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	78			73.4		ug/L				6	30
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

GC/MS VOA

Analysis Batch: 27214

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-4	MLPV-IW0001D-052.5-20230309	Total/NA	Water	8260D	
670-16007-8	MLPV-IW0027I-030.5-20230309	Total/NA	Water	8260D	
670-16007-11	MLPV-IW0051-050.0-20230309	Total/NA	Water	8260D	
670-16007-12	MLPV-IW0050-045.0-20230309	Total/NA	Water	8260D	
670-16007-13	MLPV-MW0100-020.0-20230309	Total/NA	Water	8260D	
670-16007-16	MLPV-TB02-20230309	Total/NA	Water	8260D	
670-16007-17	MLPV-MW0108-037.5-20230309	Total/NA	Water	8260D	
670-16007-18	MLPV-MW0097-037.5-20230309	Total/NA	Water	8260D	
670-16007-19	MLPV-VAB-IW0005D-054.5-20230309	Total/NA	Water	8260D	
670-16007-20	MLPV-MW0084-052.0-20230309	Total/NA	Water	8260D	
670-16007-21	MLPV-MW0085-052.0-20230309	Total/NA	Water	8260D	
670-16007-22	PRES-IW0009-045.0-20230309	Total/NA	Water	8260D	
MB 670-27214/8	Method Blank	Total/NA	Water	8260D	
LCS 670-27214/5	Lab Control Sample	Total/NA	Water	8260D	
670-16007-A-3 MS	Matrix Spike	Total/NA	Water	8260D	
670-16007-C-2 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27383

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16007-15	WCPS-IW0001SR-007.5-20230309	Total/NA	Water	8260D	
670-16007-23	WCPS-IW0002SRR-008.0-20230309	Total/NA	Water	8260D	
670-16007-24	MLPV-IW0047-037.5-20230309	Total/NA	Water	8260D	
670-16007-25	MLPV-MW0081-030.0-20230309	Total/NA	Water	8260D	
MB 670-27383/9	Method Blank	Total/NA	Water	8260D	
LCS 670-27383/6	Lab Control Sample	Total/NA	Water	8260D	
670-16007-C-5 MS	Matrix Spike	Total/NA	Water	8260D	
670-16007-A-1 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: MLPV-IW0001D-052.5-20230309
Lab Sample ID: 670-16007-4
Date Collected: 03/09/23 08:46
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 16:33

Client Sample ID: MLPV-IW0027I-030.5-20230309
Lab Sample ID: 670-16007-8
Date Collected: 03/09/23 11:37
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 17:25

Client Sample ID: MLPV-IW0051-050.0-20230309
Lab Sample ID: 670-16007-11
Date Collected: 03/09/23 10:33
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 17:59

Client Sample ID: MLPV-IW0050-045.0-20230309
Lab Sample ID: 670-16007-12
Date Collected: 03/09/23 13:02
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 18:16

Client Sample ID: MLPV-MW0100-020.0-20230309
Lab Sample ID: 670-16007-13
Date Collected: 03/09/23 12:39
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 18:33

Client Sample ID: WCPS-IW0001SR-007.5-20230309
Lab Sample ID: 670-16007-15
Date Collected: 03/09/23 13:18
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 14:22

Client Sample ID: MLPV-TB02-20230309
Lab Sample ID: 670-16007-16
Date Collected: 03/09/23 00:00
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 15:42

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: MLPV-MW0108-037.5-20230309
Lab Sample ID: 670-16007-17
Date Collected: 03/09/23 09:12
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 19:08

Client Sample ID: MLPV-MW0097-037.5-20230309
Lab Sample ID: 670-16007-18
Date Collected: 03/09/23 10:04
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 19:25

Client Sample ID: MLPV-VAB-IW0005D-054.5-20230309
Lab Sample ID: 670-16007-19
Date Collected: 03/09/23 13:02
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 19:42

Client Sample ID: MLPV-MW0084-052.0-20230309
Lab Sample ID: 670-16007-20
Date Collected: 03/09/23 09:42
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 20:16

Client Sample ID: MLPV-MW0085-052.0-20230309
Lab Sample ID: 670-16007-21
Date Collected: 03/09/23 11:12
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 20:33

Client Sample ID: PRES-IW0009-045.0-20230309
Lab Sample ID: 670-16007-22
Date Collected: 03/09/23 12:01
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27214	T1Y	EET ORL	03/22/23 19:59

Client Sample ID: WCPS-IW0002SRR-008.0-20230309
Lab Sample ID: 670-16007-23
Date Collected: 03/09/23 12:08
Matrix: Water
Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 14:40

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Client Sample ID: MLPV-IW0047-037.5-20230309

Lab Sample ID: 670-16007-24

Date Collected: 03/09/23 10:31

Matrix: Water

Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 14:58

Client Sample ID: MLPV-MW0081-030.0-20230309

Lab Sample ID: 670-16007-25

Date Collected: 03/09/23 00:00

Matrix: Water

Date Received: 03/09/23 15:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27383	KG	EET ORL	03/23/23 15:16

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16007-2
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16007-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16007-4	MLPV-IW0001D-052.5-20230309	Water	03/09/23 08:46	03/09/23 15:00
670-16007-8	MLPV-IW0027I-030.5-20230309	Water	03/09/23 11:37	03/09/23 15:00
670-16007-11	MLPV-IW0051-050.0-20230309	Water	03/09/23 10:33	03/09/23 15:00
670-16007-12	MLPV-IW0050-045.0-20230309	Water	03/09/23 13:02	03/09/23 15:00
670-16007-13	MLPV-MW0100-020.0-20230309	Water	03/09/23 12:39	03/09/23 15:00
670-16007-15	WCPS-IW0001SR-007.5-20230309	Water	03/09/23 13:18	03/09/23 15:00
670-16007-16	MLPV-TB02-20230309	Water	03/09/23 00:00	03/09/23 15:00
670-16007-17	MLPV-MW0108-037.5-20230309	Water	03/09/23 09:12	03/09/23 15:00
670-16007-18	MLPV-MW0097-037.5-20230309	Water	03/09/23 10:04	03/09/23 15:00
670-16007-19	MLPV-VAB-IW0005D-054.5-20230309	Water	03/09/23 13:02	03/09/23 15:00
670-16007-20	MLPV-MW0084-052.0-20230309	Water	03/09/23 09:42	03/09/23 15:00
670-16007-21	MLPV-MW0085-052.0-20230309	Water	03/09/23 11:12	03/09/23 15:00
670-16007-22	PRES-IW0009-045.0-20230309	Water	03/09/23 12:01	03/09/23 15:00
670-16007-23	WCPS-IW0002SRR-008.0-20230309	Water	03/09/23 12:08	03/09/23 15:00
670-16007-24	MLPV-IW0047-037.5-20230309	Water	03/09/23 10:31	03/09/23 15:00
670-16007-25	MLPV-MW0081-030.0-20230309	Water	03/09/23 00:00	03/09/23 15:00

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 3
Site Location: Biosparge Area 1/VAB/Hot Spot 2/ West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
		Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)	

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl / Total No. of Containers	Select VOCs by SW8260B	Comments
	MLPV-IW0057 35-045.0-20230309	MLPV-IW0057	20230309	1155	WG	N	G	3	3	
	MLPV-IW0058 40-035.0-20230309	MLPV-IW0058	20230309	1250	WG	N	G	3	3	
	MLPV-IW0059 34-035.0-20230309	MLPV-IW0059	20230309	1108	WG	N	G	3	3	
	MLPV-IW0060 10-052.5-20230307	MLPV-IW0060	20230309	0846	WG	N	G	3	3	
	MLPV-ASMW0004 IW0058 - 47.5-20230321	MLPV-ASMW0004	20230309	0909	WG	N	G	3	3	
	MLPV-ASMW0005 - 047.5-20230307	MLPV-ASMW0005	20230309	1058	WG	N	G	3	3	
	MLPV-ASMW0006 - 037.5-20230307	MLPV-ASMW0006	20230309	1015	WG	N	G	3	3	
	MLPV-IW0031 27I-032.5-20230309	MLPV-IW0031	20230309	1137	WG	N	G	3	3	
	MLPV-IW0061 - 045.0-20230307	MLPV-IW0061	20230309	0937	WG	N	G	3	3	
	MLPV-IW0062 41-045.0-20230309	MLPV-IW0062	20230309	1321	WG	N	G	3	3	
	MLPV-IW0063 51-50 20230309	MLPV-IW0063	20230309	1033	WG	N	G	3	3	
	MLPV-IW0064 52-045.020230309	MLPV-IW0064	20230309	1302	WG	N	G	3	3	



***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Duncan	3/9/23	1500	James W Driggers	3/9/23	1500
2						
3						

Sample Shipment and Delivery Details

Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0/2.5

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 2 of 3
Site Location: Biosparge Area 1/VAB1/Hot Spot 2/West Crawler Park		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA #	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl										Comments
	MLPV-~~IW0006IR~~ MW0100-20-20230307	MLPV-IW006IR	20230307	1239	WG	N	G	3	3										
	MLPV-IW0028I-59-47.5-20230307	MLPV-IW0028I	20230307	0951	WG	N	G	3	3										
	WCPS-IW0015R-7.5-20230307 MLPV-~~IW0046~~	MLPV-IW0046	20230307	1318	WG	N	G	3	3										
	MLPV-TB02	MLPV-TB02	20230307		WQ	TB	G	2	2										
	MLPV-MW0108-037.5-20230307		20230307	0912															
	MLPV-MW0077-037.5-20230307		20230307	1004	WG	N	G	3	3										
	MLPV-VAB-IW0005D-54.5-20230307		20230307	1302	WG	N	G	3	3										
	MLPV-MW0084-52-20230307		20230307	0942	WG	N	G	3	3										
	MLPV-MW0085-52-20230307		20230307	1123	WG	N	G	3	3										
	PRES-IW0007-45-20230307		20230307	1201	WG	N	G	3	3										
	WCPS-IW0025R-6-20230307		20230307	1208	WG	N	G	3	3										
	MLPV-IW0047-37.5-20230307		20230307	1031	WG	N	G	3	3										

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Meagan Dunkle	3/9/23	1500	Jamell Gregory	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3.0 / 2.5

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 3 of 3
Site Location: Former Hot Spot 2 (Biosparge Area / JAB West Crawler Pit)		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 / Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	Select VOCs by SW8260B											Comments
	MLPV-[illegible]81-0320-20230309	MLPV-IW0011I	20230309		WG	N	G	3	3											
	MLPV-IW0032	MLPV-IW0032	202303		WG	N	G	3	3											
	MLPV-IW0033	MLPV-IW0033	202303		WG	N	G	3	3											
	MLPV-IW0034	MLPV-IW0034	202303		WG	N	G	3	3											
	MLPV-IW0035	MLPV-IW0035	202303		WG	N	G	3	3											
	MLPV-IW0036	MLPV-IW0036	202303		WG	N	G	3	3											
	MLPV-IW0037	MLPV-IW0037	202303		WG	N	G	3	3											
	MLPV-IW0038	MLPV-IW0038	202303		WG	N	G	3	3											
	MLPV-IW0039	MLPV-IW0039	202303		WG	N	G	3	3											
	MLPV-IW0040	MLPV-IW0040	202303		WG	N	G	3	3											
	MLPV-IW0041	MLPV-IW0041	202303		WG	N	G	3	3											
	MLPV-IW0042	MLPV-IW0042	202303		WG	N	G	3	3											

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Megan Dunkle	3/9/23	1500	[illegible]	3/9/23	1500
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphonic acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3,0/2,5

SO 5824

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16007-2

Login Number: 16007
List Number: 1
Creator: Bittle, David W

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 11:47:22 AM Revision 2

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16083-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

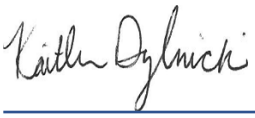
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Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Authorized for release by
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Revision 2

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc. Job ID: 670-16083-1
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16083-1

Revision
The report being provided is a revision of the original report sent on 3/24/2023. The report (revision 2) is being revised due to: client request to include results for trichloroethene..

Report revision history
Revision 1 - 3/27/2023 - Reason - The report (revision 1) is being revised due to update of reported vinyl chloride results for MLPV-MW0102-030.0-20230310 (670-16083-13).

Receipt
The samples were received on 3/10/2023 4:15 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.0º C.

GC/MS VOA
Method 8260D: The continuing calibration verification (CCV) associated with batch 670-27165 recovered above the upper control limit for Vinyl chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated sample is impacted: (CCVIS 670-27165/3).

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-27165 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-MW0101-045.0-20230309 (670-16083-10). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Client Sample ID: WCPS-IW0016-020.0-20230309 — Lab Sample ID: 670-16083-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.77	I	1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0110-035.0-20230309 — Lab Sample ID: 670-16083-3

No Detections.

Client Sample ID: MLPV-MW0109-025.0-20230309 — Lab Sample ID: 670-16083-4

No Detections.

Client Sample ID: MLPV-MW0091-052.5-20230309 — Lab Sample ID: 670-16083-5

No Detections.

Client Sample ID: VABU-IW0001I-025.0-20230310 — Lab Sample ID: 670-16083-7

No Detections.

Client Sample ID: WCPS-IW0005S-007.0-20230309 — Lab Sample ID: 670-16083-9

No Detections.

Client Sample ID: MLPV-MW0101-045.0-20230309 — Lab Sample ID: 670-16083-10

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.4		1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0092-052.5-20230309 — Lab Sample ID: 670-16083-12

No Detections.

Client Sample ID: MLPV-MW0102-030.0-20230310 — Lab Sample ID: 670-16083-13

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	9.6		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	2.8		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	440		25	18	ug/L	25		8260D	Total/NA

Client Sample ID: MLPV-MW0103-040.0-20230310 — Lab Sample ID: 670-16083-14

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	30		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	3.7		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride - DL	1000		50	36	ug/L	50		8260D	Total/NA

Client Sample ID: MLPV-MW0105-052.5-20230310 — Lab Sample ID: 670-16083-15

No Detections.

Client Sample ID: MLPV-MW0106-030.0-20230310 — Lab Sample ID: 670-16083-16

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.54	I	1.0	0.53	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0107-040.0-20230310 — Lab Sample ID: 670-16083-17

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.75	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	21		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Client Sample ID: MLPV-MW0104-052.5-20230310 **Lab Sample ID: 670-16083-18**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: WCPS-IW0016-020.0-20230309

Lab Sample ID: 670-16083-1

Date Collected: 03/09/23 13:48

Matrix: Water

Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.77	I	1.0	0.53	ug/L			03/21/23 18:33	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 18:33	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 18:33	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 18:33	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*105*		*40 - 146*		*03/21/23 18:33*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 18:33*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/21/23 18:33*	*1*

Client Sample ID: MLPV-MW0110-035.0-20230309

Lab Sample ID: 670-16083-3

Date Collected: 03/09/23 16:12

Matrix: Water

Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 19:09	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 19:09	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 19:09	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 19:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/21/23 19:09*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 19:09*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/21/23 19:09*	*1*

Client Sample ID: MLPV-MW0109-025.0-20230309

Lab Sample ID: 670-16083-4

Date Collected: 03/09/23 15:36

Matrix: Water

Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 19:27	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 19:27	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 19:27	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/21/23 19:27*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 19:27*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/21/23 19:27*	*1*

Client Sample ID: MLPV-MW0091-052.5-20230309

Lab Sample ID: 670-16083-5

Date Collected: 03/09/23 16:25

Matrix: Water

Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 13:38	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 13:38	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 13:38	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 13:38	1

Client Sample ID: MLPV-MW0091-052.5-20230309 Lab Sample ID: 670-16083-5

Date Collected: 03/09/23 16:25 **Matrix: Water**
Date Received: 03/10/23 16:15

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 13:38*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/22/23 13:38*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 13:38*	*1*

Client Sample ID: VABU-IW0001I-025.0-20230310 Lab Sample ID: 670-16083-7

Date Collected: 03/10/23 10:45 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 20:04	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 20:04	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 20:04	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 20:04	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/21/23 20:04*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/21/23 20:04*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/21/23 20:04*	*1*

Client Sample ID: WCPS-IW0005S-007.0-20230309 Lab Sample ID: 670-16083-9

Date Collected: 03/09/23 14:39 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 00:22	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 00:22	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 00:22	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 00:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 00:22*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/22/23 00:22*	*1*
4-Bromofluorobenzene (Surr)	*89*		*41 - 142*		*03/22/23 00:22*	*1*

Client Sample ID: MLPV-MW0101-045.0-20230309 Lab Sample ID: 670-16083-10

Date Collected: 03/09/23 13:49 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.4**		1.0	0.53	ug/L			03/23/23 16:24	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 16:24	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 16:24	1
Trichloroethene	8.9	U	10	8.9	ug/L			03/22/23 18:16	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/22/23 18:16*	*10*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/23/23 16:24*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*03/22/23 18:16*	*10*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*03/23/23 16:24*	*1*

Client Sample ID: MLPV-MW0101-045.0-20230309 Lab Sample ID: 670-16083-10

Date Collected: 03/09/23 13:49 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 18:16*	*10*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/23/23 16:24*	*1*

Client Sample ID: MLPV-MW0092-052.5-20230309 Lab Sample ID: 670-16083-12

Date Collected: 03/09/23 15:44 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 14:15	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 14:15	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 14:15	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 14:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 14:15*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/22/23 14:15*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 14:15*	*1*

Client Sample ID: MLPV-MW0102-030.0-20230310 Lab Sample ID: 670-16083-13

Date Collected: 03/10/23 11:59 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**9.6**		1.0	0.53	ug/L			03/22/23 14:33	1
trans-1,2-Dichloroethene	**2.8**		1.0	0.73	ug/L			03/22/23 14:33	1
Vinyl chloride	**440**		25	18	ug/L			03/23/23 13:22	25
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 14:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 14:33*	*1*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/23/23 13:22*	*25*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/22/23 14:33*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/23/23 13:22*	*25*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 14:33*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/23/23 13:22*	*25*

Client Sample ID: MLPV-MW0103-040.0-20230310 Lab Sample ID: 670-16083-14

Date Collected: 03/10/23 12:38 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**30**		1.0	0.53	ug/L			03/22/23 14:51	1
trans-1,2-Dichloroethene	**3.7**		1.0	0.73	ug/L			03/22/23 14:51	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 14:51	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 14:51*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/22/23 14:51*	*1*

Client Sample ID: MLPV-MW0103-040.0-20230310 Lab Sample ID: 670-16083-14

Date Collected: 03/10/23 12:38 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*03/22/23 14:51*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	**1000**		50	36	ug/L			03/23/23 13:40	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/23/23 13:40*	*50*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/23/23 13:40*	*50*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/23/23 13:40*	*50*

Client Sample ID: MLPV-MW0105-052.5-20230310 Lab Sample ID: 670-16083-15

Date Collected: 03/10/23 11:06 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 15:09	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 15:09	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 15:09	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 15:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/22/23 15:09*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/22/23 15:09*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/22/23 15:09*	*1*

Client Sample ID: MLPV-MW0106-030.0-20230310 Lab Sample ID: 670-16083-16

Date Collected: 03/10/23 11:48 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.54**	**I**	1.0	0.53	ug/L			03/22/23 15:27	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 15:27	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 15:27	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 15:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 15:27*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/22/23 15:27*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 15:27*	*1*

Client Sample ID: MLPV-MW0107-040.0-20230310 Lab Sample ID: 670-16083-17

Date Collected: 03/10/23 11:05 **Matrix: Water**
Date Received: 03/10/23 16:15

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.75**	**I**	1.0	0.53	ug/L			03/22/23 15:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 15:46	1

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Client Sample ID: MLPV-MW0107-040.0-20230310

Lab Sample ID: 670-16083-17

Date Collected: 03/10/23 11:05
Date Received: 03/10/23 16:15

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	21		1.0	0.71	ug/L			03/22/23 15:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 15:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/22/23 15:46*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/22/23 15:46*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 15:46*	*1*

Client Sample ID: MLPV-MW0104-052.5-20230310

Lab Sample ID: 670-16083-18

Date Collected: 03/10/23 12:15
Date Received: 03/10/23 16:15

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 16:04	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 16:04	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 16:04	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 16:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 16:04*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/22/23 16:04*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/22/23 16:04*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
400-234398-A-11 DU	Duplicate	103	100	99
400-234398-B-11 MS - DL	Matrix Spike	100	100	85
670-16001-E-3 MS	Matrix Spike	99	99	85
670-16083-1	WCPS-IW0016-020.0-20230309	105	103	97
670-16083-3	MLPV-MW0110-035.0-20230309	102	101	92
670-16083-4	MLPV-MW0109-025.0-20230309	102	103	93
670-16083-5	MLPV-MW0091-052.5-20230309	102	101	91
670-16083-7	VABU-IW0001I-025.0-20230310	103	103	92
670-16083-9	WCPS-IW0005S-007.0-20230309	102	101	89
670-16083-10	MLPV-MW0101-045.0-20230309	103	104	92
670-16083-10	MLPV-MW0101-045.0-20230309	101	104	91
670-16083-12	MLPV-MW0092-052.5-20230309	102	101	92
670-16083-13	MLPV-MW0102-030.0-20230310	102	103	91
670-16083-13	MLPV-MW0102-030.0-20230310	101	102	91
670-16083-13 DU	MLPV-MW0102-030.0-20230310	104	102	92
670-16083-14	MLPV-MW0103-040.0-20230310	102	101	94
670-16083-14 - DL	MLPV-MW0103-040.0-20230310	102	103	91
670-16083-14 MS - DL	MLPV-MW0103-040.0-20230310	100	101	85
670-16083-15	MLPV-MW0105-052.5-20230310	103	102	91
670-16083-16	MLPV-MW0106-030.0-20230310	101	101	92
670-16083-17	MLPV-MW0107-040.0-20230310	102	103	92
670-16083-18	MLPV-MW0104-052.5-20230310	101	102	92
670-16083-A-8 DU	Duplicate	103	101	94
670-16325-A-1 DU	Duplicate	101	97	99
670-16325-A-2 MS	Matrix Spike	102	100	92
LCS 670-27061/4	Lab Control Sample	103	100	93
LCS 670-27165/4	Lab Control Sample	101	100	90
LCS 670-27218/4	Lab Control Sample	101	101	91
LCS 670-27396/4	Lab Control Sample	99	102	86
MB 670-27061/7	Method Blank	101	99	97
MB 670-27165/7	Method Blank	101	101	95
MB 670-27218/7	Method Blank	101	100	93
MB 670-27396/7	Method Blank	100	102	91

Surrogate Legend

TOL = Toluene-d8 (Surr)

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27061/7
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 12:54	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 12:54	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 12:54	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 12:54	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/21/23 12:54*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*03/21/23 12:54*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/21/23 12:54*	*1*

Lab Sample ID: LCS 670-27061/4
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	17.4		ug/L		87	56 - 128		
trans-1,2-Dichloroethene			20.0	17.9		ug/L		90	54 - 134		
Vinyl chloride			20.0	22.6		ug/L		113	20 - 167		
Trichloroethene			20.0	17.7		ug/L		89	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*

Lab Sample ID: 670-16325-A-2 MS
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	5.3	U	200	216		ug/L		108	56 - 128		
trans-1,2-Dichloroethene	7.3	U	200	222		ug/L		111	54 - 134		
Vinyl chloride	7.1	U	200	319		ug/L		160	20 - 167		
Trichloroethene	8.9	U	200	215		ug/L		108	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*

Lab Sample ID: 670-16325-A-1 DU
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16325-A-1 DU
Matrix: Water
Analysis Batch: 27061

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*97*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: MB 670-27165/7
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/21/23 22:32	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/21/23 22:32	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/21/23 22:32	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/21/23 22:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/21/23 22:32*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/21/23 22:32*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/21/23 22:32*	*1*

Lab Sample ID: LCS 670-27165/4
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.6		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	18.8		ug/L		94	54 - 134
Vinyl chloride	20.0	22.1		ug/L		110	20 - 167
Trichloroethene	20.0	19.0		ug/L		95	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16083-A-8 DU
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U	0.802	I	ug/L		NC	30
trans-1,2-Dichloroethene	0.73	U	0.73	U	ug/L		NC	20
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16083-A-8 DU
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*

Lab Sample ID: MB 670-27218/7
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/22/23 11:17	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/22/23 11:17	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/22/23 11:17	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/22/23 11:17	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/22/23 11:17*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/22/23 11:17*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/22/23 11:17*	*1*

Lab Sample ID: LCS 670-27218/4
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	18.1		ug/L		90	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		94	54 - 134
Vinyl chloride	20.0	25.5		ug/L		127	20 - 167
Trichloroethene	20.0	19.0		ug/L		95	62 - 135

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*

Lab Sample ID: 670-16001-E-3 MS
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	100		100	217		ug/L		113	56 - 128
trans-1,2-Dichloroethene	3.7	U	100	122		ug/L		122	54 - 134
Vinyl chloride	12		100	173		ug/L		161	20 - 167
Trichloroethene	4.5	U	100	125		ug/L		125	62 - 135

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16001-E-3 MS
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
4-Bromofluorobenzene (Surr)	*85*		*41 - 142*

Lab Sample ID: 400-234398-A-11 DU
Matrix: Water
Analysis Batch: 27218

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	240			254		ug/L				4	30
trans-1,2-Dichloroethene	9.4	I		8.94	I	ug/L				5	20
Vinyl chloride	170			184		ug/L				7	30
Trichloroethene	19			20.8		ug/L				10	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: MB 670-27396/7
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/23/23 12:19	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/23/23 12:19	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/23/23 12:19	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/23/23 12:19	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/23/23 12:19*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/23/23 12:19*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*03/23/23 12:19*	*1*

Lab Sample ID: LCS 670-27396/4
Matrix: Water
Analysis Batch: 27396

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	17.3		ug/L		87	56 - 128		
trans-1,2-Dichloroethene			20.0	18.2		ug/L		91	54 - 134		
Vinyl chloride			20.0	24.4		ug/L		122	20 - 167		
Trichloroethene			20.0	17.7		ug/L		88	62 - 135		

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*86*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16083-13 DU
Matrix: Water
Analysis Batch: 27396

Client Sample ID: MLPV-MW0102-030.0-20230310
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	13	U		13	U	ug/L				NC	30
trans-1,2-Dichloroethene	18	U		18	U	ug/L				NC	20
Vinyl chloride	440			18	U	ug/L				NC	30
Trichloroethene	22	U		22	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*104*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 400-234398-B-11 MS
Matrix: Water
Analysis Batch: 27165

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	220		200	435		ug/L		108	56 - 128		
trans-1,2-Dichloroethene - DL	7.8	I	200	232		ug/L		112	54 - 134		
Vinyl chloride - DL	160		200	478		ug/L		157	20 - 167		
Trichloroethene - DL	19		200	239		ug/L		110	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*100*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*

Lab Sample ID: 670-16083-14 MS
Matrix: Water
Analysis Batch: 27396

Client Sample ID: MLPV-MW0103-040.0-20230310
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene - DL	27	I	1000	1070		ug/L		105	56 - 128		
trans-1,2-Dichloroethene - DL	37	U	1000	1140		ug/L		114	54 - 134		
Vinyl chloride - DL	1000		1000	2590		ug/L		159	20 - 167		
Trichloroethene - DL	45	U	1000	1100		ug/L		110	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*
4-Bromofluorobenzene (Surr) - DL	*85*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

GC/MS VOA

Analysis Batch: 27061

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-1	WCPS-IW0016-020.0-20230309	Total/NA	Water	8260D	
670-16083-3	MLPV-MW0110-035.0-20230309	Total/NA	Water	8260D	
670-16083-4	MLPV-MW0109-025.0-20230309	Total/NA	Water	8260D	
670-16083-7	VABU-IW0001I-025.0-20230310	Total/NA	Water	8260D	
MB 670-27061/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27061/4	Lab Control Sample	Total/NA	Water	8260D	
670-16325-A-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-16325-A-1 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-9	WCPS-IW0005S-007.0-20230309	Total/NA	Water	8260D	
MB 670-27165/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27165/4	Lab Control Sample	Total/NA	Water	8260D	
400-234398-B-11 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-16083-A-8 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27218

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-5	MLPV-MW0091-052.5-20230309	Total/NA	Water	8260D	
670-16083-10	MLPV-MW0101-045.0-20230309	Total/NA	Water	8260D	
670-16083-12	MLPV-MW0092-052.5-20230309	Total/NA	Water	8260D	
670-16083-13	MLPV-MW0102-030.0-20230310	Total/NA	Water	8260D	
670-16083-14	MLPV-MW0103-040.0-20230310	Total/NA	Water	8260D	
670-16083-15	MLPV-MW0105-052.5-20230310	Total/NA	Water	8260D	
670-16083-16	MLPV-MW0106-030.0-20230310	Total/NA	Water	8260D	
670-16083-17	MLPV-MW0107-040.0-20230310	Total/NA	Water	8260D	
670-16083-18	MLPV-MW0104-052.5-20230310	Total/NA	Water	8260D	
MB 670-27218/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27218/4	Lab Control Sample	Total/NA	Water	8260D	
670-16001-E-3 MS	Matrix Spike	Total/NA	Water	8260D	
400-234398-A-11 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27396

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16083-10	MLPV-MW0101-045.0-20230309	Total/NA	Water	8260D	
670-16083-13	MLPV-MW0102-030.0-20230310	Total/NA	Water	8260D	
670-16083-14 - DL	MLPV-MW0103-040.0-20230310	Total/NA	Water	8260D	
MB 670-27396/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27396/4	Lab Control Sample	Total/NA	Water	8260D	
670-16083-14 MS - DL	MLPV-MW0103-040.0-20230310	Total/NA	Water	8260D	
670-16083-13 DU	MLPV-MW0102-030.0-20230310	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Client Sample ID: WCPS-IW0016-020.0-20230309
Lab Sample ID: 670-16083-1
Date Collected: 03/09/23 13:48
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 18:33

Client Sample ID: MLPV-MW0110-035.0-20230309
Lab Sample ID: 670-16083-3
Date Collected: 03/09/23 16:12
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 19:09

Client Sample ID: MLPV-MW0109-025.0-20230309
Lab Sample ID: 670-16083-4
Date Collected: 03/09/23 15:36
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 19:27

Client Sample ID: MLPV-MW0091-052.5-20230309
Lab Sample ID: 670-16083-5
Date Collected: 03/09/23 16:25
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 13:38

Client Sample ID: VABU-IW0001I-025.0-20230310
Lab Sample ID: 670-16083-7
Date Collected: 03/10/23 10:45
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27061	P1K	EET ORL	03/21/23 20:04

Client Sample ID: WCPS-IW0005S-007.0-20230309
Lab Sample ID: 670-16083-9
Date Collected: 03/09/23 14:39
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27165	T1Y	EET ORL	03/22/23 00:22

Client Sample ID: MLPV-MW0101-045.0-20230309
Lab Sample ID: 670-16083-10
Date Collected: 03/09/23 13:49
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		10	27218	KG	EET ORL	03/22/23 18:16
Total/NA	Analysis	8260D		1	27396	T1Y	EET ORL	03/23/23 16:24

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Client Sample ID: MLPV-MW0092-052.5-20230309
Lab Sample ID: 670-16083-12
Date Collected: 03/09/23 15:44
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 14:15

Client Sample ID: MLPV-MW0102-030.0-20230310
Lab Sample ID: 670-16083-13
Date Collected: 03/10/23 11:59
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 14:33
Total/NA	Analysis	8260D		25	27396	T1Y	EET ORL	03/23/23 13:22

Client Sample ID: MLPV-MW0103-040.0-20230310
Lab Sample ID: 670-16083-14
Date Collected: 03/10/23 12:38
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 14:51
Total/NA	Analysis	8260D	DL	50	27396	T1Y	EET ORL	03/23/23 13:40

Client Sample ID: MLPV-MW0105-052.5-20230310
Lab Sample ID: 670-16083-15
Date Collected: 03/10/23 11:06
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 15:09

Client Sample ID: MLPV-MW0106-030.0-20230310
Lab Sample ID: 670-16083-16
Date Collected: 03/10/23 11:48
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 15:27

Client Sample ID: MLPV-MW0107-040.0-20230310
Lab Sample ID: 670-16083-17
Date Collected: 03/10/23 11:05
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 15:46

Client Sample ID: MLPV-MW0104-052.5-20230310
Lab Sample ID: 670-16083-18
Date Collected: 03/10/23 12:15
Matrix: Water
Date Received: 03/10/23 16:15

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27218	KG	EET ORL	03/22/23 16:04

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16083-1
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16083-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16083-1	WCPS-IW0016-020.0-20230309	Water	03/09/23 13:48	03/10/23 16:15
670-16083-3	MLPV-MW0110-035.0-20230309	Water	03/09/23 16:12	03/10/23 16:15
670-16083-4	MLPV-MW0109-025.0-20230309	Water	03/09/23 15:36	03/10/23 16:15
670-16083-5	MLPV-MW0091-052.5-20230309	Water	03/09/23 16:25	03/10/23 16:15
670-16083-7	VABU-IW0001I-025.0-20230310	Water	03/10/23 10:45	03/10/23 16:15
670-16083-9	WCPS-IW0005S-007.0-20230309	Water	03/09/23 14:39	03/10/23 16:15
670-16083-10	MLPV-MW0101-045.0-20230309	Water	03/09/23 13:49	03/10/23 16:15
670-16083-12	MLPV-MW0092-052.5-20230309	Water	03/09/23 15:44	03/10/23 16:15
670-16083-13	MLPV-MW0102-030.0-20230310	Water	03/10/23 11:59	03/10/23 16:15
670-16083-14	MLPV-MW0103-040.0-20230310	Water	03/10/23 12:38	03/10/23 16:15
670-16083-15	MLPV-MW0105-052.5-20230310	Water	03/10/23 11:06	03/10/23 16:15
670-16083-16	MLPV-MW0106-030.0-20230310	Water	03/10/23 11:48	03/10/23 16:15
670-16083-17	MLPV-MW0107-040.0-20230310	Water	03/10/23 11:05	03/10/23 16:15
670-16083-18	MLPV-MW0104-052.5-20230310	Water	03/10/23 12:15	03/10/23 16:15

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

COC No. | Page: 1 of 2

Project Name: NASA KSC - MLPV | PO No. 148569 | Project No. 60615493.4 | Phase:

Site Location: LCP Monitoring - BSA / Hot Spot 2 / VAB | Send Invoice To: Instructions in MSA | EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings

TO No.: 80KSC019F0075 | AECOM Project Manager: **Linnea King Clark; Caroline Bekins** | Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando | Report to: Jennifer Chastain Cc: Teresa Amentt Jennings

Sampler/Phone # | Caroline Bekins 714-943-9928 | Madan Parsotan 321-696-6000 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-13

Lab Name: Eurofins | Turnaround Time(specify): Standard 14 day

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	WCPS-IW0016-020.0-20230309 MLPV-IW0009D	~~MLPV-IW0009D~~	20230309	1348	WG	N	G	3	3	
	MLPV-IW0038-035.0-20230310	~~MLPV-IW0009I~~	20230310	0856	WG	N	G	3	3	
	MW110-035.0-20230309 MLPV-IW0012D	~~MLPV-IW0012D~~	20230309	1612	WG	N	G	3	3	
	MW109-025.0-20230309 MLPV-IW0018D	~~MLPV-IW0018D~~	20230309	1536	WG	N	G	3	3	
	MW091-052.5-20230309 MLPV-IW0020D	~~MLPV-IW0020D~~	20230309	1625	WG	N	G	3	3	
	MLPV-IW0029D-031.5-20230309	~~MLPV-IW0029D~~	20230309	1358	WG	N	G	3	3	
	VABU-IW0001I-025.0-20230310 MLPV-IW0047	~~MLPV-IW0047~~	20230310	1045	WG	N	G	3	3	
	IW0039-045.0-20230310 MLPV-IW0052	~~MLPV-IW0052~~	20230310	0849	WG	N	G	3	3	
	WCPS-IW0055-057.5-20230309 MLPV-IW0053	~~MLPV-IW0053~~	20230309	1437	WG	N	G	3	3	
	MW101-045.0-20230309 MLPV-SAMW0001	~~MLPV-SAMW0001~~	20230309	1349	WG	N	G	3	3	
	IW0037-045.0-20230309 MLPV-SAMW0003	~~MLPV-SAMW0003~~	20230309	1425	WG	N	G	3	3	
	MLPV-MW092-052.5-20230309 PREC-IW0009	~~PREC-IW0009~~	20230309	1544	WG	N	G	3	3	

670-16083 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		3-10-23	1453		3/7/23	0730
2				James W Bruggy	3/7/23	1453
3					3/10/23	1615

1.5/1.0°C

(1) **AA**=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: **AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 2 of 2
Site Location: LCP Monitoring – BSA / Hot Spot 2 / VAB		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl										Comments
	~~SATV-IW0009I~~ MLPV-MW0102-030.0-20230310	~~SATV-IW0009I~~	202303 10	1159	WG	N	G	3	3										
	~~MLPV-VAB-IW0005D~~ MLPV-MW0103-040.0-20230310	~~MLPV-VAB-IW0005D~~	202303 10	1238	WG	N	G	3	3										
	~~VABU-IW0001I~~ MLPV-MW0105-052.5-20230310	~~VABU-IW0001I~~	202303 10	1106	WG	N	G	3	3										
	~~WCPS-IW0001SR~~ MLPV-MW0106-030.0-20230310	~~WCPS-IW0001SR~~	202303 10	1148	WG	N	G	3	3										
	~~WCPS-IW0015~~ MLPV-MW0107-040.0-20230310	~~WCPS-IW0016~~	202303 10	1105	WG	N	G	3	3										
	MLPV-~~IW0002IR~~ MW0104-052.5-20230310	~~MLPV-IW0002IR~~	202303 10	1215	WG	N	G	3	3										
	MLPV-IW0001D	**MLPV-IW0001D**	**202303**		**WG**	**N**	**G**	**3**	**3**										
	WCPS-IW0005S	**WCPS-IW0005S**	**202303**		**WG**	**N**	**G**	**3**	**3**										
	WCPS-IW0015S	**WCPS-IW0015S**	**202303**		**WG**	**N**	**G**	**3**	**3**										
	MLPV-IW0027I	**MLPV-IW0027I**	**202303**		**WG**	**N**	**G**	**3**	**3**										
	MLPV-IW0014I	**MLPV-IW0014I**	**202303**		**WG**	**N**	**G**	**3**	**3**										
	MLPV-IW0017I	**MLPV-IW0017I**	**202303**		**WG**	**N**	**G**	**3**	**3**										

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes____ No____
Shipping Company:
Tracking No: 1.5 oc
Date Shipped: 7.0

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	3-10-23	1453	1	3/7/23	0730
2			2 James W Gregory	3/10/23	1453
3			3	3/10/23	1615

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16083-1

Login Number: 16083
List Number: 1
Creator: Ferguson, Craig

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 11:55:49 AM Revision 1

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16141-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

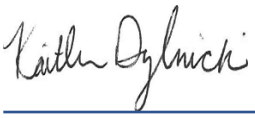
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Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Authorized for release by
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Revision 1

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J1	Estimated value; value may not be accurate. Surrogate recovery outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16141-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16141-1

REVISION

The report being provided is a revision of the original report sent on 3/27/2023. The report (revision 1) is being revised due to client request to include results for trichloroethene.

Receipt
The samples were received on 3/13/2023 4:33 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

GC/MS VOA
Method 8260D: Surrogate recovery for Dibromofluoromethane for the following sample was high just outside the upper control limit: MLPV-MW0099-045.0-20230313 (670-16141-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Client Sample ID: MLPV-IW0009D-047.5-20230313 — Lab Sample ID: 670-16141-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	23		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0087-052.5-20230313 — Lab Sample ID: 670-16141-5

No Detections.

Client Sample ID: MLPV-MW0089-040.0-20230313 — Lab Sample ID: 670-16141-6

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.1		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	1.8		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0098-025.0-20230313 — Lab Sample ID: 670-16141-7

No Detections.

Client Sample ID: MLPV-MW0099-045.0-20230313 — Lab Sample ID: 670-16141-8

No Detections.

Client Sample ID: MLPV-IW0053-040.0-20230313 — Lab Sample ID: 670-16141-9

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0009D-047.5-20230313 Lab Sample ID: 670-16141-1

Date Collected: 03/13/23 13:31 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 14:20	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 14:20	1
Vinyl chloride	**23**		1.0	0.71	ug/L			03/27/23 14:20	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 14:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/27/23 14:20*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 14:20*	*1*
4-Bromofluorobenzene (Surr)	*67*		*41 - 142*		*03/27/23 14:20*	*1*

Client Sample ID: MLPV-MW0087-052.5-20230313 Lab Sample ID: 670-16141-5

Date Collected: 03/13/23 12:40 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 15:30	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 15:30	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 15:30	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 15:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/27/23 15:30*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 15:30*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 15:30*	*1*

Client Sample ID: MLPV-MW0089-040.0-20230313 Lab Sample ID: 670-16141-6

Date Collected: 03/13/23 14:26 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**2.1**		1.0	0.53	ug/L			03/27/23 15:48	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 15:48	1
Vinyl chloride	**1.8**		1.0	0.71	ug/L			03/27/23 15:48	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 15:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 15:48*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 15:48*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*03/27/23 15:48*	*1*

Client Sample ID: MLPV-MW0098-025.0-20230313 Lab Sample ID: 670-16141-7

Date Collected: 03/13/23 10:34 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:53	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:53	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:53	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 12:53	1

Client Sample ID: MLPV-MW0098-025.0-20230313 Lab Sample ID: 670-16141-7

Date Collected: 03/13/23 10:34 **Matrix: Water**
Date Received: 03/13/23 16:33

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:53*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 12:53*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/27/23 12:53*	*1*

Client Sample ID: MLPV-MW0099-045.0-20230313 Lab Sample ID: 670-16141-8

Date Collected: 03/13/23 11:25 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 13:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 13:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 13:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 13:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/27/23 13:28*	*1*
Dibromofluoromethane (Surr)	*149*	*J1*	*53 - 146*		*03/27/23 13:28*	*1*
4-Bromofluorobenzene (Surr)	*65*		*41 - 142*		*03/27/23 13:28*	*1*

Client Sample ID: MLPV-IW0053-040.0-20230313 Lab Sample ID: 670-16141-9

Date Collected: 03/13/23 14:39 **Matrix: Water**
Date Received: 03/13/23 16:33

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 16:06	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 16:06	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 16:06	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 16:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/27/23 16:06*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 16:06*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/27/23 16:06*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16141-1	MLPV-IW0009D-047.5-2023031	101	102	67
670-16141-5	MLPV-MW0087-052.5-2023031 3	102	101	98
670-16141-6	MLPV-MW0089-040.0-2023031 3	99	100	96
670-16141-7	MLPV-MW0098-025.0-2023031 3	100	101	101
670-16141-7 DU	MLPV-MW0098-025.0-2023031 3	100	100	96
670-16141-8	MLPV-MW0099-045.0-2023031 3	102	149 J1	65
670-16141-8 MS	MLPV-MW0099-045.0-2023031 3	100	103	90
670-16141-9	MLPV-IW0053-040.0-20230313	102	101	101
LCS 670-27765/4	Lab Control Sample	103	99	99
MB 670-27765/7	Method Blank	100	102	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27765/7
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:35	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:35	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:35	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 12:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:35*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 12:35*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 12:35*	*1*

Lab Sample ID: LCS 670-27765/4
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.6		ug/L		93	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Vinyl chloride			20.0	24.9		ug/L		124	20 - 167		
Trichloroethene			20.0	18.1		ug/L		91	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16141-8 MS
Matrix: Water
Analysis Batch: 27765

Client Sample ID: MLPV-MW0099-045.0-20230313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	26.2		ug/L		131	54 - 134		
Vinyl chloride	0.71	U	20.0	28.2		ug/L		141	20 - 167		
Trichloroethene	0.89	U	20.0	21.6		ug/L		108	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16141-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: MLPV-MW0098-025.0-20230313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16141-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: MLPV-MW0098-025.0-20230313
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

GC/MS VOA

Analysis Batch: 27765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16141-1	MLPV-IW0009D-047.5-20230313	Total/NA	Water	8260D	
670-16141-5	MLPV-MW0087-052.5-20230313	Total/NA	Water	8260D	
670-16141-6	MLPV-MW0089-040.0-20230313	Total/NA	Water	8260D	
670-16141-7	MLPV-MW0098-025.0-20230313	Total/NA	Water	8260D	
670-16141-8	MLPV-MW0099-045.0-20230313	Total/NA	Water	8260D	
670-16141-9	MLPV-IW0053-040.0-20230313	Total/NA	Water	8260D	
MB 670-27765/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27765/4	Lab Control Sample	Total/NA	Water	8260D	
670-16141-8 MS	MLPV-MW0099-045.0-20230313	Total/NA	Water	8260D	
670-16141-7 DU	MLPV-MW0098-025.0-20230313	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Client Sample ID: MLPV-IW0009D-047.5-20230313
Lab Sample ID: 670-16141-1
Date Collected: 03/13/23 13:31
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 14:20

Client Sample ID: MLPV-MW0087-052.5-20230313
Lab Sample ID: 670-16141-5
Date Collected: 03/13/23 12:40
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 15:30

Client Sample ID: MLPV-MW0089-040.0-20230313
Lab Sample ID: 670-16141-6
Date Collected: 03/13/23 14:26
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 15:48

Client Sample ID: MLPV-MW0098-025.0-20230313
Lab Sample ID: 670-16141-7
Date Collected: 03/13/23 10:34
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 12:53

Client Sample ID: MLPV-MW0099-045.0-20230313
Lab Sample ID: 670-16141-8
Date Collected: 03/13/23 11:25
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 13:28

Client Sample ID: MLPV-IW0053-040.0-20230313
Lab Sample ID: 670-16141-9
Date Collected: 03/13/23 14:39
Matrix: Water
Date Received: 03/13/23 16:33

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 16:06

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-16141-1
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16141-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16141-1	MLPV-IW0009D-047.5-20230313	Water	03/13/23 13:31	03/13/23 16:33
670-16141-5	MLPV-MW0087-052.5-20230313	Water	03/13/23 12:40	03/13/23 16:33
670-16141-6	MLPV-MW0089-040.0-20230313	Water	03/13/23 14:26	03/13/23 16:33
670-16141-7	MLPV-MW0098-025.0-20230313	Water	03/13/23 10:34	03/13/23 16:33
670-16141-8	MLPV-MW0099-045.0-20230313	Water	03/13/23 11:25	03/13/23 16:33
670-16141-9	MLPV-IW0053-040.0-20230313	Water	03/13/23 14:39	03/13/23 16:33

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of	
Site Location: LCP Monitoring	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075 AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928 Madan Parsotan 321-696-6000 Devin Kehoe 919-943-3797	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-IW0079~~ MLPV-IW0009D-047.5-20230313		20230313	1331	WG	N	G	3	3	
	~~MLPV-IW0036~~ MLPV-IW0036-37.5-20230313	~~MLPV-IW0056~~	20230313	1035	WG	N	G	3	3	
	~~MLPV-IW0022D~~ MLPV-SAMW0004D-20230313	MLPV-IW0022D	20230313		WG	N	G	3	3	
	~~MLPV-IW0030~~ MLPV-SAMW0004D-047.5-20230313	~~MLPV-IW0030~~	20230313	1201	WG	N	G	3	3	
	~~MLPV-IW0051~~ MLPV-SAMW0004I-037.5-20230313	~~MLPV-IW0051~~	20230313	1121	WG	N	G	3	3	
	~~MLPV-IW0054~~ MLPV-MW0087-052.5-20230313	~~MLPV-IW0053~~	20230313	1240	WG	N	G	3	3	
	~~MLPV-IW0055~~ MLPV-MW0089-040.0-20230313	~~MLPV-IW0055~~	20230313	1426	WG	N	G	3	3	
	~~MLPV-MW0110~~ MLPV-MW0098-025.0-20230313	~~MLPV-MW0110~~	20230313	1034	WG	N	G	3	3	
	~~WCPS-IW0002SRR~~ MLPV-MW0099-045.0-20230313	~~WCPS-IW0003SRR~~	20230313	1125	WG	N	G	3	3	
	~~MLPV-MW0100~~ MLPV-IW0053-040.0-20230313	~~MLPV-MW0100~~	20230313	1439	WG	N	G	3	3	
	MLPV-MW0086	MLPV-MW0086	202303		WG	N	G	3	3	
	MLPV-MW0095	MLPV-MW0095	202303		WG	N	G	3	3	

670-16141 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-13-23	1515	James W Gregory	3/13/23	1515
2						
3				Craig Berg	3/13/23	1633

1.0/0.5°C

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDW**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16141-1

Login Number: 16141
List Number: 1
Creator: Ferguson, Craig

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 12:21:25 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16219-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

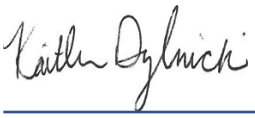
See page two for job notes and contact information.

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16219-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16219-2

REVISION

The report being provided is a revision of the original report sent on 3/28/2023. The report (revision 1) is being revised due to client request to include results for trichloroethene.

Receipt
The samples were received on 3/14/2023 4:43 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.6°C

GC/MS VOA
Method 8260D: Surrogate recovery for Dibromofluoromethane for the following sample was high just outside the upper control limit: (670-16141-C-8). This sample did not contain any target analytes; therefore, re-extraction and/or re-analysis was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Client Sample ID: MLPV-MW0088-040.0-20230314 — Lab Sample ID: 670-16219-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.3		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: WCPS-IW0015S-008.0-20230314 — Lab Sample ID: 670-16219-4

No Detections.

Client Sample ID: MLPV-IW0052-045.0-20230314 — Lab Sample ID: 670-16219-6

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.6		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	12		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0090-052.5-20230314 — Lab Sample ID: 670-16219-8

No Detections.

Client Sample ID: MLPV-IW0055-045.5-20230314 — Lab Sample ID: 670-16219-10

No Detections.

Client Sample ID: MLPV-IW0012D-045.5-20230314 — Lab Sample ID: 670-16219-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.5		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-SAMW-0001-043.0-20230314 — Lab Sample ID: 670-16219-12

No Detections.

Client Sample ID: MPLV-IW0014I-037.5-20230314 — Lab Sample ID: 670-16219-13

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.98	I	1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-MW0088-040.0-20230314

Lab Sample ID: 670-16219-2

Date Collected: 03/14/23 10:44
Matrix: Water
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 18:29	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 18:29	1
Vinyl chloride	**2.3**		1.0	0.71	ug/L			03/27/23 18:29	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 18:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/27/23 18:29*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/27/23 18:29*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/27/23 18:29*	*1*

Client Sample ID: WCPS-IW0015S-008.0-20230314

Lab Sample ID: 670-16219-4

Date Collected: 03/14/23 14:12
Matrix: Water
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 19:04	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 19:04	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 19:04	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 19:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 19:04*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*03/27/23 19:04*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*03/27/23 19:04*	*1*

Client Sample ID: MLPV-IW0052-045.0-20230314

Lab Sample ID: 670-16219-6

Date Collected: 03/14/23 10:57
Matrix: Water
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.6**		1.0	0.53	ug/L			03/27/23 19:39	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 19:39	1
Vinyl chloride	**12**		1.0	0.71	ug/L			03/27/23 19:39	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 19:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 19:39*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 19:39*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/27/23 19:39*	*1*

Client Sample ID: MLPV-MW0090-052.5-20230314

Lab Sample ID: 670-16219-8

Date Collected: 03/14/23 10:01
Matrix: Water
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 00:31	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 00:31	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 00:31	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 00:31	1

Client Sample ID: MLPV-MW0090-052.5-20230314 Lab Sample ID: 670-16219-8

Date Collected: 03/14/23 10:01 **Matrix: Water**
Date Received: 03/14/23 16:43

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 00:31*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/28/23 00:31*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/28/23 00:31*	*1*

Client Sample ID: MLPV-IW0055-045.5-20230314 Lab Sample ID: 670-16219-10

Date Collected: 03/14/23 09:18 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 01:06	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 01:06	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 01:06	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 01:06	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/28/23 01:06*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/28/23 01:06*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/28/23 01:06*	*1*

Client Sample ID: MLPV-IW0012D-045.5-20230314 Lab Sample ID: 670-16219-11

Date Collected: 03/14/23 12:36 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 01:24	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 01:24	1
Vinyl chloride	**2.5**		1.0	0.71	ug/L			03/28/23 01:24	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 01:24	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*65*		*40 - 146*		*03/28/23 01:24*	*1*
Dibromofluoromethane (Surr)	*97*		*53 - 146*		*03/28/23 01:24*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*03/28/23 01:24*	*1*

Client Sample ID: MLPV-SAMW-0001-043.0-20230314 Lab Sample ID: 670-16219-12

Date Collected: 03/14/23 11:47 **Matrix: Water**
Date Received: 03/14/23 16:43

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 22:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 22:46	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 22:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 22:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 22:46*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 22:46*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*03/27/23 22:46*	*1*

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Client Sample ID: MPLV-IW0014I-037.5-20230314
Date Collected: 03/14/23 11:37
Date Received: 03/14/23 16:43

Lab Sample ID: 670-16219-13
Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 23:21	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 23:21	1
Vinyl chloride	**0.98**	**I**	1.0	0.71	ug/L			03/27/23 23:21	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 23:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/27/23 23:21*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/27/23 23:21*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/27/23 23:21*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16141-A-8 MS	Matrix Spike	100	103	90
670-16141-C-7 DU	Duplicate	100	100	96
670-16219-2	MLPV-MW0088-040.0-20230314	101	103	99
670-16219-4	WCPS-IW0015S-008.0-20230314	100	99	102
670-16219-6	MLPV-IW0052-045.0-20230314	99	100	99
670-16219-8	MLPV-MW0090-052.5-20230314	99	100	100
670-16219-10	MLPV-IW0055-045.5-20230314	102	101	97
670-16219-11	MLPV-IW0012D-045.5-20230314	65	97	95
670-16219-12	MLPV-SAMW-0001-043.0-20230314	100	101	97
670-16219-12 DU	MLPV-SAMW-0001-043.0-20230314	100	100	102
670-16219-13	MPLV-IW0014I-037.5-20230314	102	101	101
670-16219-13 MS	MPLV-IW0014I-037.5-20230314	101	101	96
LCS 670-27765/4	Lab Control Sample	103	99	99
LCS 670-27858/4	Lab Control Sample	103	99	96
MB 670-27765/7	Method Blank	100	102	98
MB 670-27858/7	Method Blank	99	100	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27765/7
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 12:35	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 12:35	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 12:35	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 12:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/27/23 12:35*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/27/23 12:35*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 12:35*	*1*

Lab Sample ID: LCS 670-27765/4
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.6		ug/L		93	56 - 128		
trans-1,2-Dichloroethene			20.0	19.2		ug/L		96	54 - 134		
Vinyl chloride			20.0	24.9		ug/L		124	20 - 167		
Trichloroethene			20.0	18.1		ug/L		91	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16141-A-8 MS
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	26.2		ug/L		131	54 - 134		
Vinyl chloride	0.71	U	20.0	28.2		ug/L		141	20 - 167		
Trichloroethene	0.89	U	20.0	21.6		ug/L		108	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16141-C-7 DU
Matrix: Water
Analysis Batch: 27765

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: MB 670-27858/7
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 22:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 22:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 22:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 22:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 22:28*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 22:28*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 22:28*	*1*

Lab Sample ID: LCS 670-27858/4
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.5		ug/L		97	56 - 128
trans-1,2-Dichloroethene	20.0	22.5		ug/L		113	54 - 134
Vinyl chloride	20.0	21.4		ug/L		107	20 - 167
Trichloroethene	20.0	18.8		ug/L		94	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: 670-16219-13 MS
Matrix: Water
Analysis Batch: 27858

Client Sample ID: MPLV-IW0014I-037.5-20230314
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.53	U	20.0	21.0		ug/L		105	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	25.5		ug/L		128	54 - 134
Vinyl chloride	0.98	I	20.0	29.5		ug/L		143	20 - 167
Trichloroethene	0.89	U	20.0	21.2		ug/L		106	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16219-13 MS
Matrix: Water
Analysis Batch: 27858

Client Sample ID: MPLV-IW0014I-037.5-20230314
Prep Type: Total/NA

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: 670-16219-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: MLPV-SAMW-0001-043.0-20230314
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

GC/MS VOA

Analysis Batch: 27765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16219-2	MLPV-MW0088-040.0-20230314	Total/NA	Water	8260D	
670-16219-4	WCPS-IW0015S-008.0-20230314	Total/NA	Water	8260D	
670-16219-6	MLPV-IW0052-045.0-20230314	Total/NA	Water	8260D	
MB 670-27765/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27765/4	Lab Control Sample	Total/NA	Water	8260D	
670-16141-A-8 MS	Matrix Spike	Total/NA	Water	8260D	
670-16141-C-7 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16219-8	MLPV-MW0090-052.5-20230314	Total/NA	Water	8260D	
670-16219-10	MLPV-IW0055-045.5-20230314	Total/NA	Water	8260D	
670-16219-11	MLPV-IW0012D-045.5-20230314	Total/NA	Water	8260D	
670-16219-12	MLPV-SAMW-0001-043.0-20230314	Total/NA	Water	8260D	
670-16219-13	MPLV-IW0014I-037.5-20230314	Total/NA	Water	8260D	
MB 670-27858/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27858/4	Lab Control Sample	Total/NA	Water	8260D	
670-16219-13 MS	MPLV-IW0014I-037.5-20230314	Total/NA	Water	8260D	
670-16219-12 DU	MLPV-SAMW-0001-043.0-20230314	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Client Sample ID: MLPV-MW0088-040.0-20230314
Lab Sample ID: 670-16219-2
Date Collected: 03/14/23 10:44
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 18:29

Client Sample ID: WCPS-IW0015S-008.0-20230314
Lab Sample ID: 670-16219-4
Date Collected: 03/14/23 14:12
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 19:04

Client Sample ID: MLPV-IW0052-045.0-20230314
Lab Sample ID: 670-16219-6
Date Collected: 03/14/23 10:57
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27765	ES	EET ORL	03/27/23 19:39

Client Sample ID: MLPV-MW0090-052.5-20230314
Lab Sample ID: 670-16219-8
Date Collected: 03/14/23 10:01
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 00:31

Client Sample ID: MLPV-IW0055-045.5-20230314
Lab Sample ID: 670-16219-10
Date Collected: 03/14/23 09:18
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 01:06

Client Sample ID: MLPV-IW0012D-045.5-20230314
Lab Sample ID: 670-16219-11
Date Collected: 03/14/23 12:36
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 01:24

Client Sample ID: MLPV-SAMW-0001-043.0-20230314
Lab Sample ID: 670-16219-12
Date Collected: 03/14/23 11:47
Matrix: Water
Date Received: 03/14/23 16:43

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/27/23 22:46

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Client Sample ID: MPLV-IW0014I-037.5-20230314
Date Collected: 03/14/23 11:37
Date Received: 03/14/23 16:43

Lab Sample ID: 670-16219-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/27/23 23:21

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16219-2
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16219-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16219-2	MLPV-MW0088-040.0-20230314	Water	03/14/23 10:44	03/14/23 16:43
670-16219-4	WCPS-IW0015S-008.0-20230314	Water	03/14/23 14:12	03/14/23 16:43
670-16219-6	MLPV-IW0052-045.0-20230314	Water	03/14/23 10:57	03/14/23 16:43
670-16219-8	MLPV-MW0090-052.5-20230314	Water	03/14/23 10:01	03/14/23 16:43
670-16219-10	MLPV-IW0055-045.5-20230314	Water	03/14/23 09:18	03/14/23 16:43
670-16219-11	MLPV-IW0012D-045.5-20230314	Water	03/14/23 12:36	03/14/23 16:43
670-16219-12	MLPV-SAMW-0001-043.0-20230314	Water	03/14/23 11:47	03/14/23 16:43
670-16219-13	MPLV-IW0014I-037.5-20230314	Water	03/14/23 11:37	03/14/23 16:43

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4 / Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	~~Caroline Bekins 714-943-9928~~ ~~Madan Parsotan 321-696-6000~~ Devn Kehoe 919-943-5947	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-MW0099~~ MLPV-IW0033-045.0-20230314	~~MLPV-MW0099~~	202303 14	1431	WG	N	G	3	3	
	~~MLPV-MW0101~~ MLPV-MW0088-040.0-20230314	~~MLPV-MW0101~~	202303 14	1044	WG	N	G	3	3	
	~~MLPV-MW0085~~ MLPV-IW0042-035.0-20230314	~~MLPV-MW0085~~	202303 14	0927	WG	N	G	3	3	
	~~MLPV-MW0084~~ WCPS-IW00155-008.0-20230314	~~MLPV-MW0084~~	202303 14	1412	WG	N	G	3	3	
	~~MLPV-MW0076~~ MLPV-IW0048-045.0-20230314	~~MLPV-MW0076~~	202303 14	1316	WG	N	G	3	3	
	~~MLPV-MW0080~~ MLPV-IW0052-045.0-20230314	~~MLPV-MW0080~~	202303 14	1057	WG	N	G	3	3	
	~~MLPV-MW0083~~ MLPV-IW0043-045.0-20230314	~~MLPV-MW0083~~	202303	0959	WG	N	G	3	3	
	MLPV-MW0090 ~~0457.5-20230314~~	~~MLPV-MW0090~~	202303 14	1001	WG	N	G	3	3	
	~~MLPV-TB01~~ MLPV-IW0032-~~035.0~~ -20230314	~~MLPV-TB01~~	202303 14	1359	WG	N	G	3	3	
	MLPV-IW0055-045.0-20230314			0918						
	MLPV-IW0012D-045.0-20230314			1236						

670-16219 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-13

	Relinquished by (signature)	Date	Time
1		3-14-23	1512
2			
3			

***Lab* Comments:**

	Received by (signature)	Date	Time
1	James W Diggs	3/14/23	1512
2	MC	3/14/23	16 43
3			

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes ✓ No ____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2 1 1 6

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # ~~Caroline Bekins 714-943-9928~~	~~Madan Parsotan 321-696-6000~~ Devin Kehoe 919-943-3747	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl / Total No. of Containers	Select VOCs by SW8260B	Comments
	~~MLPV-MW0107~~ MLPV-SAMW-0001-043.0-20230314	~~MLPV-MW0107~~	202303 14	1147	WG	N	G	3	3	
	~~MLPV-MW0100~~ MLPV-IW0014I-037.6-20230314	~~MLPV-MW0100~~	202303 14	1137	WG	N	G	3	3	
	MLPV-MW0088	MLPV-MW0088	202303		WG	N	G	3	3	
	MLPV-MW0089	MLPV-MW0089	202303		WG	N	G	3	3	
	MLPV-MW0093	MLPV-MW0093	202303		WG	N	G	3	3	
	MLPV-MW0097	MLPV-MW0097	202303		WG	N	G	3	3	
	MLPV-MW0082	MLPV-MW0082	202303		WG	N	G	3	3	
	MLPV-MW0104	MLPV-MW0104	202303		WG	N	G	3	3	
	MLPV-MW0105	MLPV-MW0105	202303		WG	N	G	3	3	
	MLPV-MW0091	MLPV-MW0091	202303		WG	N	G	3	3	
	MLPV-MW0087	MLPV-MW0087	202303		WG	N	G	3	3	
	MLPV-MW0092	MLPV-MW0092	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Denton	3-14-23	1512	James W Gregory	3/14/23	1512
2				RTC	3/14/23	1643
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2.1/1.6

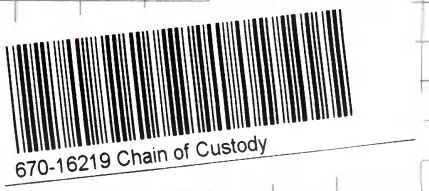
CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of	
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins ~~714-943-0928~~ ~~Madan Parseton 321-696-6000~~ Devm Kehoe 919-943-5447	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B	Comments
	~~MLPV-MW0099~~ MLPV-IW0033-045.0-~~MLPV-MW0099~~ 20230314		202303 14	1431	WG	N	G	3	3	
	~~MLPV-MW0101~~ MLPV-MW0088-040.0-~~MLPV-MW0101~~ 20230314		202303 14	1044	WG	N	G	3	3	
	~~MLPV-MW0085~~ MLPV-IW0042-035.0-~~MLPV-MW0085~~ 20230314		202303 14	0927	WG	N	G	3	3	
	~~MLPV-MW0084~~ WCPS-IW0015S-068.0-~~MLPV-MW0084~~ 20230314		202303 14	1412	WG	N	G	3	3	
	~~MLPV-MW0076~~ MLPV-IW0048-045.0-~~MLPV-MW0076~~ 20230314		202303 14	1316	WG	N	G	3	3	
	~~MLPV-MW0080~~ MLPV-IW0052-045.0-~~MLPV-MW0080~~ 20230314		202303 14	1057	WG	N	G	3	3	
	~~MLPV-MW0083~~ MLPV-IW0043-045.0-~~MLPV-MW0083~~ 20230314		202303	0959	WG	N	G	3	3	
	MLPV-MW0090 ~~MLPV-MW0090~~ 0982.5-20230314		202303 14	1001	WG	N	G	3	3	
	~~MLPV-TB01~~ MLPV-IW0082-~~MLPV-TB01~~ 035.5-20230314		202303 14	1359	WG	N	G	3	3	
	MLPV-IW0055-045.0-20230314			0918						
	MLPV-IW0012D-045.0-20230314			1236						



***Field* Comments:**

Report only per QAPP WS #15-13

***Lab* Comments:**

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	3-14-23	1512	1 James W Dragoo	3/14/23	1512
2			2 MC	3/14/23	16 43
3			3		

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

Samples Iced?(check) Yes✓ No____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2/1/16

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of	
Site Location: LCP Monitoring		PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # ~~Caroline Bekins 714-943-9928~~	~~Madan Parsotan 321-696-6000~~ Devin Kehoe 919-943-3744	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl — Total No. of Containers	(3) HCl — Select VOCs by SW8260B	Comments
	~~MLPV-MW0107~~ MLPV-SAMW-0001-043.0-20230314	~~MLPV-MW0107~~	202303 14	1147	WG	N	G	3	3	
	~~MLPV-MW0106~~ MLPV-IW0014I-037.8-20230314	~~MLPV-MW0106~~	202303 14	1137	WG	N	G	3	3	
	MLPV-MW0088	MLPV-MW0088	202303		WG	N	G	3	3	
	MLPV-MW0089	MLPV-MW0089	202303		WG	N	G	3	3	
	MLPV-MW0093	MLPV-MW0093	202303		WG	N	G	3	3	
	MLPV-MW0097	MLPV-MW0097	202303		WG	N	G	3	3	
	MLPV-MW0082	MLPV-MW0082	202303		WG	N	G	3	3	
	MLPV-MW0104	MLPV-MW0104	202303		WG	N	G	3	3	
	MLPV-MW0105	MLPV-MW0105	202303		WG	N	G	3	3	
	MLPV-MW0091	MLPV-MW0091	202303		WG	N	G	3	3	
	MLPV-MW0087	MLPV-MW0087	202303		WG	N	G	3	3	
	MLPV-MW0092	MLPV-MW0092	202303		WG	N	G	3	3	

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-14-23	1572	James W Gregory MAC	3/14/23	1572
2					3/14/23	1643
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: **AB**=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2-1-1-6

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16219-2

Login Number: 16219
List Number: 1
Creator: Clerisier, Meline

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 12:42:24 PM Revision 2

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16320-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

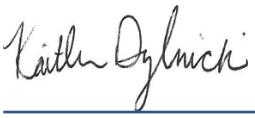
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Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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7/3/2023 12:42:24 PM
Revision 2

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QC Sample Results 11
QC Association Summary 14
Lab Chronicle 15
Certification Summary 17
Method Summary 18
Sample Summary 19
Chain of Custody 20
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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16320-1
Project/Site: NASA KSC MLPV LCP

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
L	Off-scale high. Actual value is known to be greater than the value given.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16320-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16320-1

Revision
The report being provided is a revision of the original report sent on 3/31/2023. The report (revision 2) is being revised due to: client request to include results for trichloroethene.

Report revision history
Revision 1 - 5/4/2023 - Reason - update of sample IDs to match the chain of custody. (670-16320-4) MLPV-MW0086-020.0-20230314 & (670-16320-5) MPLV-MW0093-040.0-20230315..

Receipt
The samples were received on 3/15/2023 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.8°C

GC/MS VOA
Method 8260D: For the matrix spike (MS) associated with analytical batch 670-27904, due to the additional level of Vinyl Chloride present in the spiked samples, the concentration in the MS was above the instrument calibration range and not able to be quantified above the calibration range due to curve fit used in calibration.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Client Sample ID: MLPV-IW0054-045.0-20230315 — Lab Sample ID: 670-16320-2

No Detections.

Client Sample ID: MLPV-IW0018D-052.5-20230315 — Lab Sample ID: 670-16320-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.95	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	3.6		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0086-020.0-20230314 — Lab Sample ID: 670-16320-4

No Detections.

Client Sample ID: MLPV-MW0093-040.0-20230315 — Lab Sample ID: 670-16320-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.85	I	1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0009I-030.5-20230314 — Lab Sample ID: 670-16320-6

No Detections.

Client Sample ID: MLPV-IW0017I-037.5-20230314 — Lab Sample ID: 670-16320-8

No Detections.

Client Sample ID: MLPV-IW0022D-050.5-20230315 — Lab Sample ID: 670-16320-9

No Detections.

Client Sample ID: MLPV-IW0049-043.0-20230315 — Lab Sample ID: 670-16320-10

No Detections.

Client Sample ID: MLPV-IW0029D-044.5-20230315 — Lab Sample ID: 670-16320-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.88	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	39		1.0	0.71	ug/L	1		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0054-045.0-20230315 Lab Sample ID: 670-16320-2

Date Collected: 03/15/23 10:56 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 02:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 02:16	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 02:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 02:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/28/23 02:16*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 02:16*	*1*
4-Bromofluorobenzene (Surr)	*79*		*41 - 142*		*03/28/23 02:16*	*1*

Client Sample ID: MLPV-IW0018D-052.5-20230315 Lab Sample ID: 670-16320-3

Date Collected: 03/15/23 13:17 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.95**	**I**	1.0	0.53	ug/L			03/28/23 02:34	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 02:34	1
Vinyl chloride	**3.6**		1.0	0.71	ug/L			03/28/23 02:34	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 02:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/28/23 02:34*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 02:34*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/28/23 02:34*	*1*

Client Sample ID: MLPV-MW0086-020.0-20230314 Lab Sample ID: 670-16320-4

Date Collected: 03/14/23 15:57 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 02:51	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 02:51	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 02:51	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 02:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/28/23 02:51*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*03/28/23 02:51*	*1*
4-Bromofluorobenzene (Surr)	*116*		*41 - 142*		*03/28/23 02:51*	*1*

Client Sample ID: MLPV-MW0093-040.0-20230315 Lab Sample ID: 670-16320-5

Date Collected: 03/15/23 10:13 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 03:09	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 03:09	1
Vinyl chloride	**0.85**	**I**	1.0	0.71	ug/L			03/28/23 03:09	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 03:09	1

Client Sample ID: MLPV-MW0093-040.0-20230315 Lab Sample ID: 670-16320-5

Date Collected: 03/15/23 10:13 **Matrix: Water**
Date Received: 03/15/23 15:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		03/28/23 03:09	1
Dibromofluoromethane (Surr)	102		53 - 146		03/28/23 03:09	1
4-Bromofluorobenzene (Surr)	65		41 - 142		03/28/23 03:09	1

Client Sample ID: MLPV-IW0009I-030.5-20230314 Lab Sample ID: 670-16320-6

Date Collected: 03/14/23 17:01 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 03:26	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 03:26	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 03:26	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 03:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		03/28/23 03:26	1
Dibromofluoromethane (Surr)	100		53 - 146		03/28/23 03:26	1
4-Bromofluorobenzene (Surr)	99		41 - 142		03/28/23 03:26	1

Client Sample ID: MLPV-IW0017I-037.5-20230314 Lab Sample ID: 670-16320-8

Date Collected: 03/14/23 17:35 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 15:30	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 15:30	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 15:30	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 15:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146		03/28/23 15:30	1
Dibromofluoromethane (Surr)	102		53 - 146		03/28/23 15:30	1
4-Bromofluorobenzene (Surr)	103		41 - 142		03/28/23 15:30	1

Client Sample ID: MLPV-IW0022D-050.5-20230315 Lab Sample ID: 670-16320-9

Date Collected: 03/15/23 12:23 **Matrix: Water**
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 15:48	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 15:48	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 15:48	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 15:48	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		03/28/23 15:48	1
Dibromofluoromethane (Surr)	101		53 - 146		03/28/23 15:48	1
4-Bromofluorobenzene (Surr)	98		41 - 142		03/28/23 15:48	1

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Client Sample ID: MLPV-IW0049-043.0-20230315

Lab Sample ID: 670-16320-10

Date Collected: 03/15/23 11:38
Matrix: Water
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 13:26	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 13:26	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 13:26	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 13:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/28/23 13:26*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/28/23 13:26*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/28/23 13:26*	*1*

Client Sample ID: MLPV-IW0029D-044.5-20230315

Lab Sample ID: 670-16320-11

Date Collected: 03/15/23 14:53
Matrix: Water
Date Received: 03/15/23 15:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.88**	**I**	1.0	0.53	ug/L			03/28/23 14:01	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 14:01	1
Vinyl chloride	**39**		1.0	0.71	ug/L			03/28/23 14:01	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 14:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/28/23 14:01*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/28/23 14:01*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/28/23 14:01*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16219-C-12 DU	Duplicate	100	100	102
670-16219-C-13 MS	Matrix Spike	101	101	96
670-16320-2	MLPV-IW0054-045.0-20230315	100	102	79
670-16320-3	MLPV-IW0018D-052.5-20230315	101	102	98
670-16320-4	MLPV-MW0086-020.0-20230314	101	104	116
670-16320-5	MLPV-MW0093-040.0-20230315	101	102	65
670-16320-6	MLPV-IW0009I-030.5-20230314	100	100	99
670-16320-8	MLPV-IW0017I-037.5-20230314	102	102	103
670-16320-9	MLPV-IW0022D-050.5-20230315	100	101	98
670-16320-10	MLPV-IW0049-043.0-20230315	99	103	100
670-16320-10 DU	MLPV-IW0049-043.0-20230315	103	100	96
670-16320-11	MLPV-IW0029D-044.5-20230315	101	101	100
670-16320-11 MS	MLPV-IW0029D-044.5-20230315	101	99	99
LCS 670-27858/4	Lab Control Sample	103	99	96
LCS 670-27904/4	Lab Control Sample	102	100	99
MB 670-27858/7	Method Blank	99	100	98
MB 670-27904/7	Method Blank	100	101	98

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27858/7
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/27/23 22:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/27/23 22:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/27/23 22:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/27/23 22:28	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/27/23 22:28*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/27/23 22:28*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/27/23 22:28*	*1*

Lab Sample ID: LCS 670-27858/4
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	19.5		ug/L		97	56 - 128		
trans-1,2-Dichloroethene			20.0	22.5		ug/L		113	54 - 134		
Vinyl chloride			20.0	21.4		ug/L		107	20 - 167		
Trichloroethene			20.0	18.8		ug/L		94	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: 670-16219-C-13 MS
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	21.0		ug/L		105	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	25.5		ug/L		128	54 - 134		
Vinyl chloride	0.98	I	20.0	29.5		ug/L		143	20 - 167		
Trichloroethene	0.89	U	20.0	21.2		ug/L		106	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

Lab Sample ID: 670-16219-C-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16219-C-12 DU
Matrix: Water
Analysis Batch: 27858

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*

Lab Sample ID: MB 670-27904/7
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 13:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 13:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 13:08	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 13:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/28/23 13:08*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/28/23 13:08*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*03/28/23 13:08*	*1*

Lab Sample ID: LCS 670-27904/4
Matrix: Water
Analysis Batch: 27904

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	21.1		ug/L		106	56 - 128
trans-1,2-Dichloroethene	20.0	19.8		ug/L		99	54 - 134
Vinyl chloride	20.0	19.6		ug/L		98	20 - 167
Trichloroethene	20.0	20.7		ug/L		103	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16320-11 MS
Matrix: Water
Analysis Batch: 27904

Client Sample ID: MLPV-IW0029D-044.5-20230315
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.88	I	20.0	22.2		ug/L		106	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	24.5		ug/L		122	54 - 134
Vinyl chloride	39		20.0	NQ	L	ug/L			20 - 167
Trichloroethene	0.89	U	20.0	21.1		ug/L		106	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16320-11 MS
Matrix: Water
Analysis Batch: 27904

Client Sample ID: MLPV-IW0029D-044.5-20230315
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*99*		*53 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*

Lab Sample ID: 670-16320-10 DU
Matrix: Water
Analysis Batch: 27904

Client Sample ID: MLPV-IW0049-043.0-20230315
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

GC/MS VOA

Analysis Batch: 27858

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16320-2	MLPV-IW0054-045.0-20230315	Total/NA	Water	8260D	
670-16320-3	MLPV-IW0018D-052.5-20230315	Total/NA	Water	8260D	
670-16320-4	MLPV-MW0086-020.0-20230314	Total/NA	Water	8260D	
670-16320-5	MLPV-MW0093-040.0-20230315	Total/NA	Water	8260D	
670-16320-6	MLPV-IW0009I-030.5-20230314	Total/NA	Water	8260D	
MB 670-27858/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27858/4	Lab Control Sample	Total/NA	Water	8260D	
670-16219-C-13 MS	Matrix Spike	Total/NA	Water	8260D	
670-16219-C-12 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 27904

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16320-8	MLPV-IW0017I-037.5-20230314	Total/NA	Water	8260D	
670-16320-9	MLPV-IW0022D-050.5-20230315	Total/NA	Water	8260D	
670-16320-10	MLPV-IW0049-043.0-20230315	Total/NA	Water	8260D	
670-16320-11	MLPV-IW0029D-044.5-20230315	Total/NA	Water	8260D	
MB 670-27904/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27904/4	Lab Control Sample	Total/NA	Water	8260D	
670-16320-11 MS	MLPV-IW0029D-044.5-20230315	Total/NA	Water	8260D	
670-16320-10 DU	MLPV-IW0049-043.0-20230315	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Client Sample ID: MLPV-IW0054-045.0-20230315
Lab Sample ID: 670-16320-2
Date Collected: 03/15/23 10:56
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 02:16

Client Sample ID: MLPV-IW0018D-052.5-20230315
Lab Sample ID: 670-16320-3
Date Collected: 03/15/23 13:17
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 02:34

Client Sample ID: MLPV-MW0086-020.0-20230314
Lab Sample ID: 670-16320-4
Date Collected: 03/14/23 15:57
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 02:51

Client Sample ID: MLPV-MW0093-040.0-20230315
Lab Sample ID: 670-16320-5
Date Collected: 03/15/23 10:13
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 03:09

Client Sample ID: MLPV-IW0009I-030.5-20230314
Lab Sample ID: 670-16320-6
Date Collected: 03/14/23 17:01
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27858	T1Y	EET ORL	03/28/23 03:26

Client Sample ID: MLPV-IW0017I-037.5-20230314
Lab Sample ID: 670-16320-8
Date Collected: 03/14/23 17:35
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27904	ES	EET ORL	03/28/23 15:30

Client Sample ID: MLPV-IW0022D-050.5-20230315
Lab Sample ID: 670-16320-9
Date Collected: 03/15/23 12:23
Matrix: Water
Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27904	ES	EET ORL	03/28/23 15:48

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Client Sample ID: MLPV-IW0049-043.0-20230315

Lab Sample ID: 670-16320-10

Date Collected: 03/15/23 11:38

Matrix: Water

Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27904	ES	EET ORL	03/28/23 13:26

Client Sample ID: MLPV-IW0029D-044.5-20230315

Lab Sample ID: 670-16320-11

Date Collected: 03/15/23 14:53

Matrix: Water

Date Received: 03/15/23 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27904	ES	EET ORL	03/28/23 14:01

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc. Job ID: 670-16320-1
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16320-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16320-2	MLPV-IW0054-045.0-20230315	Water	03/15/23 10:56	03/15/23 15:30
670-16320-3	MLPV-IW0018D-052.5-20230315	Water	03/15/23 13:17	03/15/23 15:30
670-16320-4	MLPV-MW0086-020.0-20230314	Water	03/14/23 15:57	03/15/23 15:30
670-16320-5	MLPV-MW0093-040.0-20230315	Water	03/15/23 10:13	03/15/23 15:30
670-16320-6	MLPV-IW0009I-030.5-20230314	Water	03/14/23 17:01	03/15/23 15:30
670-16320-8	MLPV-IW0017I-037.5-20230314	Water	03/14/23 17:35	03/15/23 15:30
670-16320-9	MLPV-IW0022D-050.5-20230315	Water	03/15/23 12:23	03/15/23 15:30
670-16320-10	MLPV-IW0049-043.0-20230315	Water	03/15/23 11:38	03/15/23 15:30
670-16320-11	MLPV-IW0029D-044.5-20230315	Water	03/15/23 14:53	03/15/23 15:30

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of	
Site Location: LCP Monitoring			PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager:	Linnea King Clark; Caroline Bekins	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000 Devin Kehoe 914-943-3949	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins		Turnaround Time(specify): Standard 14 day	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B HCl											Comments
	~~MLPV-MW0102~~ MLPV-IW0028I-030.5-20230315	~~MLPV-MW0102~~	202303 15	1305	WG	N	G	3	3											
	~~MLPV-MW0106~~ MLPV-IW0054-045.0-20230315	~~MLPV-MW0106~~	202303 15	1056	WG	N	G	3	3											
	~~MLPV-IW0021R~~ MLPV-IW0018D-052.5-20230315	~~MLPV-IW0021R~~	202303 15	1317	WG	N	G	3	3											
	~~MLPV-MW0109~~ MLPV-MW0086-020.0-20230314	~~MLPV-MW0109~~	202303 14	1557	WG	N	G	3	3											
	~~MLPV-MW0078~~ MLPV-MW0093-040.0-20230315	~~MLPV-MW0078~~	202303 15	1013	WG	N	G	3	3											
	~~MLPV-MW0077~~ MLPV-IW0081-030.5-20230314	~~MLPV-MW0077~~	202303 14	1701	WG	N	G	3	3											
	~~MLPV-MW0081~~ MLPV-IW0044-045.0-20230314	~~MLPV-MW0081~~	202303 14	1654	WG	N	G	3	3											
	~~MLPV-MW0079~~ MLPV-IW0017I-037.5-20230314	~~MLPV-MW0079~~	202303 14	1735	WG	N	G	3	3											
	~~MLPV-MW0098~~ MLPV-IW0022D-050.5-20230315	~~MLPV-MW0098~~	202303 15	1223	WG	N	G	3	3											
	~~MLPV-MW0096~~ MLPV-IW0049-043.0-20230315	~~MLPV-MW0096~~	202303 15	1138	WG	N	G	3	3											
	~~MLPV-MW0094~~ MLPV-IW0029D-044.5-20230315	~~MLPV-MW0094~~	202303 15	1453	WG	N	G	3	3											
	~~MLPV-MW0103~~	~~MLPV-MW0103~~	202303		WG	N	G	3	3											

670-16320 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-15-23	1530	James W Shegay	3/15/23	1530
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Tnp Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2,311,8

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of	
Site Location: LCP Monitoring	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000 Devin Kehoe 914-943-3249	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Total No. of Containers (3)	Select VOCs by SW8260B (HCl)	Comments
	~~MLPV-MW0102~~ MLPV-IW0028I-030.5-20230315	~~MLPV-MW0102~~	202303 15	1305	WG	N	G	3	3	
	~~MLPV-MW0106~~ MLPV-IW0054-045.0-20230315	~~MLPV-MW0106~~	202303 15	1056	WG	N	G	3	3	
	~~MLPV-IW0021R~~ MLPV-IW0018D-052.5-20230315	~~MLPV-IW0021R~~	202303 15	1317	WG	N	G	3	3	
	~~MLPV-MW0109~~ MLPV-MW0086-020.0-20230314	~~MLPV-MW0109~~	202303 14	1557	WG	N	G	3	3	
	~~MLPV-MW0078~~ MLPV-MW0093-040.0-20230315	~~MLPV-MW0078~~	202303 15	1013	WG	N	G	3	3	
	~~MLPV-MW0077~~ MLPV-IW0081-030.5-20230314	~~MLPV-MW0077~~	202303 14	1701	WG	N	G	3	3	
	~~MLPV-MW0081~~ MLPV-IW0044-045.0-20230314	~~MLPV-MW0081~~	202303 14	1654	WG	N	G	3	3	
	~~MLPV-MW0079~~ MLPV-IW0017I-037.5-20230314	~~MLPV-MW0079~~	202303 14	1735	WG	N	G	3	3	
	~~MLPV-MW0098~~ MLPV-IW0022D-050.5-20230315	~~MLPV-MW0098~~	202303 15	1223	WG	N	G	3	3	
	~~MLPV-MW0096~~ MLPV-IW0049-043.0-20230315	~~MLPV-MW0096~~	202303 15	1138	WG	N	G	3	3	
	~~MLPV-MW0094~~ MLPV-IW0029D-044.5-20230315	~~MLPV-MW0094~~	202303 15	1453	WG	N	G	3	3	
	~~MLPV-MW0103~~	~~MLPV-MW0103~~	202303		WG	N	G	3	3	

670-16320 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	3-15-23	1530	James W Shegay	3/15/23	1530
2						
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Tnp Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

2,311,8

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16320-1

Login Number: 16320
List Number: 1
Creator: Wehr, Alex C

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 1:17:40 PM Revision 2

JOB DESCRIPTION

NASA KSC MLPV LCP

JOB NUMBER

670-16417-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

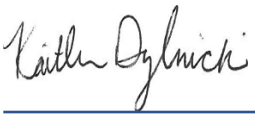
my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Generated
7/3/2023 1:17:40 PM
Revision 2

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

Table of Contents

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QC Association Summary 12
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Method Summary 15
Sample Summary 16
Chain of Custody 17
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Definitions/Glossary

Client: AECOM Technical Services Inc.
Job ID: 670-16417-2
Project/Site: NASA KSC MLPV LCP

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16417-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16417-2

Revision
The report being provided is a revision of the original report sent on 3/29/2023. The report (revision 2) is being revised due to: client request to include results for trichloroethene.

Report revision history
Revision 1 - 3/30/2023 - Reason - The report (revision 1) is being revised due to missing chain of custody in original report and to update sample ID for MLPV-IW0056-035.0-20230316 (670-16417-5).

Receipt
The samples were received on 3/16/2023 3:45 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.5°C

GC/MS VOA
Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for the following sample associated with analytical batch 670-28045 were outside control limits: (870-15440-B-3 MS). The associated laboratory control sample (LCS) recovery met acceptance criteria.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16417-2

Client Sample ID: MLPV-SAMW0003-045.0-20230316 — Lab Sample ID: 670-16417-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	95		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	6.1		1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	67		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0056-035.0-20230316 — Lab Sample ID: 670-16417-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-SAMW0003-045.0-20230316

Lab Sample ID: 670-16417-4

Date Collected: 03/16/23 10:27
Matrix: Water
Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**95**		1.0	0.53	ug/L			03/28/23 19:17	1
trans-1,2-Dichloroethene	**6.1**		1.0	0.73	ug/L			03/28/23 19:17	1
Vinyl chloride	**67**		1.0	0.71	ug/L			03/28/23 19:17	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 19:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/28/23 19:17*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/28/23 19:17*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/28/23 19:17*	*1*

Client Sample ID: MLPV-IW0056-035.0-20230316

Lab Sample ID: 670-16417-5

Date Collected: 03/16/23 12:55
Matrix: Water
Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 11:49	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 19:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 19:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/28/23 19:36*	*1*
Toluene-d8 (Surr)	*100*		*40 - 146*		*03/29/23 11:49*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*03/28/23 19:36*	*1*
Dibromofluoromethane (Surr)	*113*		*53 - 146*		*03/29/23 11:49*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/28/23 19:36*	*1*
4-Bromofluorobenzene (Surr)	*88*		*41 - 142*		*03/29/23 11:49*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16417-2

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
670-16417-4	MLPV-SAMW0003-045.0-20230	102	105	92
670-16417-5	MLPV-IW0056-035.0-20230316	103	105	93
670-16417-5	MLPV-IW0056-035.0-20230316	100	113	88
670-16676-B-2 DU	Duplicate	103	105	95
670-16676-C-1 MS	Matrix Spike	101	102	88
870-15440-B-1 DU	Duplicate	100	109	88
870-15440-B-3 MS	Matrix Spike	98	106	90
LCS 670-27908/4	Lab Control Sample	103	101	95
LCS 670-28045/4	Lab Control Sample	99	104	88
MB 670-27908/7	Method Blank	103	102	93
MB 670-28045/7	Method Blank	99	109	86

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27908/7
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 12:36	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 12:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 12:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 12:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/28/23 12:36*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 12:36*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/28/23 12:36*	*1*

Lab Sample ID: LCS 670-27908/4
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.3		ug/L		92	56 - 128		
trans-1,2-Dichloroethene			20.0	18.1		ug/L		90	54 - 134		
Vinyl chloride			20.0	24.3		ug/L		122	20 - 167		
Trichloroethene			20.0	18.6		ug/L		93	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Lab Sample ID: 670-16676-C-1 MS
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	22.4		ug/L		112	54 - 134		
Vinyl chloride	0.71	U	20.0	27.8		ug/L		139	20 - 167		
Trichloroethene	0.89	U	20.0	22.7		ug/L		114	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
4-Bromofluorobenzene (Surr)	*88*		*41 - 142*

Lab Sample ID: 670-16676-B-2 DU
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16676-B-2 DU
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
Dibromofluoromethane (Surr)	*105*		*53 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*

Lab Sample ID: MB 670-28045/7
Matrix: Water
Analysis Batch: 28045

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 10:07	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/29/23 10:07	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/29/23 10:07	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/29/23 10:07	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/29/23 10:07*	*1*
Dibromofluoromethane (Surr)	*109*		*53 - 146*		*03/29/23 10:07*	*1*
4-Bromofluorobenzene (Surr)	*86*		*41 - 142*		*03/29/23 10:07*	*1*

Lab Sample ID: LCS 670-28045/4
Matrix: Water
Analysis Batch: 28045

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			2.50	2.74		ug/L		110	56 - 128		
trans-1,2-Dichloroethene			2.50	2.80		ug/L		112	54 - 134		
Vinyl chloride			2.50	1.93		ug/L		77	20 - 167		
Trichloroethene			2.50	3.20		ug/L		128	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*104*		*53 - 146*
4-Bromofluorobenzene (Surr)	*88*		*41 - 142*

Lab Sample ID: 870-15440-B-3 MS
Matrix: Water
Analysis Batch: 28045

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	2.50	1.53		ug/L		61	56 - 128		
trans-1,2-Dichloroethene	0.73	U	2.50	1.63		ug/L		65	54 - 134		
Vinyl chloride	0.71	U	2.50	2.73		ug/L		109	20 - 167		
Trichloroethene	0.89	U	2.50	1.65		ug/L		66	62 - 135		

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 870-15440-B-3 MS
Matrix: Water
Analysis Batch: 28045

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*98*		*40 - 146*
Dibromofluoromethane (Surr)	*106*		*53 - 146*
4-Bromofluorobenzene (Surr)	*90*		*41 - 142*

Lab Sample ID: 870-15440-B-1 DU
Matrix: Water
Analysis Batch: 28045

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*109*		*53 - 146*
4-Bromofluorobenzene (Surr)	*88*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16417-2

GC/MS VOA

Analysis Batch: 27908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-4	MLPV-SAMW0003-045.0-20230316	Total/NA	Water	8260D	
670-16417-5	MLPV-IW0056-035.0-20230316	Total/NA	Water	8260D	
MB 670-27908/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27908/4	Lab Control Sample	Total/NA	Water	8260D	
670-16676-C-1 MS	Matrix Spike	Total/NA	Water	8260D	
670-16676-B-2 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 28045

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-5	MLPV-IW0056-035.0-20230316	Total/NA	Water	8260D	
MB 670-28045/7	Method Blank	Total/NA	Water	8260D	
LCS 670-28045/4	Lab Control Sample	Total/NA	Water	8260D	
870-15440-B-3 MS	Matrix Spike	Total/NA	Water	8260D	
870-15440-B-1 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-16417-2
Project/Site: NASA KSC MLPV LCP

Client Sample ID: MLPV-SAMW0003-045.0-20230316
Lab Sample ID: 670-16417-4

Date Collected: 03/16/23 10:27
Matrix: Water
Date Received: 03/16/23 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27908	T1Y	EET ORL	03/28/23 19:17

Client Sample ID: MLPV-IW0056-035.0-20230316
Lab Sample ID: 670-16417-5

Date Collected: 03/16/23 12:55
Matrix: Water
Date Received: 03/16/23 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28045	KG	EET ORL	03/29/23 11:49
Total/NA	Analysis	8260D		1	27908	T1Y	EET ORL	03/28/23 19:36

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16417-2
Project/Site: NASA KSC MLPV LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16417-2

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV LCP

Job ID: 670-16417-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16417-4	MLPV-SAMW0003-045.0-20230316	Water	03/16/23 10:27	03/16/23 15:45
670-16417-5	MLPV-IW0056-035.0-20230316	Water	03/16/23 12:55	03/16/23 15:45

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 1
Site Location: IDW / VAB / Hot Spot 2		PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928 / Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-2 & 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl: Select VOCs by SW8260B by Wksht # 15-14	4 DEG C: Select PFAS by 537	4 DEG: Nitrate by EPA 300.0	H2SO4 <2: Total Phosphorus by EPA 345.6	Comments
	MLPV-IDW01 - 20230316	MLPV-IDW01	202303 16	1252	IDW	IDW	G	7	3	2	1	1	
	MLPV-IDW02 - 20230316	MLPV-IDW02	202303 16	1300	IDW	IDW	G	7	3	2	1	1	
	MLPV-IDW03 - 20230316	MLPV-IDW03	202303 16	1303	IDW	IDW	G	7	3	2	1	1	
	~~MLPV-IDW04~~ SAMPLE0003-0045.0 - 20230316	~~MLPV-IDW04~~	202303 16	1027	~~IDW~~	~~IDW~~	G	3	3	~~2~~	~~1~~	~~1~~	
	~~MLPV-IDW05~~ 100056-035.5-20230316	~~MLPV-IDW05~~	202303 16	1255	~~IDW~~	~~IDW~~	G	3	3	~~2~~	~~1~~	~~1~~	(13)
	~~MLPV-IDW06~~	MLPV-IDW06	202303		~~IDW~~	~~IDW~~	G	7	3	2	1	1	
	~~MLPV-IDW07~~	MLPV-IDW07	202303		~~IDW~~	~~IDW~~	~~G~~	~~7~~	~~3~~	2	1	1	

670-16417 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-14 & 15-2 (not DOD)

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		3/17/23	0700		3/16/23	1400
2		3/16/23	1400	James W Driggers	3/16/23	1400
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3/16 1545

2.0 | 1.5

7/3/2023 (Rev. 2)

SO 5826

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16417-2

Login Number: 16417
List Number: 1
Creator: Hartley, Tyler

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/3/2023 1:19:51 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV - LCP

JOB NUMBER

670-16634-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

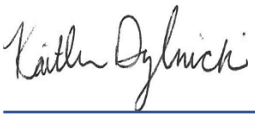
my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16634-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16634-1

REVISION

The report being provided is a revision of the original report sent on 4/3/2023. The report (revision 1) is being revised due to client request to include results for trichloroethene..

Receipt
The samples were received on 3/21/2023 4:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Client Sample ID: MLPV-IW0020D-047.5-20230321 — Lab Sample ID: 670-16634-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.83	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	3.1		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: Trip Blank — Lab Sample ID: 670-16634-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Client Sample ID: MLPV-IW0020D-047.5-20230321

Lab Sample ID: 670-16634-1

Date Collected: 03/21/23 13:15

Matrix: Water

Date Received: 03/21/23 16:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.83**	**I**	1.0	0.53	ug/L			04/01/23 00:10	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			04/01/23 00:10	1
Vinyl chloride	**3.1**		1.0	0.71	ug/L			04/01/23 00:10	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			04/01/23 00:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*04/01/23 00:10*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*04/01/23 00:10*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*04/01/23 00:10*	*1*

Client Sample ID: Trip Blank

Lab Sample ID: 670-16634-2

Date Collected: 03/21/23 00:00

Matrix: Water

Date Received: 03/21/23 16:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/31/23 23:52	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/31/23 23:52	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/31/23 23:52	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/31/23 23:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/31/23 23:52*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/31/23 23:52*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*03/31/23 23:52*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	DBFM	BFB
Lab Sample ID	Client Sample ID	(40-146)	(53-146)	(41-142)
660-127998-E-4 DU	Duplicate	99	100	104
670-16634-1	MLPV-IW0020D-047.5-20230321	98	101	101
670-16634-2	Trip Blank	99	100	102
670-16724-C-7 MS	Matrix Spike	99	100	103
LCS 670-28260/13	Lab Control Sample	100	101	100
MB 670-28260/16	Method Blank	99	101	100

Surrogate Legend

TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)
BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-28260/16
Matrix: Water
Analysis Batch: 28260

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/31/23 18:17	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/31/23 18:17	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/31/23 18:17	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/31/23 18:17	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*40 - 146*		*03/31/23 18:17*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*03/31/23 18:17*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/31/23 18:17*	*1*

Lab Sample ID: LCS 670-28260/13
Matrix: Water
Analysis Batch: 28260

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.4		ug/L		92	56 - 128		
trans-1,2-Dichloroethene			20.0	17.7		ug/L		88	54 - 134		
Vinyl chloride			20.0	17.7		ug/L		88	20 - 167		
Trichloroethene			20.0	18.7		ug/L		94	62 - 135		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*

Lab Sample ID: 670-16724-C-7 MS
Matrix: Water
Analysis Batch: 28260

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	19.9		ug/L		100	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	19.5		ug/L		98	54 - 134		
Vinyl chloride	0.71	U	20.0	19.9		ug/L		100	20 - 167		
Trichloroethene	0.89	U	20.0	19.6		ug/L		98	62 - 135		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*

Lab Sample ID: 660-127998-E-4 DU
Matrix: Water
Analysis Batch: 28260

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Vinyl chloride	0.71	U		0.71	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 660-127998-E-4 DU
Matrix: Water
Analysis Batch: 28260

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

GC/MS VOA

Analysis Batch: 28260

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16634-1	MLPV-IW0020D-047.5-20230321	Total/NA	Water	8260D	
670-16634-2	Trip Blank	Total/NA	Water	8260D	
MB 670-28260/16	Method Blank	Total/NA	Water	8260D	
LCS 670-28260/13	Lab Control Sample	Total/NA	Water	8260D	
670-16724-C-7 MS	Matrix Spike	Total/NA	Water	8260D	
660-127998-E-4 DU	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-16634-1
Project/Site: NASA KSC MLPV - LCP

Client Sample ID: MLPV-IW0020D-047.5-20230321
Lab Sample ID: 670-16634-1

Date Collected: 03/21/23 13:15
Matrix: Water
Date Received: 03/21/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28260	JFL	EET ORL	04/01/23 00:10

Client Sample ID: Trip Blank
Lab Sample ID: 670-16634-2

Date Collected: 03/21/23 00:00
Matrix: Water
Date Received: 03/21/23 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28260	JFL	EET ORL	03/31/23 23:52

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16634-1
Project/Site: NASA KSC MLPV - LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	04-10-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-16634-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16634-1	MLPV-IW0020D-047.5-20230321	Water	03/21/23 13:15	03/21/23 16:30
670-16634-2	Trip Blank	Water	03/21/23 00:00	03/21/23 16:30

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of 1	
Site Location: LCP Monitoring			PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075	AECOM Project Manager: **Linnea King Clark**		Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Patrick Bendl 724-591-6324		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Turnaround Time(specify): Standard 14 day		Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B											Comments
	MLPV-IW0020D-(47.5)-20230321	MLPV-IW0020D	20230321	1315	WG	N	G	3	3											
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										
					WG	N	G	3	3	PB										

670-16634 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Qaylier				3/7/23	1700
2		3/21/23	1630		3/21/23	1630
3						1.0/0.5

Samples Iced?(check) Yes_____ No_____
Shipping Company:
Tracking No:
Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc. Job Number: 670-16634-1

Login Number: 16634 **List Source: Eurofins Orlando**
List Number: 1
Creator: Ferguson, Craig

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 7/27/2023 2:00:44 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV - LCP

JOB NUMBER

670-18638-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

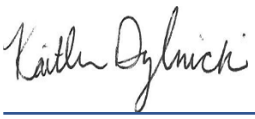
my EOL

Job Notes

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The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



Generated
7/27/2023 2:00:44 PM
Revision 1

Authorized for release by
Kaitlin Dylnicki, Project Manager
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(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Job ID: 670-18638-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-18638-1

Revision
The report being provided is a revision of the original report sent on 5/5/2023. The report (revision 1) is being revised to update to include results for trichloroethene per client request..

Receipt
The samples were received on 4/26/2023 6:08 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 11.9º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Client Sample ID: MLPV-IW0047-040.0-20230426 — Lab Sample ID: 670-18638-1

No Detections.

Client Sample ID: MLPV-MW0097-040.0-20230426 — Lab Sample ID: 670-18638-2

No Detections.

Client Sample ID: MLPV-MW0108-040.0-20230426 — Lab Sample ID: 670-18638-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.2		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	26		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0110-006.0-20230426 — Lab Sample ID: 670-18638-4

No Detections.

Client Sample ID: MLPV-SAMW0001-045.5-20230426 — Lab Sample ID: 670-18638-5

No Detections.

Client Sample ID: MLPV-TB01-20230426 — Lab Sample ID: 670-18638-6

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0047-040.0-20230426

Lab Sample ID: 670-18638-1

Date Collected: 04/26/23 12:10

Matrix: Water

Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 15:17	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 15:17	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 15:17	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 15:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 15:17*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 15:17*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 15:17*	*1*

Client Sample ID: MLPV-MW0097-040.0-20230426

Lab Sample ID: 670-18638-2

Date Collected: 04/26/23 13:04

Matrix: Water

Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 15:34	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 15:34	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 15:34	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 15:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 15:34*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 15:34*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 15:34*	*1*

Client Sample ID: MLPV-MW0108-040.0-20230426

Lab Sample ID: 670-18638-3

Date Collected: 04/26/23 14:08

Matrix: Water

Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.2**		1.0	0.53	ug/L			05/04/23 15:52	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 15:52	1
Vinyl chloride	**26**		1.0	0.71	ug/L			05/04/23 15:52	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 15:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*05/04/23 15:52*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*05/04/23 15:52*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 15:52*	*1*

Client Sample ID: MLPV-MW0110-006.0-20230426

Lab Sample ID: 670-18638-4

Date Collected: 04/26/23 10:06

Matrix: Water

Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 16:10	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 16:10	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 16:10	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 16:10	1

Client Sample ID: MLPV-MW0110-006.0-20230426 Lab Sample ID: 670-18638-4

Date Collected: 04/26/23 10:06 **Matrix: Water**
Date Received: 04/26/23 18:08

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*05/04/23 16:10*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 16:10*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*05/04/23 16:10*	*1*

Client Sample ID: MLPV-SAMW0001-045.5-20230426 Lab Sample ID: 670-18638-5

Date Collected: 04/26/23 10:48 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 16:28	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 16:28	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 16:28	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 16:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 16:28*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*05/04/23 16:28*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*05/04/23 16:28*	*1*

Client Sample ID: MLPV-TB01-20230426 Lab Sample ID: 670-18638-6

Date Collected: 04/26/23 10:00 **Matrix: Water**
Date Received: 04/26/23 18:08

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 11:18	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 11:18	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 11:18	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 11:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 11:18*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*05/04/23 11:18*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*05/04/23 11:18*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
670-18638-1	MLPV-IW0047-040.0-20230426	102	101	101
670-18638-2	MLPV-MW0097-040.0-20230426	102	101	101
670-18638-3	MLPV-MW0108-040.0-20230426	103	100	101
670-18638-4	MLPV-MW0110-006.0-20230426	102	101	103
670-18638-5	MLPV-SAMW0001-045.5-20230426	101	100	101
670-18638-6	MLPV-TB01-20230426	101	102	99
670-18639-A-3 MS - DL	Matrix Spike	101	99	101
670-18639-A-5 DU - DL	Duplicate	103	102	101
LCS 670-33117/4	Lab Control Sample	102	100	100
MB 670-33117/7	Method Blank	101	101	99

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-33117/7
Matrix: Water
Analysis Batch: 33117

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			05/04/23 10:43	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			05/04/23 10:43	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			05/04/23 10:43	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			05/04/23 10:43	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*05/04/23 10:43*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*05/04/23 10:43*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*05/04/23 10:43*	*1*

Lab Sample ID: LCS 670-33117/4
Matrix: Water
Analysis Batch: 33117

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.5		ug/L		97	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		95	54 - 134
Vinyl chloride	20.0	15.5		ug/L		77	20 - 167
Trichloroethene	20.0	19.0		ug/L		95	62 - 135

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 670-18639-A-3 MS
Matrix: Water
Analysis Batch: 33117

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene - DL	5.3	U	200	209		ug/L		105	56 - 128
trans-1,2-Dichloroethene - DL	7.3	U	200	203		ug/L		102	54 - 134
Vinyl chloride - DL	280		200	488		ug/L		103	20 - 167
Trichloroethene - DL	8.9	U	200	206		ug/L		103	62 - 135

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*101*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*99*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL (Continued)

Lab Sample ID: 670-18639-A-5 DU
Matrix: Water
Analysis Batch: 33117

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene - DL	2.7	U		2.7	U	ug/L				NC	30
trans-1,2-Dichloroethene - DL	3.7	U		3.7	U	ug/L				NC	20
Vinyl chloride - DL	120			113		ug/L				4	30
Trichloroethene - DL	4.5	U		4.5	U	ug/L				NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
Toluene-d8 (Surr) - DL	*103*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*102*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*101*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

GC/MS VOA

Analysis Batch: 33117

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-18638-1	MLPV-IW0047-040.0-20230426	Total/NA	Water	8260D	
670-18638-2	MLPV-MW0097-040.0-20230426	Total/NA	Water	8260D	
670-18638-3	MLPV-MW0108-040.0-20230426	Total/NA	Water	8260D	
670-18638-4	MLPV-MW0110-006.0-20230426	Total/NA	Water	8260D	
670-18638-5	MLPV-SAMW0001-045.5-20230426	Total/NA	Water	8260D	
670-18638-6	MLPV-TB01-20230426	Total/NA	Water	8260D	
MB 670-33117/7	Method Blank	Total/NA	Water	8260D	
LCS 670-33117/4	Lab Control Sample	Total/NA	Water	8260D	
670-18639-A-3 MS - DL	Matrix Spike	Total/NA	Water	8260D	
670-18639-A-5 DU - DL	Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Client Sample ID: MLPV-IW0047-040.0-20230426
Lab Sample ID: 670-18638-1
Date Collected: 04/26/23 12:10
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 15:17

Client Sample ID: MLPV-MW0097-040.0-20230426
Lab Sample ID: 670-18638-2
Date Collected: 04/26/23 13:04
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 15:34

Client Sample ID: MLPV-MW0108-040.0-20230426
Lab Sample ID: 670-18638-3
Date Collected: 04/26/23 14:08
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 15:52

Client Sample ID: MLPV-MW0110-006.0-20230426
Lab Sample ID: 670-18638-4
Date Collected: 04/26/23 10:06
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 16:10

Client Sample ID: MLPV-SAMW0001-045.5-20230426
Lab Sample ID: 670-18638-5
Date Collected: 04/26/23 10:48
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 16:28

Client Sample ID: MLPV-TB01-20230426
Lab Sample ID: 670-18638-6
Date Collected: 04/26/23 10:00
Matrix: Water
Date Received: 04/26/23 18:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	33117	T1Y	EET ORL	05/04/23 11:18

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-18638-1
Project/Site: NASA KSC MLPV - LCP

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - LCP

Job ID: 670-18638-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-18638-1	MLPV-IW0047-040.0-20230426	Water	04/26/23 12:10	04/26/23 18:08
670-18638-2	MLPV-MW0097-040.0-20230426	Water	04/26/23 13:04	04/26/23 18:08
670-18638-3	MLPV-MW0108-040.0-20230426	Water	04/26/23 14:08	04/26/23 18:08
670-18638-4	MLPV-MW0110-006.0-20230426	Water	04/26/23 10:06	04/26/23 18:08
670-18638-5	MLPV-SAMW0001-045.5-20230426	Water	04/26/23 10:48	04/26/23 18:08
670-18638-6	MLPV-TB01-20230426	Water	04/26/23 10:00	04/26/23 18:08

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of 1	
Site Location: LCP Monitoring	PO No. 148569	Project No. 60615493.4	Phase:
TO No.: 80KSC019F0075 AECOM Project Manager: **Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone # Patrick Bendle 724-591-6324, Devin Ke Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to:Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins	Deliver Samples To:		Site-Spicific WS#15 from QAPP: 15-13
Turnaround Time(specify): Standard 14 day	**Sample Analysis Requested** (*Enter number of containers for each test*)		

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl / Total No. of Containers	Select VOCs by SW8260B	Comments
	MLPV-IW0047-040.0-20230426	MLPV-IW0047	20230426	1210	WG	N	G	3	3	
DK	~~MLPV-IW0053~~	~~MLPV-IW0053~~	202304		WG	N	G	~~3~~	~~3~~	
	MLPV-MW0097-040.0-20230426	MLPV-MW0097	20230426	1304	WG	N	G	3	3	
	MLPV-MW0108-040.0-20230426	MLPV-MW0108	20230426	1408	WG	N	G	3	3	
	MLPV-MW0110-006.0-20230426	MLPV-MW0110	20230426	1006	WG	N	G	3	3	
	MLPV-SAMW0001-045.5-20230426	MLPV-SAMW0001	20230426	1048	WG	N	G	3	3	
	MLPV-TB01-20230426	MLPV-TB01	20230426	1000	WQ	TB	G	2	2	

670-18638 Chain of Custody

***Field* Comments:** Report only per QAPP WS #15-13

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 1

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Pat B	4/26/23	1808	MC	4/26/23	18:08
2						
3						

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, **Dark**=Store In Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

12-4 / 11-9

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-18638-1

Login Number: 18638
List Number: 1
Creator: Wehr, Alex C

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/30/2023 4:27:44 PM

JOB DESCRIPTION

NASA KSC MLPV IDW

JOB NUMBER

670-16417-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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3/30/2023 4:27:44 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

LCMS

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate.
U	Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-16417-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16417-1

Receipt
The samples were received on 3/16/2023 3:45 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.5°C

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

PFAS
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Client Sample ID: MLPV-IDW01-20230316 — Lab Sample ID: 670-16417-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	1.3		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	2.3		1.0	0.71	ug/L	1		8260D	Total/NA
Perfluorobutanesulfonic acid	0.0016	I	0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0089		0.0047	0.0019	ug/L	1		537 IDA	Total/NA
Perfluoroheptanesulfonic acid	0.00057	I	0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0020		0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0070		0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0037		0.0019	0.00085	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00072	I	0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonamide	0.00066	I	0.0019	0.00066	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.040		0.0019	0.00095	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0067		0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.0011	I	0.0019	0.00047	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0035		0.0019	0.00047	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV-IDW02-20230316 — Lab Sample ID: 670-16417-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	4.4		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	14		1.0	0.71	ug/L	1		8260D	Total/NA
Nitrate as N	240	I	400	200	ug/L	1		300.0	Total/NA
Perfluorobutanesulfonic acid	0.0010	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0070		0.0049	0.0020	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0031		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0048		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0041		0.0020	0.00089	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.0018	I J	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonamide	0.00089	I	0.0020	0.00069	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.019		0.0020	0.00099	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.011		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.00056	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0023		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	74	I	100	40	ug/L	1		365.4	Total/NA

Client Sample ID: MLPV-IDW03-20230316 — Lab Sample ID: 670-16417-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.0		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	7.6		1.0	0.71	ug/L	1		8260D	Total/NA
Nitrate as N	300	I	400	200	ug/L	1		300.0	Total/NA
Perfluorobutanesulfonic acid	0.00062	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0079		0.0049	0.0020	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0013	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0036		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0029		0.0020	0.00088	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00054	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonamide	0.00069	I	0.0020	0.00069	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.016		0.0020	0.00098	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0057		0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.00056	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0014	I	0.0020	0.00049	ug/L	1		537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IDW01-20230316
Lab Sample ID: 670-16417-1

Date Collected: 03/16/23 12:52
Matrix: Water

Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.3**		1.0	0.53	ug/L			03/28/23 18:22	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 18:22	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 18:22	1
Vinyl chloride	**2.3**		1.0	0.71	ug/L			03/28/23 18:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/28/23 18:22*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/28/23 18:22*	*1*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/28/23 18:22*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			03/17/23 17:19	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
4:2 Fluorotelomer sulfonic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
6:2 Fluorotelomer sulfonic acid	0.0040	U	0.0047	0.0040	ug/L		03/21/23 15:26	03/28/23 03:37	1
8:2 Fluorotelomer sulfonic acid	0.00095	U	0.0028	0.00095	ug/L		03/21/23 15:26	03/28/23 03:37	1
9Cl-PF3ONS	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
DONA	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
HFPODA	0.00095	U	0.0028	0.00095	ug/L		03/21/23 15:26	03/28/23 03:37	1
NEtFOSAA	0.00047	U	0.0028	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
NMeFOSAA	0.00057	U	0.0019	0.00057	ug/L		03/21/23 15:26	03/28/23 03:37	1
NMeFOSA	0.00095	U	0.0028	0.00095	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorobutanesulfonic acid	**0.0016**	**I**	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorobutanoic acid	**0.0089**		0.0047	0.0019	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorodecanesulfonic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorodecanoic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorododecanoic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluoroheptanesulfonic acid	**0.00057**	**I**	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluoroheptanoic acid	**0.0020**		0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorohexanesulfonic acid	**0.0070**		0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorohexanoic acid	**0.0037**		0.0019	0.00085	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorononanesulfonic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorononanoic acid	**0.00072**	**I**	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorooctanesulfonamide	**0.00066**	**I**	0.0019	0.00066	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorooctanesulfonic acid	**0.040**		0.0019	0.00095	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorooctanoic acid	**0.0067**		0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluoropentanesulfonic acid	**0.0011**	**I**	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluoropentanoic acid	**0.0035**		0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorotetradecanoic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluorotridecanoic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1
Perfluoroundecanoic acid	0.00047	U	0.0019	0.00047	ug/L		03/21/23 15:26	03/28/23 03:37	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*149*		*10 - 200*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
M2-6:2 FTS	*143*		*17 - 200*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
M2-8:2 FTS	*138*		*33 - 200*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C2-PFDoDA	*98*		*17 - 176*	*03/21/23 15:26*	*03/28/23 03:37*	*1*

Client Sample ID: MLPV-IDW01-20230316

Lab Sample ID: 670-16417-1

Date Collected: 03/16/23 12:52

Matrix: Water

Date Received: 03/16/23 15:45

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFTeDA	*94*		*10 - 179*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C3 HFPO-DA	*105*		*17 - 185*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C3 PFBS	*150*		*16 - 200*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C3 PFHxS	*121*		*28 - 188*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C4 PFBA	*124*		*42 - 165*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C4 PFHpA	*116*		*31 - 182*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C5 PFPeA	*142*		*38 - 187*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
d5-NEtFOSAA	*100*		*29 - 195*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C6 PFDA	*121*		*49 - 163*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C8 PFOA	*115*		*48 - 162*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C8 PFOS	*120*		*51 - 159*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C8 FOSA	*104*		*10 - 168*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
d3-NMeFOSAA	*106*		*31 - 174*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
d3-NMePFOSA	*64*		*10 - 155*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C5 PFHxA	*105*		*24 - 179*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C7 PFUnA	*106*		*34 - 174*	*03/21/23 15:26*	*03/28/23 03:37*	*1*
13C9 PFNA	*121*		*51 - 167*	*03/21/23 15:26*	*03/28/23 03:37*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:43	1

Client Sample ID: MLPV-IDW02-20230316

Lab Sample ID: 670-16417-2

Date Collected: 03/16/23 13:00

Matrix: Water

Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**4.4**		1.0	0.53	ug/L			03/28/23 18:41	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 18:41	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 18:41	1
Vinyl chloride	**14**		1.0	0.71	ug/L			03/28/23 18:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/28/23 18:41*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*03/28/23 18:41*	*1*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/28/23 18:41*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**240**	**I**	400	200	ug/L			03/17/23 17:37	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		03/21/23 15:26	03/28/23 03:48	1
8:2 Fluorotelomer sulfonic acid	0.00099	U	0.0030	0.00099	ug/L		03/21/23 15:26	03/28/23 03:48	1
9Cl-PF3ONS	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
DONA	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
HFPODA	0.00099	U	0.0030	0.00099	ug/L		03/21/23 15:26	03/28/23 03:48	1

Client Sample ID: MLPV-IDW02-20230316
Date Collected: 03/16/23 13:00
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16417-2
Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NEtFOSAA	0.00049	U	0.0030	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
NMeFOSAA	0.00059	U	0.0020	0.00059	ug/L		03/21/23 15:26	03/28/23 03:48	1
NMeFOSA	0.00099	U	0.0030	0.00099	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorobutanesulfonic acid	**0.0010**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorobutanoic acid	**0.0070**		0.0049	0.0020	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorodecanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorodecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorododecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluoroheptanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluoroheptanoic acid	**0.0031**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorohexanesulfonic acid	**0.0048**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorohexanoic acid	**0.0041**		0.0020	0.00089	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorononanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorononanoic acid	**0.0018**	**I J**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorooctanesulfonamide	**0.00089**	**I**	0.0020	0.00069	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorooctanesulfonic acid	**0.019**		0.0020	0.00099	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorooctanoic acid	**0.011**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluoropentanesulfonic acid	**0.00056**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluoropentanoic acid	**0.0023**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorotetradecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluorotridecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1
Perfluoroundecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*146*		*10 - 200*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
M2-6:2 FTS	*145*		*17 - 200*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
M2-8:2 FTS	*134*		*33 - 200*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C2-PFDoDA	*98*		*17 - 176*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C2 PFTeDA	*112*		*10 - 179*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C3 HFPO-DA	*113*		*17 - 185*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C3 PFBS	*160*		*16 - 200*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C3 PFHxS	*136*		*28 - 188*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C4 PFBA	*123*		*42 - 165*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C4 PFHpA	*128*		*31 - 182*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C5 PFPeA	*141*		*38 - 187*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
d5-NEtFOSAA	*109*		*29 - 195*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C6 PFDA	*117*		*49 - 163*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C8 PFOA	*125*		*48 - 162*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C8 PFOS	*114*		*51 - 159*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C8 FOSA	*111*		*10 - 168*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
d3-NMeFOSAA	*107*		*31 - 174*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
d3-NMePFOSA	*64*		*10 - 155*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C5 PFHxA	*118*		*24 - 179*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C7 PFUnA	*117*		*34 - 174*	*03/21/23 15:26*	*03/28/23 03:48*	*1*
13C9 PFNA	*116*		*51 - 167*	*03/21/23 15:26*	*03/28/23 03:48*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	**74**	**I**	100	40	ug/L		03/17/23 10:37	03/20/23 22:44	1

Client Sample ID: MLPV-IDW03-20230316 **Lab Sample ID: 670-16417-3**
Date Collected: 03/16/23 13:03 **Matrix: Water**
Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**2.0**		1.0	0.53	ug/L			03/28/23 18:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 18:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 18:59	1
Vinyl chloride	**7.6**		1.0	0.71	ug/L			03/28/23 18:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*03/28/23 18:59*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*03/28/23 18:59*	*1*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/28/23 18:59*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**300**	**I**	400	200	ug/L			03/17/23 17:55	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		03/21/23 15:26	03/28/23 03:59	1
8:2 Fluorotelomer sulfonic acid	0.00098	U	0.0029	0.00098	ug/L		03/21/23 15:26	03/28/23 03:59	1
9Cl-PF3ONS	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
DONA	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
HFPODA	0.00098	U	0.0029	0.00098	ug/L		03/21/23 15:26	03/28/23 03:59	1
NEtFOSAA	0.00049	U	0.0029	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
NMeFOSAA	0.00059	U	0.0020	0.00059	ug/L		03/21/23 15:26	03/28/23 03:59	1
NMeFOSA	0.00098	U	0.0029	0.00098	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorobutanesulfonic acid	**0.00062**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorobutanoic acid	**0.0079**		0.0049	0.0020	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorodecanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorodecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorododecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluoroheptanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluoroheptanoic acid	**0.0013**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorohexanesulfonic acid	**0.0036**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorohexanoic acid	**0.0029**		0.0020	0.00088	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorononanesulfonic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorononanoic acid	**0.00054**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorooctanesulfonamide	**0.00069**	**I**	0.0020	0.00069	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorooctanesulfonic acid	**0.016**		0.0020	0.00098	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorooctanoic acid	**0.0057**		0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluoropentanesulfonic acid	**0.00056**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluoropentanoic acid	**0.0014**	**I**	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorotetradecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluorotridecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1
Perfluoroundecanoic acid	0.00049	U	0.0020	0.00049	ug/L		03/21/23 15:26	03/28/23 03:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*170*		*10 - 200*	*03/21/23 15:26*	*03/28/23 03:59*	*1*
M2-6:2 FTS	*151*		*17 - 200*	*03/21/23 15:26*	*03/28/23 03:59*	*1*
M2-8:2 FTS	*120*		*33 - 200*	*03/21/23 15:26*	*03/28/23 03:59*	*1*
13C2-PFDoDA	*100*		*17 - 176*	*03/21/23 15:26*	*03/28/23 03:59*	*1*

Client Sample ID: MLPV-IDW03-20230316 **Lab Sample ID: 670-16417-3**
Date Collected: 03/16/23 13:03 **Matrix: Water**
Date Received: 03/16/23 15:45

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFTeDA	102		10 - 179	03/21/23 15:26	03/28/23 03:59	1
13C3 HFPO-DA	121		17 - 185	03/21/23 15:26	03/28/23 03:59	1
13C3 PFBS	153		16 - 200	03/21/23 15:26	03/28/23 03:59	1
13C3 PFHxS	136		28 - 188	03/21/23 15:26	03/28/23 03:59	1
13C4 PFBA	130		42 - 165	03/21/23 15:26	03/28/23 03:59	1
13C4 PFHpA	134		31 - 182	03/21/23 15:26	03/28/23 03:59	1
13C5 PFPeA	136		38 - 187	03/21/23 15:26	03/28/23 03:59	1
d5-NEtFOSAA	99		29 - 195	03/21/23 15:26	03/28/23 03:59	1
13C6 PFDA	109		49 - 163	03/21/23 15:26	03/28/23 03:59	1
13C8 PFOA	128		48 - 162	03/21/23 15:26	03/28/23 03:59	1
13C8 PFOS	122		51 - 159	03/21/23 15:26	03/28/23 03:59	1
13C8 FOSA	107		10 - 168	03/21/23 15:26	03/28/23 03:59	1
d3-NMeFOSAA	104		31 - 174	03/21/23 15:26	03/28/23 03:59	1
d3-NMePFOSA	69		10 - 155	03/21/23 15:26	03/28/23 03:59	1
13C5 PFHxA	124		24 - 179	03/21/23 15:26	03/28/23 03:59	1
13C7 PFUnA	106		34 - 174	03/21/23 15:26	03/28/23 03:59	1
13C9 PFNA	118		51 - 167	03/21/23 15:26	03/28/23 03:59	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:45	1

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)							
		BFB	DBFM	TOL					
Lab Sample ID	Client Sample ID	(41-142)	(53-146)	(40-146)					
670-16417-1	MLPV-IDW01-20230316	93	103	102					
670-16417-2	MLPV-IDW02-20230316	92	103	102					
670-16417-3	MLPV-IDW03-20230316	92	104	102					
670-16676-B-2 DU	Duplicate	95	105	103					
670-16676-C-1 MS	Matrix Spike	88	102	101					
LCS 670-27908/4	Lab Control Sample	95	101	103					
MB 670-27908/7	Method Blank	93	102	103					

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	PFDoDA	PFTDA	HFPODA	C3PFBS	C3PFHS
Lab Sample ID	Client Sample ID	(10-200)	(17-200)	(33-200)	(17-176)	(10-179)	(17-185)	(16-200)	(28-188)
670-16417-1	MLPV-IDW01-20230316	149	143	138	98	94	105	150	121
670-16417-2	MLPV-IDW02-20230316	146	145	134	98	112	113	160	136
670-16417-3	MLPV-IDW03-20230316	170	151	120	100	102	121	153	136
LCS 410-355823/2-A	Lab Control Sample	137	147	139	113	118	109	136	126
LCSD 410-355823/3-A	Lab Control Sample Dup	136	160	143	120	126	116	129	125
MB 410-355823/1-A	Method Blank	139	146	136	110	120	112	123	124

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	C4PFHA	PFPeA	d5NEFOS	C6PFDA	C8PFOA	C8PFOS	PFOSA
Lab Sample ID	Client Sample ID	(42-165)	(31-182)	(38-187)	(29-195)	(49-163)	(48-162)	(51-159)	(10-168)
670-16417-1	MLPV-IDW01-20230316	124	116	142	100	121	115	120	104
670-16417-2	MLPV-IDW02-20230316	123	128	141	109	117	125	114	111
670-16417-3	MLPV-IDW03-20230316	130	134	136	99	109	128	122	107
LCS 410-355823/2-A	Lab Control Sample	126	130	126	115	125	124	121	108
LCSD 410-355823/3-A	Lab Control Sample Dup	131	131	132	114	126	128	127	112
MB 410-355823/1-A	Method Blank	126	129	124	112	122	131	119	107

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		d3NMFOS	d3NMFSA	13C5PHA	13C7PUA	C9PFNA			
Lab Sample ID	Client Sample ID	(31-174)	(10-155)	(24-179)	(34-174)	(51-167)			
670-16417-1	MLPV-IDW01-20230316	106	64	105	106	121			
670-16417-2	MLPV-IDW02-20230316	107	64	118	117	116			
670-16417-3	MLPV-IDW03-20230316	104	69	124	106	118			
LCS 410-355823/2-A	Lab Control Sample	128	70	125	131	116			
LCSD 410-355823/3-A	Lab Control Sample Dup	123	70	130	120	133			
MB 410-355823/1-A	Method Blank	112	62	126	127	118			

Surrogate Legend

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
PFDoDA = 13C2-PFDoDA
PFTDA = 13C2 PFTeDA
HFPODA = 13C3 HFPO-DA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
PFBA = 13C4 PFBA
C4PFHA = 13C4 PFHpA
PFPeA = 13C5 PFPeA
d5NEFOS = d5-NEtFOSAA
C6PFDA = 13C6 PFDA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
d3NMFOS = d3-NMeFOSAA
d3NMFSA = d3-NMePFOSA
13C5PHA = 13C5 PFHxA
13C7PUA = 13C7 PFUnA
C9PFNA = 13C9 PFNA

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-27908/7
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/28/23 12:36	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/28/23 12:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/28/23 12:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/28/23 12:36	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*03/28/23 12:36*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*03/28/23 12:36*	*1*
Toluene-d8 (Surr)	*103*		*40 - 146*		*03/28/23 12:36*	*1*

Lab Sample ID: LCS 670-27908/4
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			20.0	18.3		ug/L		92	56 - 128		
trans-1,2-Dichloroethene			20.0	18.1		ug/L		90	54 - 134		
Trichloroethene			20.0	18.6		ug/L		93	62 - 135		
Vinyl chloride			20.0	24.3		ug/L		122	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*
Toluene-d8 (Surr)	*103*		*40 - 146*

Lab Sample ID: 670-16676-C-1 MS
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.53	U	20.0	22.2		ug/L		111	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	22.4		ug/L		112	54 - 134		
Trichloroethene	0.89	U	20.0	22.7		ug/L		114	62 - 135		
Vinyl chloride	0.71	U	20.0	27.8		ug/L		139	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*88*		*41 - 142*
Dibromofluoromethane (Surr)	*102*		*53 - 146*
Toluene-d8 (Surr)	*101*		*40 - 146*

Lab Sample ID: 670-16676-B-2 DU
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U		0.53	U	ug/L				NC	30
trans-1,2-Dichloroethene	0.73	U		0.73	U	ug/L				NC	20
Trichloroethene	0.89	U		0.89	U	ug/L				NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16676-B-2 DU
Matrix: Water
Analysis Batch: 27908

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30

Surrogate	*DU %Recovery*	*DU Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*105*		*53 - 146*
Toluene-d8 (Surr)	*103*		*40 - 146*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-26744/6
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			03/17/23 15:57	1

Lab Sample ID: LCS 670-26744/4
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	4000	4060		ug/L		101	90 - 110

Lab Sample ID: LCSD 670-26744/5
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	4000	4100		ug/L		103	90 - 110	1	20

Lab Sample ID: 670-16454-A-1 MS
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	200	U	5000	5290		ug/L		106	80 - 120

Lab Sample ID: 670-16454-A-1 MSD
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	200	U	5000	5290		ug/L		106	80 - 120	0	20

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-355823/1-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 355823

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		03/21/23 15:26	03/28/23 02:20	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
DONA	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		03/21/23 15:26	03/28/23 02:20	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*139*		*10 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
M2-6:2 FTS	*146*		*17 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
M2-8:2 FTS	*136*		*33 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C2-PFDoDA	*110*		*17 - 176*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C2 PFTeDA	*120*		*10 - 179*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 HFPO-DA	*112*		*17 - 185*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 PFBS	*123*		*16 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 PFHxS	*124*		*28 - 188*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C4 PFBA	*126*		*42 - 165*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C4 PFHpA	*129*		*31 - 182*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C5 PFPeA	*124*		*38 - 187*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
d5-NEtFOSAA	*112*		*29 - 195*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C6 PFDA	*122*		*49 - 163*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 PFOA	*131*		*48 - 162*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 PFOS	*119*		*51 - 159*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 FOSA	*107*		*10 - 168*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
d3-NMeFOSAA	*112*		*31 - 174*	*03/21/23 15:26*	*03/28/23 02:20*	*1*

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-355823/1-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 355823

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
d3-NMePFOSA	62		10 - 155	03/21/23 15:26	03/28/23 02:20	1
13C5 PFHxA	126		24 - 179	03/21/23 15:26	03/28/23 02:20	1
13C7 PFUnA	127		34 - 174	03/21/23 15:26	03/28/23 02:20	1
13C9 PFNA	118		51 - 167	03/21/23 15:26	03/28/23 02:20	1

Lab Sample ID: LCS 410-355823/2-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 355823

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0216		ug/L		91	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0238		ug/L		100	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0229		ug/L		94	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0264		ug/L		108	55 - 138
9Cl-PF3ONS	0.0238	0.0216		ug/L		91	59 - 135
DONA	0.0242	0.0204		ug/L		84	55 - 143
HFPODA	0.0256	0.0253		ug/L		99	50 - 135
NEtFOSAA	0.0256	0.0281		ug/L		110	55 - 134
NMeFOSAA	0.0256	0.0254		ug/L		99	59 - 140
NMeFOSA	0.0256	0.0286		ug/L		112	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0202		ug/L		89	53 - 138
Perfluorobutanoic acid	0.0256	0.0228		ug/L		89	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0225		ug/L		91	55 - 137
Perfluorodecanoic acid	0.0256	0.0229		ug/L		90	56 - 138
Perfluorododecanoic acid	0.0256	0.0252		ug/L		98	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0229		ug/L		94	56 - 140
Perfluoroheptanoic acid	0.0256	0.0237		ug/L		92	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0219		ug/L		94	58 - 134
Perfluorohexanoic acid	0.0256	0.0228		ug/L		89	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0247		ug/L		100	59 - 136
Perfluorononanoic acid	0.0256	0.0257		ug/L		101	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0266		ug/L		104	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0218		ug/L		92	45 - 150
Perfluorooctanoic acid	0.0256	0.0221		ug/L		86	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0229		ug/L		95	55 - 140
Perfluoropentanoic acid	0.0256	0.0235		ug/L		92	57 - 141
Perfluorotetradecanoic acid	0.0256	0.0243		ug/L		95	62 - 139
Perfluorotridecanoic acid	0.0256	0.0247		ug/L		96	58 - 146
Perfluoroundecanoic acid	0.0256	0.0229		ug/L		90	60 - 141

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
M2-4:2 FTS	137		10 - 200
M2-6:2 FTS	147		17 - 200
M2-8:2 FTS	139		33 - 200
13C2-PFDoDA	113		17 - 176
13C2 PFTeDA	118		10 - 179
13C3 HFPO-DA	109		17 - 185
13C3 PFBS	136		16 - 200
13C3 PFHxS	126		28 - 188

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-355823/2-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 355823

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFBA	126		42 - 165
13C4 PFHpA	130		31 - 182
13C5 PFPeA	126		38 - 187
d5-NEtFOSAA	115		29 - 195
13C6 PFDA	125		49 - 163
13C8 PFOA	124		48 - 162
13C8 PFOS	121		51 - 159
13C8 FOSA	108		10 - 168
d3-NMeFOSAA	128		31 - 174
d3-NMePFOSA	70		10 - 155
13C5 PFHxA	125		24 - 179
13C7 PFUnA	131		34 - 174
13C9 PFNA	116		51 - 167

Lab Sample ID: LCSD 410-355823/3-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 355823

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS			0.0238	0.0219		ug/L		92	53 - 139	1	30
4:2 Fluorotelomer sulfonic acid			0.0239	0.0267		ug/L		111	55 - 139	11	30
6:2 Fluorotelomer sulfonic acid			0.0243	0.0227		ug/L		94	28 - 173	1	30
8:2 Fluorotelomer sulfonic acid			0.0245	0.0241		ug/L		98	55 - 138	9	30
9Cl-PF3ONS			0.0238	0.0211		ug/L		89	59 - 135	2	30
DONA			0.0242	0.0210		ug/L		87	55 - 143	3	30
HFPODA			0.0256	0.0236		ug/L		92	50 - 135	7	30
NEtFOSAA			0.0256	0.0276		ug/L		108	55 - 134	2	30
NMeFOSAA			0.0256	0.0280		ug/L		109	59 - 140	10	30
NMeFOSA			0.0256	0.0302		ug/L		118	64 - 143	6	30
Perfluorobutanesulfonic acid			0.0227	0.0203		ug/L		90	53 - 138	0	30
Perfluorobutanoic acid			0.0256	0.0222		ug/L		87	59 - 136	3	30
Perfluorodecanesulfonic acid			0.0247	0.0223		ug/L		90	55 - 137	1	30
Perfluorodecanoic acid			0.0256	0.0226		ug/L		88	56 - 138	1	30
Perfluorododecanoic acid			0.0256	0.0249		ug/L		97	59 - 143	1	30
Perfluoroheptanesulfonic acid			0.0244	0.0239		ug/L		98	56 - 140	4	30
Perfluoroheptanoic acid			0.0256	0.0238		ug/L		93	59 - 145	1	30
Perfluorohexanesulfonic acid			0.0233	0.0216		ug/L		93	58 - 134	1	30
Perfluorohexanoic acid			0.0256	0.0226		ug/L		88	58 - 139	1	30
Perfluorononanesulfonic acid			0.0246	0.0223		ug/L		91	59 - 136	10	30
Perfluorononanoic acid			0.0256	0.0238		ug/L		93	61 - 139	8	30
Perfluorooctanesulfonamide			0.0256	0.0256		ug/L		100	43 - 167	4	30
Perfluorooctanesulfonic acid			0.0237	0.0222		ug/L		94	45 - 150	2	30
Perfluorooctanoic acid			0.0256	0.0209		ug/L		82	51 - 145	6	30
Perfluoropentanesulfonic acid			0.0240	0.0239		ug/L		99	55 - 140	4	30
Perfluoropentanoic acid			0.0256	0.0233		ug/L		91	57 - 141	1	30
Perfluorotetradecanoic acid			0.0256	0.0225		ug/L		88	62 - 139	8	30
Perfluorotridecanoic acid			0.0256	0.0229		ug/L		90	58 - 146	7	30
Perfluoroundecanoic acid			0.0256	0.0263		ug/L		103	60 - 141	14	30

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
M2-4:2 FTS	136		10 - 200
M2-6:2 FTS	160		17 - 200
M2-8:2 FTS	143		33 - 200
13C2-PFDoDA	120		17 - 176
13C2 PFTeDA	126		10 - 179
13C3 HFPO-DA	116		17 - 185
13C3 PFBS	129		16 - 200
13C3 PFHxS	125		28 - 188
13C4 PFBA	131		42 - 165
13C4 PFHpA	131		31 - 182
13C5 PFPeA	132		38 - 187
d5-NEtFOSAA	114		29 - 195
13C6 PFDA	126		49 - 163
13C8 PFOA	128		48 - 162
13C8 PFOS	127		51 - 159
13C8 FOSA	112		10 - 168
d3-NMeFOSAA	123		31 - 174
d3-NMePFOSA	70		10 - 155
13C5 PFHxA	130		24 - 179
13C7 PFUnA	120		34 - 174
13C9 PFNA	133		51 - 167

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-26750/12-A
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 26750

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:26	1

Lab Sample ID: LCS 670-26750/11-A
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 26750

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Phosphorus as P			1500	1570		ug/L		105	90 - 110		

Lab Sample ID: 670-16437-C-1-D MS
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 26750

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Phosphorus as P	40	U	1500	1520		ug/L		101	85 - 115		

Lab Sample ID: 670-16437-C-1-E MSD
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 26750

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	40	U	1500	1560		ug/L		104	85 - 115	3	20

GC/MS VOA

Analysis Batch: 27908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	8260D	
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	8260D	
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	8260D	
MB 670-27908/7	Method Blank	Total/NA	Water	8260D	
LCS 670-27908/4	Lab Control Sample	Total/NA	Water	8260D	
670-16676-C-1 MS	Matrix Spike	Total/NA	Water	8260D	
670-16676-B-2 DU	Duplicate	Total/NA	Water	8260D	

HPLC/IC

Analysis Batch: 26744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	300.0	
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	300.0	
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	300.0	
MB 670-26744/6	Method Blank	Total/NA	Water	300.0	
LCS 670-26744/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-26744/5	Lab Control Sample Dup	Total/NA	Water	300.0	
670-16454-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
670-16454-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 355823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	537 IDA	
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	537 IDA	
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	537 IDA	
MB 410-355823/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-355823/2-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-355823/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

Analysis Batch: 357670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	537 IDA	355823
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	537 IDA	355823
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	537 IDA	355823
MB 410-355823/1-A	Method Blank	Total/NA	Water	537 IDA	355823
LCS 410-355823/2-A	Lab Control Sample	Total/NA	Water	537 IDA	355823
LCSD 410-355823/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	355823

General Chemistry

Prep Batch: 26750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	365.2/365.3/365	
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	365.2/365.3/365	
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	365.2/365.3/365	
MB 670-26750/12-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-26750/11-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-16437-C-1-D MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-16437-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

General Chemistry

Analysis Batch: 27040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16417-1	MLPV-IDW01-20230316	Total/NA	Water	365.4	26750
670-16417-2	MLPV-IDW02-20230316	Total/NA	Water	365.4	26750
670-16417-3	MLPV-IDW03-20230316	Total/NA	Water	365.4	26750
MB 670-26750/12-A	Method Blank	Total/NA	Water	365.4	26750
LCS 670-26750/11-A	Lab Control Sample	Total/NA	Water	365.4	26750
670-16437-C-1-D MS	Matrix Spike	Total/NA	Water	365.4	26750
670-16437-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	26750

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Client Sample ID: MLPV-IDW01-20230316

Lab Sample ID: 670-16417-1

Date Collected: 03/16/23 12:52
Date Received: 03/16/23 15:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27908	T1Y	EET ORL	03/28/23 18:22
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 17:19
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 03:37
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:43

Client Sample ID: MLPV-IDW02-20230316

Lab Sample ID: 670-16417-2

Date Collected: 03/16/23 13:00
Date Received: 03/16/23 15:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27908	T1Y	EET ORL	03/28/23 18:41
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 17:37
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 03:48
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:44

Client Sample ID: MLPV-IDW03-20230316

Lab Sample ID: 670-16417-3

Date Collected: 03/16/23 13:03
Date Received: 03/16/23 15:45

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	27908	T1Y	EET ORL	03/28/23 18:59
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 17:55
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 03:59
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:45

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16417-1
Project/Site: NASA KSC MLPV IDW

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87997	07-02-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
300.0	Anions, Ion Chromatography	EPA	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
365.4	Phosphorus, Total	EPA	EET ORL
365.2/365.3/365	Phosphorus, Total	EPA	EET ORL
5030C	Purge and Trap	SW846	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16417-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16417-1	MLPV-IDW01-20230316	Water	03/16/23 12:52	03/16/23 15:45
670-16417-2	MLPV-IDW02-20230316	Water	03/16/23 13:00	03/16/23 15:45
670-16417-3	MLPV-IDW03-20230316	Water	03/16/23 13:03	03/16/23 15:45

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of 1
Site Location: IDW / VAB / Hot Spot 2			PO No. 148569	Project No. 60615493.4 Phase:
TO No.: 80KSC019F0075	AECOM Project Manager:	**Linnea King Clark; Caroline Bekins**	Send Invoice To: Instructions in MSA	EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #	Caroline Bekins 714-943-9928	Madan Parsotan 321-696-6000	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: Eurofins		Turnaround Time(specify): Standard 14 day	Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-2 & 15-14

Sample Analysis Requested (*Enter number of containers for each test*)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) Total No. of Containers	HCl Select VOCs by SW8260B by Wksht # 15-14	4 DEG C Select PFAS by 537	4 DEG Nitrate by EPA 300.0	H2SO4 <2 Total Phosphorus by EPA 345.6	Comments
	MLPV-IDW01 - 20230316	MLPV-IDW01	202303 16	1252	IDW	IDW	G	7	3	2	1	1	
	MLPV-IDW02 - 20230316	MLPV-IDW02	202303 16	1300	IDW	IDW	G	7	3	2	1	1	
	MLPV-IDW03 - 20230316	MLPV-IDW03	202303 16	1303	IDW	IDW	G	7	3	2	1	1	
	~~MLPV-IDW04~~ SAMPLE003-0415.0 - 20230316	~~MLPV-IDW04~~	202303 16	1027	~~IDW~~	~~IDW~~	G	3	3	~~2~~	~~1~~	~~1~~	
	~~MLPV-IDW05~~ 1000560-035 - 20230316	~~MLPV-IDW05~~	202303 16	1255	~~IDW~~	~~IDW~~	G	3	3	~~2~~	~~1~~	~~1~~	(13)
	~~MLPV-IDW06~~	MLPV-IDW06	202303		~~IDW~~	~~IDW~~	G	7	3	2	1	1	
	~~MLPV-IDW07~~	MLPV-IDW07	202303		~~IDW~~	~~IDW~~	G	~~7~~	~~3~~	2	1	1	

670-16417 Chain of Custody

***Field* Comments:**

Report only per QAPP WS #15-14 & 15-2 (not DOD)

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

Samples Iced?(check) Yes_____ No_____

Shipping Company:

Tracking No:

Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		3/17/23	0700		3/16/23	1400
2		3/16/23	1400	James W Driggers	3/16/23	1400
3						

(1) AA=Ambient air, **AQ**=Air quality control, **ASB**=Asbestos, **CK**=Caulk, **DS**=Storm drain sediment, **GS**=Soil gas, **IC**=IDW Concrete, **IDD**=IDW Solid, **IDS**=IDW soil, **IDW**=IDW Water, **LF**=Free Product, **MA**=Mastic, **PC**=Paint Chips, **SC**=Cement/Concrete, **SE**=Sediment, **SL**=Sludge, **SO**=Soil, **SQ**=Soil/Solid quality control, **SSD**=Subsurface sediment, **SU**=Surface soil (<6 in), **SW**=Swab or wipe, **TA**=Animal tissue, **TP**=Plant tissue, **TQ**=Tissue quality control, **WG**=Ground water, **WL**=Leachate, **WO**=Ocean water, **WP**=Drinking water, **WQ**=Water quality control, **WR**=Ground water effluent, **WS**=Surface water, **WU**=Storm water, **WW**=Waste water

(2) Sample Type: AB=Ambient Blk, **EB**=Equipment Blk, **FB**=Field Blk, **FD**=Field Duplicate Sample, **IDW**=Investigative-Derived Waste, **MIS**=Incremental Sampling Methodology, **N**=Normal Environmental Sample, **TB**=Trip Blk

(3) Preservative added: **4 DEG C**=Cool to 4 degrees, **Dark**=Store in Darkness, store cool at 4 degrees C **H2SO4**=Hydrogen sulfate, **H2SO4 <2**=Adjust to pH < 2 with sulfuric acid, **H3PO4**=Phosphoric acid, **H3PO4 <2**=Adjust to pH <2 with phosphoric acid, **HCl <2**=Adjust to pH < 2 with hydrochloric acid, **HNaO4S**=Sodium bisulfate preservation, **HNO3 <2**=Adjust to pH < 2 with nitric acid, **MeOH**=Methanol preservation, **Na2O3S2**=Sodium thiosulfate, **Na2O3S2 3/gal**=Add 3 mL 10% sodium thiosulfate per l-gal, **Na2O3S2 4/4oz**=4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2**=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, **VitC 0.6/500**=0.6 g of ascorbic acid to 500mLs, **ZnAct 2/500**=Add 2 mL of zinc acetate to 500mLs, **ZnAct+NaOH >9**=Zinc acetate and NaOH to pH>9; store cool at 4C If **NO preservative** added leave blank **Rev 8/19**

3116 1545

2.0 | 1.5

3/30/2023

SO 5826

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-6568.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Florida		Job #: 670-16417-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 3/27/2023			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV IDW	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA/3535_PFC (MOD) PFAs WS#15-2 non DOD	PRE_SCREEN_PFAS/PFAS_PreScn_W_P	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MLPV-IDW01-20230316 (670-16417-1)	3/16/23	12:52 Eastern		Water			X	X	2	
MLPV-IDW02-20230316 (670-16417-2)	3/16/23	13:00 Eastern		Water			X	X	2	
MLPV-IDW03-20230316 (670-16417-3)	3/16/23	13:03 Eastern		Water			X	X	2	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3/17 1200				
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-18-23 0927	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 0.9

JM

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16417-1

Login Number: 16417

List Source: Eurofins Orlando

List Number: 1

Creator: Hartley, Tyler

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16417-1

Login Number: 16417
List Number: 2
Creator: McCaskey, Jonathan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 03/18/23 12:39 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 3/30/2023 5:21:25 PM

JOB DESCRIPTION

NASA KSC MLPV IDW

JOB NUMBER

670-16428-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

my EOL

Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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3/30/2023 5:21:25 PM

Authorized for release by
Kaitlin Dylnicki, Project Manager
kaitlin.dylnicki@et.eurofinsus.com
(407)339-5984

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-16428-1
Project/Site: NASA KSC MLPV IDW

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

LCMS

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
TNTC	Too Numerous To Count

Job ID: 670-16428-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-16428-1

Receipt
The samples were received on 3/16/2023 3:45 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 5.0°C

GC/MS VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

PFAS
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Client Sample ID: MLPV-IDW20-20230316 — Lab Sample ID: 670-16428-1

No Detections.

Client Sample ID: MLPV-IDW21-20230316 — Lab Sample ID: 670-16428-2

No Detections.

Client Sample ID: MLPV-IDW22-20230316 — Lab Sample ID: 670-16428-3

No Detections.

Client Sample ID: MLPV-IDW23-20230316 — Lab Sample ID: 670-16428-4

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	410		400	200	ug/L	1		300.0	Total/NA
HFPODA	0.0064		0.0029	0.00097	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.011		0.0049	0.0019	ug/L	1		537 IDA	Total/NA
Perfluorodecanesulfonic acid	0.0011	I J	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorodecanoic acid	0.0012	I J	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroheptanesulfonic acid	0.00062	I	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0060		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0038		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0066	J	0.0019	0.00088	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.011	J	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.023		0.0019	0.00097	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.013		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.00055	I	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0044		0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Perfluoroundecanoic acid	0.0015	I J	0.0019	0.00049	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	690		100	40	ug/L	1		365.4	Total/NA

Client Sample ID: MLPV-IDW24-20230316 — Lab Sample ID: 670-16428-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.87	I	1.0	0.71	ug/L	1		8260D	Total/NA
Perfluorobutanesulfonic acid	0.0013	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.010		0.0048	0.0019	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0016	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0047		0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0028		0.0019	0.00087	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00063	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.032		0.0019	0.00097	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0051		0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.00066	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0015	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA

Client Sample ID: MLPV-IDW25-20230316 — Lab Sample ID: 670-16428-6

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.00080	I J	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.00063	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0013	I	0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0015	I	0.0019	0.00086	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0031		0.0019	0.00096	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0051		0.0019	0.00048	ug/L	1		537 IDA	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IDW20-20230316 Lab Sample ID: 670-16428-1

Date Collected: 03/16/23 11:09 **Matrix: Solid**
Date Received: 03/16/23 15:45 **Percent Solids: 77.1**

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.0011	U	0.021	0.0011	mg/Kg	☼	03/17/23 12:25	03/20/23 19:12	1
trans-1,2-Dichloroethene	0.0012	U	0.021	0.0012	mg/Kg	☼	03/17/23 12:25	03/20/23 19:12	1
Trichloroethene	0.0011	U	0.021	0.0011	mg/Kg	☼	03/17/23 12:25	03/20/23 19:12	1
Vinyl chloride	0.00079	U	0.021	0.00079	mg/Kg	☼	03/17/23 12:25	03/20/23 19:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:12*	*1*
4-Bromofluorobenzene (Surr)	*105*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:12*	*1*
Dibromofluoromethane (Surr)	*117*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:12*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		03/21/23 10:30	03/21/23 21:40	1
Cadmium	12	U	25	12	ug/L		03/21/23 10:30	03/21/23 21:40	1
Chromium	11	U	50	11	ug/L		03/21/23 10:30	03/21/23 21:40	1
Lead	18	U	50	18	ug/L		03/21/23 10:30	03/21/23 21:40	1

Client Sample ID: MLPV-IDW21-20230316 Lab Sample ID: 670-16428-2

Date Collected: 03/16/23 11:12 **Matrix: Solid**
Date Received: 03/16/23 15:45 **Percent Solids: 80.8**

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.00067	U	0.012	0.00067	mg/Kg	☼	03/17/23 12:25	03/20/23 19:36	1
trans-1,2-Dichloroethene	0.00072	U	0.012	0.00072	mg/Kg	☼	03/17/23 12:25	03/20/23 19:36	1
Trichloroethene	0.00062	U	0.012	0.00062	mg/Kg	☼	03/17/23 12:25	03/20/23 19:36	1
Vinyl chloride	0.00046	U	0.012	0.00046	mg/Kg	☼	03/17/23 12:25	03/20/23 19:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:36*	*1*
4-Bromofluorobenzene (Surr)	*103*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:36*	*1*
Dibromofluoromethane (Surr)	*114*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:36*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		03/21/23 10:30	03/21/23 21:43	1
Cadmium	12	U	25	12	ug/L		03/21/23 10:30	03/21/23 21:43	1
Chromium	11	U	50	11	ug/L		03/21/23 10:30	03/21/23 21:43	1
Lead	18	U	50	18	ug/L		03/21/23 10:30	03/21/23 21:43	1

Client Sample ID: MLPV-IDW22-20230316 Lab Sample ID: 670-16428-3

Date Collected: 03/16/23 11:18 **Matrix: Solid**
Date Received: 03/16/23 15:45 **Percent Solids: 76.3**

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.00072	U	0.013	0.00072	mg/Kg	☼	03/17/23 12:25	03/20/23 19:59	1
trans-1,2-Dichloroethene	0.00078	U	0.013	0.00078	mg/Kg	☼	03/17/23 12:25	03/20/23 19:59	1
Trichloroethene	0.00067	U	0.013	0.00067	mg/Kg	☼	03/17/23 12:25	03/20/23 19:59	1
Vinyl chloride	0.00049	U	0.013	0.00049	mg/Kg	☼	03/17/23 12:25	03/20/23 19:59	1

Client Sample ID: MLPV-IDW22-20230316

Lab Sample ID: 670-16428-3

Date Collected: 03/16/23 11:18
Date Received: 03/16/23 15:45

Matrix: Solid
Percent Solids: 76.3

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:59*	*1*
4-Bromofluorobenzene (Surr)	*114*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:59*	*1*
Dibromofluoromethane (Surr)	*112*		*70 - 130*	*03/17/23 12:25*	*03/20/23 19:59*	*1*

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		03/21/23 10:30	03/21/23 21:47	1
Cadmium	12	U	25	12	ug/L		03/21/23 10:30	03/21/23 21:47	1
Chromium	11	U	50	11	ug/L		03/21/23 10:30	03/21/23 21:47	1
Lead	18	U	50	18	ug/L		03/21/23 10:30	03/21/23 21:47	1

Client Sample ID: MLPV-IDW23-20230316

Lab Sample ID: 670-16428-4

Date Collected: 03/16/23 11:29
Date Received: 03/16/23 15:45

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 14:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/29/23 14:50	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/29/23 14:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/29/23 14:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/29/23 14:50*	*1*
Dibromofluoromethane (Surr)	*97*		*53 - 146*		*03/29/23 14:50*	*1*
Toluene-d8 (Surr)	*101*		*40 - 146*		*03/29/23 14:50*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**410**		400	200	ug/L			03/17/23 18:13	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
4:2 Fluorotelomer sulfonic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0049	0.0041	ug/L		03/21/23 15:26	03/28/23 04:10	1
8:2 Fluorotelomer sulfonic acid	0.00097	U	0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:10	1
9Cl-PF3ONS	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
DONA	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
HFPODA	**0.0064**		0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:10	1
NEtFOSAA	0.00049	U	0.0029	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
NMeFOSAA	0.00058	U	0.0019	0.00058	ug/L		03/21/23 15:26	03/28/23 04:10	1
NMeFOSA	0.00097	U	0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorobutanesulfonic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorobutanoic acid	**0.011**		0.0049	0.0019	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorodecanesulfonic acid	**0.0011**	**I J**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorodecanoic acid	**0.0012**	**I J**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorododecanoic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluoroheptanesulfonic acid	**0.00062**	**I**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluoroheptanoic acid	**0.0060**		0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorohexanesulfonic acid	**0.0038**		0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Client Sample ID: MLPV-IDW23-20230316

Lab Sample ID: 670-16428-4

Date Collected: 03/16/23 11:29
Date Received: 03/16/23 15:45

Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid	**0.0066**	**J**	0.0019	0.00088	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorononanesulfonic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorononanoic acid	**0.011**	**J**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorooctanesulfonamide	0.00068	U	0.0019	0.00068	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorooctanesulfonic acid	**0.023**		0.0019	0.00097	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorooctanoic acid	**0.013**		0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluoropentanesulfonic acid	**0.00055**	**I**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluoropentanoic acid	**0.0044**		0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorotetradecanoic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluorotridecanoic acid	0.00049	U	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1
Perfluoroundecanoic acid	**0.0015**	**I J**	0.0019	0.00049	ug/L		03/21/23 15:26	03/28/23 04:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*177*		*10 - 200*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
M2-6:2 FTS	*123*		*17 - 200*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
M2-8:2 FTS	*184*		*33 - 200*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C2-PFDoDA	*117*		*17 - 176*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C2 PFTeDA	*106*		*10 - 179*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C3 HFPO-DA	*125*		*17 - 185*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C3 PFBS	*152*		*16 - 200*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C3 PFHxS	*137*		*28 - 188*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C4 PFBA	*126*		*42 - 165*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C4 PFHpA	*130*		*31 - 182*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C5 PFPeA	*137*		*38 - 187*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
d5-NEtFOSAA	*127*		*29 - 195*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C6 PFDA	*118*		*49 - 163*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C8 PFOA	*122*		*48 - 162*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C8 PFOS	*126*		*51 - 159*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C8 FOSA	*89*		*10 - 168*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
d3-NMeFOSAA	*113*		*31 - 174*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
d3-NMePFOSA	*48*		*10 - 155*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C5 PFHxA	*122*		*24 - 179*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C7 PFUnA	*121*		*34 - 174*	*03/21/23 15:26*	*03/28/23 04:10*	*1*
13C9 PFNA	*126*		*51 - 167*	*03/21/23 15:26*	*03/28/23 04:10*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	**690**		100	40	ug/L		03/17/23 10:37	03/20/23 22:46	1

Client Sample ID: MLPV-IDW24-20230316

Lab Sample ID: 670-16428-5

Date Collected: 03/16/23 11:35
Date Received: 03/16/23 15:45

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 15:07	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/29/23 15:07	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/29/23 15:07	1
Vinyl chloride	**0.87**	**I**	1.0	0.71	ug/L			03/29/23 15:07	1

Client Sample ID: MLPV-IDW24-20230316

Date Collected: 03/16/23 11:35
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-5

Matrix: Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*03/29/23 15:07*	*1*
Dibromofluoromethane (Surr)	*97*		*53 - 146*		*03/29/23 15:07*	*1*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/29/23 15:07*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			03/17/23 18:30	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
4:2 Fluorotelomer sulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
6:2 Fluorotelomer sulfonic acid	0.0041	U	0.0048	0.0041	ug/L		03/21/23 15:26	03/28/23 04:21	1
8:2 Fluorotelomer sulfonic acid	0.00097	U	0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:21	1
9Cl-PF3ONS	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
DONA	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
HFPODA	0.00097	U	0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:21	1
NEtFOSAA	0.00048	U	0.0029	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
NMeFOSAA	0.00058	U	0.0019	0.00058	ug/L		03/21/23 15:26	03/28/23 04:21	1
NMeFOSA	0.00097	U	0.0029	0.00097	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorobutanesulfonic acid	**0.0013**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorobutanoic acid	**0.010**		0.0048	0.0019	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorodecanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorodecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorododecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluoroheptanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluoroheptanoic acid	**0.0016**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorohexanesulfonic acid	**0.0047**		0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorohexanoic acid	**0.0028**		0.0019	0.00087	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorononanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorononanoic acid	**0.00063**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorooctanesulfonamide	0.00068	U	0.0019	0.00068	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorooctanesulfonic acid	**0.032**		0.0019	0.00097	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorooctanoic acid	**0.0051**		0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluoropentanesulfonic acid	**0.00066**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluoropentanoic acid	**0.0015**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorotetradecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluorotridecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1
Perfluoroundecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:21	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-4:2 FTS	*132*		*10 - 200*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
M2-6:2 FTS	*136*		*17 - 200*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
M2-8:2 FTS	*109*		*33 - 200*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C2-PFDoDA	*90*		*17 - 176*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C2 PFTeDA	*95*		*10 - 179*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C3 HFPO-DA	*106*		*17 - 185*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C3 PFBS	*107*		*16 - 200*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C3 PFHxS	*112*		*28 - 188*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C4 PFBA	*106*		*42 - 165*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C4 PFHpA	*118*		*31 - 182*	*03/21/23 15:26*	*03/28/23 04:21*	*1*

Client Sample ID: MLPV-IDW24-20230316 Lab Sample ID: 670-16428-5

Date Collected: 03/16/23 11:35 **Matrix: Water**
Date Received: 03/16/23 15:45

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C5 PFPeA	*96*		*38 - 187*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
d5-NEtFOSAA	*94*		*29 - 195*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C6 PFDA	*95*		*49 - 163*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C8 PFOA	*104*		*48 - 162*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C8 PFOS	*102*		*51 - 159*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C8 FOSA	*87*		*10 - 168*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
d3-NMeFOSAA	*96*		*31 - 174*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
d3-NMePFOSA	*66*		*10 - 155*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C5 PFHxA	*109*		*24 - 179*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C7 PFUnA	*98*		*34 - 174*	*03/21/23 15:26*	*03/28/23 04:21*	*1*
13C9 PFNA	*105*		*51 - 167*	*03/21/23 15:26*	*03/28/23 04:21*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:47	1

Client Sample ID: MLPV-IDW25-20230316 Lab Sample ID: 670-16428-6

Date Collected: 03/16/23 11:45 **Matrix: Water**
Date Received: 03/16/23 15:45

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 15:25	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/29/23 15:25	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/29/23 15:25	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/29/23 15:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*03/29/23 15:25*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*03/29/23 15:25*	*1*
Toluene-d8 (Surr)	*102*		*40 - 146*		*03/29/23 15:25*	*1*

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			03/17/23 18:48	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
4:2 Fluorotelomer sulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
6:2 Fluorotelomer sulfonic acid	0.0040	U	0.0048	0.0040	ug/L		03/21/23 15:26	03/28/23 04:33	1
8:2 Fluorotelomer sulfonic acid	0.00096	U	0.0029	0.00096	ug/L		03/21/23 15:26	03/28/23 04:33	1
9Cl-PF3ONS	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
DONA	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
HFPODA	0.00096	U	0.0029	0.00096	ug/L		03/21/23 15:26	03/28/23 04:33	1
NEtFOSAA	0.00048	U	0.0029	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
NMeFOSAA	0.00057	U	0.0019	0.00057	ug/L		03/21/23 15:26	03/28/23 04:33	1
NMeFOSA	0.00096	U	0.0029	0.00096	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorobutanesulfonic acid	**0.00080**	**I J**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorobutanoic acid	0.0019	U	0.0048	0.0019	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorodecanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Client Sample ID: MLPV-IDW25-20230316
Date Collected: 03/16/23 11:45
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-6
Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorododecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluoroheptanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluoroheptanoic acid	**0.00063**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorohexanesulfonic acid	**0.0013**	**I**	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorohexanoic acid	**0.0015**	**I**	0.0019	0.00086	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorononanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorononanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorooctanesulfonamide	0.00067	U	0.0019	0.00067	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorooctanesulfonic acid	**0.0031**		0.0019	0.00096	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorooctanoic acid	**0.0051**		0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluoropentanesulfonic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluoropentanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorotetradecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluorotridecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1
Perfluoroundecanoic acid	0.00048	U	0.0019	0.00048	ug/L		03/21/23 15:26	03/28/23 04:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*152*		*10 - 200*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
M2-6:2 FTS	*146*		*17 - 200*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
M2-8:2 FTS	*128*		*33 - 200*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C2-PFDoDA	*122*		*17 - 176*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C2 PFTeDA	*116*		*10 - 179*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C3 HFPO-DA	*111*		*17 - 185*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C3 PFBS	*127*		*16 - 200*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C3 PFHxS	*128*		*28 - 188*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C4 PFBA	*120*		*42 - 165*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C4 PFHpA	*129*		*31 - 182*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C5 PFPeA	*124*		*38 - 187*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
d5-NEtFOSAA	*111*		*29 - 195*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C6 PFDA	*119*		*49 - 163*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C8 PFOA	*121*		*48 - 162*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C8 PFOS	*117*		*51 - 159*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C8 FOSA	*114*		*10 - 168*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
d3-NMeFOSAA	*118*		*31 - 174*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
d3-NMePFOSA	*82*		*10 - 155*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C5 PFHxA	*115*		*24 - 179*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C7 PFUnA	*130*		*34 - 174*	*03/21/23 15:26*	*03/28/23 04:33*	*1*
13C9 PFNA	*115*		*51 - 167*	*03/21/23 15:26*	*03/28/23 04:33*	*1*

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:48	1

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Solid — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(70-130)	(70-130)	(70-130)
670-16428-1	MLPV-IDW20-20230316	98	105	117
670-16428-2	MLPV-IDW21-20230316	100	103	114
670-16428-3	MLPV-IDW22-20230316	103	114	112
LCS 670-26939/4	Lab Control Sample	99	100	100
LCSD 670-26939/5	Lab Control Sample Dup	98	99	101
MB 670-26939/9	Method Blank	100	102	110

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(41-142)	(53-146)	(40-146)
670-16428-4	MLPV-IDW23-20230316	100	97	101
670-16428-5	MLPV-IDW24-20230316	101	97	98
670-16428-6	MLPV-IDW25-20230316	100	99	102
670-16597-F-2 MS	Matrix Spike	95	99	103
670-16597-H-1 DU	Duplicate	98	98	101
LCS 670-28077/4	Lab Control Sample	96	99	102
MB 670-28077/7	Method Blank	99	100	98

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	PFDoDA	PFTDA	HFPODA	C3PFBS	C3PFHS
Lab Sample ID	Client Sample ID	(10-200)	(17-200)	(33-200)	(17-176)	(10-179)	(17-185)	(16-200)	(28-188)
670-16428-4	MLPV-IDW23-20230316	177	123	184	117	106	125	152	137
670-16428-5	MLPV-IDW24-20230316	132	136	109	90	95	106	107	112
670-16428-6	MLPV-IDW25-20230316	152	146	128	122	116	111	127	128
LCS 410-355823/2-A	Lab Control Sample	137	147	139	113	118	109	136	126
LCSD 410-355823/3-A	Lab Control Sample Dup	136	160	143	120	126	116	129	125
MB 410-355823/1-A	Method Blank	139	146	136	110	120	112	123	124

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFBA	C4PFHA	PFPeA	d5NEFOS	C6PFDA	C8PFOA	C8PFOS	PFOSA
Lab Sample ID	Client Sample ID	(42-165)	(31-182)	(38-187)	(29-195)	(49-163)	(48-162)	(51-159)	(10-168)
670-16428-4	MLPV-IDW23-20230316	126	130	137	127	118	122	126	89
670-16428-5	MLPV-IDW24-20230316	106	118	96	94	95	104	102	87
670-16428-6	MLPV-IDW25-20230316	120	129	124	111	119	121	117	114
LCS 410-355823/2-A	Lab Control Sample	126	130	126	115	125	124	121	108
LCSD 410-355823/3-A	Lab Control Sample Dup	131	131	132	114	126	128	127	112
MB 410-355823/1-A	Method Blank	126	129	124	112	122	131	119	107

		Percent Isotope Dilution Recovery (Acceptance Limits)				
		d3NMFOS	d3NMFSA	13C5PHA	13C7PUA	C9PFNA
Lab Sample ID	Client Sample ID	(31-174)	(10-155)	(24-179)	(34-174)	(51-167)
670-16428-4	MLPV-IDW23-20230316	113	48	122	121	126
670-16428-5	MLPV-IDW24-20230316	96	66	109	98	105
670-16428-6	MLPV-IDW25-20230316	118	82	115	130	115
LCS 410-355823/2-A	Lab Control Sample	128	70	125	131	116
LCSD 410-355823/3-A	Lab Control Sample Dup	123	70	130	120	133
MB 410-355823/1-A	Method Blank	112	62	126	127	118

Surrogate Legend

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
PFDoDA = 13C2-PFDoDA
PFTDA = 13C2 PFTeDA
HFPODA = 13C3 HFPO-DA
C3PFBS = 13C3 PFBS
C3PFHS = 13C3 PFHxS
PFBA = 13C4 PFBA
C4PFHA = 13C4 PFHpA
PFPeA = 13C5 PFPeA
d5NEFOS = d5-NEtFOSAA
C6PFDA = 13C6 PFDA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
PFOSA = 13C8 FOSA
d3NMFOS = d3-NMeFOSAA
d3NMFSA = d3-NMePFOSA
13C5PHA = 13C5 PFHxA
13C7PUA = 13C7 PFUnA
C9PFNA = 13C9 PFNA

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-26939/9
Matrix: Solid
Analysis Batch: 26939

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.00064	U	0.012	0.00064	mg/Kg			03/20/23 13:42	1
trans-1,2-Dichloroethene	0.00069	U	0.012	0.00069	mg/Kg			03/20/23 13:42	1
Trichloroethene	0.00060	U	0.012	0.00060	mg/Kg			03/20/23 13:42	1
Vinyl chloride	0.00044	U	0.012	0.00044	mg/Kg			03/20/23 13:42	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*70 - 130*		*03/20/23 13:42*	*1*
4-Bromofluorobenzene (Surr)	*102*		*70 - 130*		*03/20/23 13:42*	*1*
Dibromofluoromethane (Surr)	*110*		*70 - 130*		*03/20/23 13:42*	*1*

Lab Sample ID: LCS 670-26939/4
Matrix: Solid
Analysis Batch: 26939

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			0.0500	0.0520		mg/Kg		104	48 - 137		
trans-1,2-Dichloroethene			0.0500	0.0486		mg/Kg		97	50 - 138		
Trichloroethene			0.0500	0.0483		mg/Kg		97	51 - 147		
Vinyl chloride			0.0500	0.0599		mg/Kg		120	29 - 158		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*70 - 130*
4-Bromofluorobenzene (Surr)	*100*		*70 - 130*
Dibromofluoromethane (Surr)	*100*		*70 - 130*

Lab Sample ID: LCSD 670-26939/5
Matrix: Solid
Analysis Batch: 26939

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			0.0500	0.0523		mg/Kg		105	48 - 137	1	20
trans-1,2-Dichloroethene			0.0500	0.0471		mg/Kg		94	50 - 138	3	29
Trichloroethene			0.0500	0.0495		mg/Kg		99	51 - 147	2	26
Vinyl chloride			0.0500	0.0562		mg/Kg		112	29 - 158	6	23

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*70 - 130*
4-Bromofluorobenzene (Surr)	*99*		*70 - 130*
Dibromofluoromethane (Surr)	*101*		*70 - 130*

Lab Sample ID: MB 670-28077/7
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			03/29/23 12:27	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			03/29/23 12:27	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			03/29/23 12:27	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 670-28077/7
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			03/29/23 12:27	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*40 - 146*		*03/29/23 12:27*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*03/29/23 12:27*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*03/29/23 12:27*	*1*

Lab Sample ID: LCS 670-28077/4
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	20.7		ug/L		104	56 - 128
trans-1,2-Dichloroethene	20.0	18.6		ug/L		93	54 - 134
Trichloroethene	20.0	19.5		ug/L		97	62 - 135
Vinyl chloride	20.0	21.5		ug/L		108	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-16597-F-2 MS
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.53	U	20.0	21.0		ug/L		105	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	22.0		ug/L		110	54 - 134
Trichloroethene	0.89	U	20.0	20.8		ug/L		104	62 - 135
Vinyl chloride	0.71	U	20.0	22.6		ug/L		113	20 - 167

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-16597-H-1 DU
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U	0.53	U	ug/L		NC	30
trans-1,2-Dichloroethene	0.73	U	0.73	U	ug/L		NC	20
Trichloroethene	0.89	U	0.89	U	ug/L		NC	30
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-16597-H-1 DU
Matrix: Water
Analysis Batch: 28077

Client Sample ID: Duplicate
Prep Type: Total/NA

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*
Dibromofluoromethane (Surr)	*98*		*53 - 146*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-26744/6
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			03/17/23 15:57	1

Lab Sample ID: LCS 670-26744/4
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	4000	4060		ug/L		101	90 - 110

Lab Sample ID: LCSD 670-26744/5
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	4000	4100		ug/L		103	90 - 110	1	20

Lab Sample ID: 670-16454-A-1 MS
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	200	U	5000	5290		ug/L		106	80 - 120

Lab Sample ID: 670-16454-A-1 MSD
Matrix: Water
Analysis Batch: 26744

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	200	U	5000	5290		ug/L		106	80 - 120	0	20

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-355823/1-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 355823

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-355823/1-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 355823

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		03/21/23 15:26	03/28/23 02:20	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
DONA	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		03/21/23 15:26	03/28/23 02:20	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		03/21/23 15:26	03/28/23 02:20	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*139*		*10 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
M2-6:2 FTS	*146*		*17 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
M2-8:2 FTS	*136*		*33 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C2-PFDoDA	*110*		*17 - 176*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C2 PFTeDA	*120*		*10 - 179*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 HFPO-DA	*112*		*17 - 185*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 PFBS	*123*		*16 - 200*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C3 PFHxS	*124*		*28 - 188*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C4 PFBA	*126*		*42 - 165*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C4 PFHpA	*129*		*31 - 182*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C5 PFPeA	*124*		*38 - 187*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
d5-NEtFOSAA	*112*		*29 - 195*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C6 PFDA	*122*		*49 - 163*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 PFOA	*131*		*48 - 162*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 PFOS	*119*		*51 - 159*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C8 FOSA	*107*		*10 - 168*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
d3-NMeFOSAA	*112*		*31 - 174*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
d3-NMePFOSA	*62*		*10 - 155*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C5 PFHxA	*126*		*24 - 179*	*03/21/23 15:26*	*03/28/23 02:20*	*1*
13C7 PFUnA	*127*		*34 - 174*	*03/21/23 15:26*	*03/28/23 02:20*	*1*

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-355823/1-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 355823

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C9 PFNA	118		51 - 167	03/21/23 15:26	03/28/23 02:20	1

Lab Sample ID: LCS 410-355823/2-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 355823

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0216		ug/L		91	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0238		ug/L		100	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0229		ug/L		94	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0264		ug/L		108	55 - 138
9Cl-PF3ONS	0.0238	0.0216		ug/L		91	59 - 135
DONA	0.0242	0.0204		ug/L		84	55 - 143
HFPODA	0.0256	0.0253		ug/L		99	50 - 135
NEtFOSAA	0.0256	0.0281		ug/L		110	55 - 134
NMeFOSAA	0.0256	0.0254		ug/L		99	59 - 140
NMeFOSA	0.0256	0.0286		ug/L		112	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0202		ug/L		89	53 - 138
Perfluorobutanoic acid	0.0256	0.0228		ug/L		89	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0225		ug/L		91	55 - 137
Perfluorodecanoic acid	0.0256	0.0229		ug/L		90	56 - 138
Perfluorododecanoic acid	0.0256	0.0252		ug/L		98	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0229		ug/L		94	56 - 140
Perfluoroheptanoic acid	0.0256	0.0237		ug/L		92	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0219		ug/L		94	58 - 134
Perfluorohexanoic acid	0.0256	0.0228		ug/L		89	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0247		ug/L		100	59 - 136
Perfluorononanoic acid	0.0256	0.0257		ug/L		101	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0266		ug/L		104	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0218		ug/L		92	45 - 150
Perfluorooctanoic acid	0.0256	0.0221		ug/L		86	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0229		ug/L		95	55 - 140
Perfluoropentanoic acid	0.0256	0.0235		ug/L		92	57 - 141
Perfluorotetradecanoic acid	0.0256	0.0243		ug/L		95	62 - 139
Perfluorotridecanoic acid	0.0256	0.0247		ug/L		96	58 - 146
Perfluoroundecanoic acid	0.0256	0.0229		ug/L		90	60 - 141

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
M2-4:2 FTS	137		10 - 200
M2-6:2 FTS	147		17 - 200
M2-8:2 FTS	139		33 - 200
13C2-PFDoDA	113		17 - 176
13C2 PFTeDA	118		10 - 179
13C3 HFPO-DA	109		17 - 185
13C3 PFBS	136		16 - 200
13C3 PFHxS	126		28 - 188
13C4 PFBA	126		42 - 165
13C4 PFHpA	130		31 - 182
13C5 PFPeA	126		38 - 187

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-355823/2-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 355823

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
d5-NEtFOSAA	115		29 - 195
13C6 PFDA	125		49 - 163
13C8 PFOA	124		48 - 162
13C8 PFOS	121		51 - 159
13C8 FOSA	108		10 - 168
d3-NMeFOSAA	128		31 - 174
d3-NMePFOSA	70		10 - 155
13C5 PFHxA	125		24 - 179
13C7 PFUnA	131		34 - 174
13C9 PFNA	116		51 - 167

Lab Sample ID: LCSD 410-355823/3-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 355823

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS			0.0238	0.0219		ug/L		92	53 - 139	1	30
4:2 Fluorotelomer sulfonic acid			0.0239	0.0267		ug/L		111	55 - 139	11	30
6:2 Fluorotelomer sulfonic acid			0.0243	0.0227		ug/L		94	28 - 173	1	30
8:2 Fluorotelomer sulfonic acid			0.0245	0.0241		ug/L		98	55 - 138	9	30
9Cl-PF3ONS			0.0238	0.0211		ug/L		89	59 - 135	2	30
DONA			0.0242	0.0210		ug/L		87	55 - 143	3	30
HFPODA			0.0256	0.0236		ug/L		92	50 - 135	7	30
NEtFOSAA			0.0256	0.0276		ug/L		108	55 - 134	2	30
NMeFOSAA			0.0256	0.0280		ug/L		109	59 - 140	10	30
NMeFOSA			0.0256	0.0302		ug/L		118	64 - 143	6	30
Perfluorobutanesulfonic acid			0.0227	0.0203		ug/L		90	53 - 138	0	30
Perfluorobutanoic acid			0.0256	0.0222		ug/L		87	59 - 136	3	30
Perfluorodecanesulfonic acid			0.0247	0.0223		ug/L		90	55 - 137	1	30
Perfluorodecanoic acid			0.0256	0.0226		ug/L		88	56 - 138	1	30
Perfluorododecanoic acid			0.0256	0.0249		ug/L		97	59 - 143	1	30
Perfluoroheptanesulfonic acid			0.0244	0.0239		ug/L		98	56 - 140	4	30
Perfluoroheptanoic acid			0.0256	0.0238		ug/L		93	59 - 145	1	30
Perfluorohexanesulfonic acid			0.0233	0.0216		ug/L		93	58 - 134	1	30
Perfluorohexanoic acid			0.0256	0.0226		ug/L		88	58 - 139	1	30
Perfluorononanesulfonic acid			0.0246	0.0223		ug/L		91	59 - 136	10	30
Perfluorononanoic acid			0.0256	0.0238		ug/L		93	61 - 139	8	30
Perfluorooctanesulfonamide			0.0256	0.0256		ug/L		100	43 - 167	4	30
Perfluorooctanesulfonic acid			0.0237	0.0222		ug/L		94	45 - 150	2	30
Perfluorooctanoic acid			0.0256	0.0209		ug/L		82	51 - 145	6	30
Perfluoropentanesulfonic acid			0.0240	0.0239		ug/L		99	55 - 140	4	30
Perfluoropentanoic acid			0.0256	0.0233		ug/L		91	57 - 141	1	30
Perfluorotetradecanoic acid			0.0256	0.0225		ug/L		88	62 - 139	8	30
Perfluorotridecanoic acid			0.0256	0.0229		ug/L		90	58 - 146	7	30
Perfluoroundecanoic acid			0.0256	0.0263		ug/L		103	60 - 141	14	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
M2-4:2 FTS	136		10 - 200
M2-6:2 FTS	160		17 - 200

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-355823/3-A
Matrix: Water
Analysis Batch: 357670

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 355823

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
M2-8:2 FTS	*143*		*33 - 200*
13C2-PFDoDA	*120*		*17 - 176*
13C2 PFTeDA	*126*		*10 - 179*
13C3 HFPO-DA	*116*		*17 - 185*
13C3 PFBS	*129*		*16 - 200*
13C3 PFHxS	*125*		*28 - 188*
13C4 PFBA	*131*		*42 - 165*
13C4 PFHpA	*131*		*31 - 182*
13C5 PFPeA	*132*		*38 - 187*
d5-NEtFOSAA	*114*		*29 - 195*
13C6 PFDA	*126*		*49 - 163*
13C8 PFOA	*128*		*48 - 162*
13C8 PFOS	*127*		*51 - 159*
13C8 FOSA	*112*		*10 - 168*
d3-NMeFOSAA	*123*		*31 - 174*
d3-NMePFOSA	*70*		*10 - 155*
13C5 PFHxA	*130*		*24 - 179*
13C7 PFUnA	*120*		*34 - 174*
13C9 PFNA	*133*		*51 - 167*

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 860-95091/1-A
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 95091

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.1	U	10	8.1	ug/L		03/21/23 10:30	03/21/23 19:56	1
Cadmium	2.4	U	5.0	2.4	ug/L		03/21/23 10:30	03/21/23 19:56	1
Chromium	2.2	U	10	2.2	ug/L		03/21/23 10:30	03/21/23 19:56	1
Lead	3.7	U	10	3.7	ug/L		03/21/23 10:30	03/21/23 19:56	1

Lab Sample ID: LCS 860-95091/2-A
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 95091

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Arsenic			1000	894		ug/L		89	80 - 120		
Cadmium			1000	887		ug/L		89	80 - 120		
Chromium			1000	932		ug/L		93	80 - 120		
Lead			1000	925		ug/L		93	80 - 120		

Lab Sample ID: LCSD 860-95091/3-A
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 95091

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic			1000	897		ug/L		90	80 - 120	0	20
Cadmium			1000	889		ug/L		89	80 - 120	0	20
Chromium			1000	932		ug/L		93	80 - 120	0	20

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LCSD 860-95091/3-A
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 95091

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead			1000	924		ug/L		92	80 - 120	0	20

Lab Sample ID: LB 860-94972/1-B
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 95091

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	40	U	50	40	ug/L		03/21/23 10:30	03/21/23 20:07	1
Cadmium	12	U	25	12	ug/L		03/21/23 10:30	03/21/23 20:07	1
Chromium	11	U	50	11	ug/L		03/21/23 10:30	03/21/23 20:07	1
Lead	18	U	50	18	ug/L		03/21/23 10:30	03/21/23 20:07	1

Lab Sample ID: 860-45134-A-1-D MS
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Matrix Spike
Prep Type: TCLP
Prep Batch: 95091

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	40	U	1000	945		ug/L		95	75 - 125
Cadmium	12	U	1000	940		ug/L		94	75 - 125
Chromium	11	U	1000	980		ug/L		98	75 - 125
Lead	610		1000	1580		ug/L		97	75 - 125

Lab Sample ID: 860-45134-A-1-E MSD
Matrix: Solid
Analysis Batch: 95255

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP
Prep Batch: 95091

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	40	U	1000	885		ug/L		89	75 - 125	7	20
Cadmium	12	U	1000	930		ug/L		93	75 - 125	1	20
Chromium	11	U	1000	970		ug/L		97	75 - 125	1	20
Lead	610		1000	1570		ug/L		96	75 - 125	1	20

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-26750/12-A
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 26750

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		03/17/23 10:37	03/20/23 22:26	1

Lab Sample ID: LCS 670-26750/11-A
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 26750

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P			1500	1570		ug/L		105	90 - 110

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Method: 365.4 - Phosphorus, Total (Continued)

Lab Sample ID: 670-16437-C-1-D MS
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 26750

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	40	U	1500	1520		ug/L		101	85 - 115

Lab Sample ID: 670-16437-C-1-E MSD
Matrix: Water
Analysis Batch: 27040

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 26750

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	40	U	1500	1560		ug/L		104	85 - 115	3	20

GC/MS VOA

Prep Batch: 26769

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	Total/NA	Solid	5035	
670-16428-2	MLPV-IDW21-20230316	Total/NA	Solid	5035	
670-16428-3	MLPV-IDW22-20230316	Total/NA	Solid	5035	

Analysis Batch: 26939

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	Total/NA	Solid	8260D	26769
670-16428-2	MLPV-IDW21-20230316	Total/NA	Solid	8260D	26769
670-16428-3	MLPV-IDW22-20230316	Total/NA	Solid	8260D	26769
MB 670-26939/9	Method Blank	Total/NA	Solid	8260D	
LCS 670-26939/4	Lab Control Sample	Total/NA	Solid	8260D	
LCSD 670-26939/5	Lab Control Sample Dup	Total/NA	Solid	8260D	

Analysis Batch: 28077

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	8260D	
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	8260D	
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	8260D	
MB 670-28077/7	Method Blank	Total/NA	Water	8260D	
LCS 670-28077/4	Lab Control Sample	Total/NA	Water	8260D	
670-16597-F-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-16597-H-1 DU	Duplicate	Total/NA	Water	8260D	

HPLC/IC

Analysis Batch: 26744

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	300.0	
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	300.0	
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	300.0	
MB 670-26744/6	Method Blank	Total/NA	Water	300.0	
LCS 670-26744/4	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-26744/5	Lab Control Sample Dup	Total/NA	Water	300.0	
670-16454-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
670-16454-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 355823

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	537 IDA	
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	537 IDA	
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	537 IDA	
MB 410-355823/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-355823/2-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-355823/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

Analysis Batch: 357670

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	537 IDA	355823
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	537 IDA	355823
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	537 IDA	355823

LCMS (Continued)

Analysis Batch: 357670 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 410-355823/1-A	Method Blank	Total/NA	Water	537 IDA	355823
LCS 410-355823/2-A	Lab Control Sample	Total/NA	Water	537 IDA	355823
LCSD 410-355823/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	355823

Metals

Leach Batch: 94972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	TCLP	Solid	1311	
670-16428-2	MLPV-IDW21-20230316	TCLP	Solid	1311	
670-16428-3	MLPV-IDW22-20230316	TCLP	Solid	1311	
LB 860-94972/1-B	Method Blank	TCLP	Solid	1311	
860-45134-A-1-D MS	Matrix Spike	TCLP	Solid	1311	
860-45134-A-1-E MSD	Matrix Spike Duplicate	TCLP	Solid	1311	

Prep Batch: 95091

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	TCLP	Solid	3010A	94972
670-16428-2	MLPV-IDW21-20230316	TCLP	Solid	3010A	94972
670-16428-3	MLPV-IDW22-20230316	TCLP	Solid	3010A	94972
LB 860-94972/1-B	Method Blank	TCLP	Solid	3010A	94972
MB 860-95091/1-A	Method Blank	Total/NA	Solid	3010A	
LCS 860-95091/2-A	Lab Control Sample	Total/NA	Solid	3010A	
LCSD 860-95091/3-A	Lab Control Sample Dup	Total/NA	Solid	3010A	
860-45134-A-1-D MS	Matrix Spike	TCLP	Solid	3010A	94972
860-45134-A-1-E MSD	Matrix Spike Duplicate	TCLP	Solid	3010A	94972

Analysis Batch: 95255

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	TCLP	Solid	6010D	95091
670-16428-2	MLPV-IDW21-20230316	TCLP	Solid	6010D	95091
670-16428-3	MLPV-IDW22-20230316	TCLP	Solid	6010D	95091
LB 860-94972/1-B	Method Blank	TCLP	Solid	6010D	95091
MB 860-95091/1-A	Method Blank	Total/NA	Solid	6010D	95091
LCS 860-95091/2-A	Lab Control Sample	Total/NA	Solid	6010D	95091
LCSD 860-95091/3-A	Lab Control Sample Dup	Total/NA	Solid	6010D	95091
860-45134-A-1-D MS	Matrix Spike	TCLP	Solid	6010D	95091
860-45134-A-1-E MSD	Matrix Spike Duplicate	TCLP	Solid	6010D	95091

General Chemistry

Prep Batch: 26750

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	365.2/365.3/365	
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	365.2/365.3/365	
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	365.2/365.3/365	
MB 670-26750/12-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-26750/11-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-16437-C-1-D MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-16437-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

General Chemistry

Analysis Batch: 27040

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-4	MLPV-IDW23-20230316	Total/NA	Water	365.4	26750
670-16428-5	MLPV-IDW24-20230316	Total/NA	Water	365.4	26750
670-16428-6	MLPV-IDW25-20230316	Total/NA	Water	365.4	26750
MB 670-26750/12-A	Method Blank	Total/NA	Water	365.4	26750
LCS 670-26750/11-A	Lab Control Sample	Total/NA	Water	365.4	26750
670-16437-C-1-D MS	Matrix Spike	Total/NA	Water	365.4	26750
670-16437-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	26750

Analysis Batch: 94934

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-16428-1	MLPV-IDW20-20230316	Total/NA	Solid	Moisture	
670-16428-2	MLPV-IDW21-20230316	Total/NA	Solid	Moisture	
670-16428-3	MLPV-IDW22-20230316	Total/NA	Solid	Moisture	
MB 860-94934/1	Method Blank	Total/NA	Solid	Moisture	
840-2080-B-1 DU	Duplicate	Total/NA	Solid	Moisture	

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Client Sample ID: MLPV-IDW20-20230316
Lab Sample ID: 670-16428-1
Date Collected: 03/16/23 11:09
Matrix: Solid
Date Received: 03/16/23 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			94972	EMC	EET HOU	03/20/23 13:00 - 03/21/23 05:00 [1]
TCLP	Prep	3010A			95091	MD	EET HOU	03/21/23 10:30
TCLP	Analysis	6010D		1	95255	JDM	EET HOU	03/21/23 21:40
Total/NA	Analysis	Moisture		1	94934	JM	EET HOU	03/20/23 12:13

Client Sample ID: MLPV-IDW20-20230316
Lab Sample ID: 670-16428-1
Date Collected: 03/16/23 11:09
Matrix: Solid
Date Received: 03/16/23 15:45
Percent Solids: 77.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			26769	RG	EET ORL	03/17/23 12:25
Total/NA	Analysis	8260D		1	26939	P1K	EET ORL	03/20/23 19:12

Client Sample ID: MLPV-IDW21-20230316
Lab Sample ID: 670-16428-2
Date Collected: 03/16/23 11:12
Matrix: Solid
Date Received: 03/16/23 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			94972	EMC	EET HOU	03/20/23 13:00 - 03/21/23 05:00 [1]
TCLP	Prep	3010A			95091	MD	EET HOU	03/21/23 10:30
TCLP	Analysis	6010D		1	95255	JDM	EET HOU	03/21/23 21:43
Total/NA	Analysis	Moisture		1	94934	JM	EET HOU	03/20/23 12:13

Client Sample ID: MLPV-IDW21-20230316
Lab Sample ID: 670-16428-2
Date Collected: 03/16/23 11:12
Matrix: Solid
Date Received: 03/16/23 15:45
Percent Solids: 80.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			26769	RG	EET ORL	03/17/23 12:25
Total/NA	Analysis	8260D		1	26939	P1K	EET ORL	03/20/23 19:36

Client Sample ID: MLPV-IDW22-20230316
Lab Sample ID: 670-16428-3
Date Collected: 03/16/23 11:18
Matrix: Solid
Date Received: 03/16/23 15:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			94972	EMC	EET HOU	03/20/23 13:00 - 03/21/23 05:00 [1]
TCLP	Prep	3010A			95091	MD	EET HOU	03/21/23 10:30
TCLP	Analysis	6010D		1	95255	JDM	EET HOU	03/21/23 21:47
Total/NA	Analysis	Moisture		1	94934	JM	EET HOU	03/20/23 12:13

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Client Sample ID: MLPV-IDW22-20230316
Date Collected: 03/16/23 11:18
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-3
Matrix: Solid
Percent Solids: 76.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			26769	RG	EET ORL	03/17/23 12:25
Total/NA	Analysis	8260D		1	26939	P1K	EET ORL	03/20/23 19:59

Client Sample ID: MLPV-IDW23-20230316
Date Collected: 03/16/23 11:29
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28077	ES	EET ORL	03/29/23 14:50
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 18:13
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 04:10
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:46

Client Sample ID: MLPV-IDW24-20230316
Date Collected: 03/16/23 11:35
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28077	ES	EET ORL	03/29/23 15:07
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 18:30
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 04:21
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:47

Client Sample ID: MLPV-IDW25-20230316
Date Collected: 03/16/23 11:45
Date Received: 03/16/23 15:45

Lab Sample ID: 670-16428-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	28077	ES	EET ORL	03/29/23 15:25
Total/NA	Analysis	300.0		1	26744	YS	EET ORL	03/17/23 18:48
Total/NA	Prep	537 IDA			355823	JU9U	ELLE	03/21/23 15:26
Total/NA	Analysis	537 IDA		1	357670	PY4D	ELLE	03/28/23 04:33
Total/NA	Prep	365.2/365.3/365			26750	JA	EET ORL	03/17/23 10:37
Total/NA	Analysis	365.4		1	27040	AT	EET ORL	03/20/23 22:48

[1] Completion dates and times are reported or not reported per method requirements or individual lab discretion.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: AECOM Technical Services Inc.
Job ID: 670-16428-1
Project/Site: NASA KSC MLPV IDW

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

Laboratory: Eurofins Houston

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	88-00759	08-04-23
Florida	NELAP	E871002	06-30-23
Louisiana	NELAP	03054	06-30-23
Louisiana (All)	NELAP	03054	06-30-23
Oklahoma	State	1306	08-31-23
Texas	NELAP	T104704215-23-50	06-30-23
Texas	TCEQ Water Supply	T104704215	12-28-25
USDA	US Federal Programs	525-23-79-79507	03-20-26

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87997	07-02-23

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
300.0	Anions, Ion Chromatography	EPA	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
6010D	Metals (ICP)	SW846	EET HOU
365.4	Phosphorus, Total	EPA	EET ORL
Moisture	Percent Moisture	EPA	EET HOU
1311	TCLP Extraction	SW846	EET HOU
3010A	Preparation, Total Metals	SW846	EET HOU
365.2/365.3/365	Phosphorus, Total	EPA	EET ORL
5030C	Purge and Trap	SW846	EET ORL
5035	Closed System Purge and Trap	SW846	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET HOU = Eurofins Houston, 4145 Greenbriar Dr, Stafford, TX 77477, TEL (281)240-4200

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV IDW

Job ID: 670-16428-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-16428-1	MLPV-IDW20-20230316	Solid	03/16/23 11:09	03/16/23 15:45
670-16428-2	MLPV-IDW21-20230316	Solid	03/16/23 11:12	03/16/23 15:45
670-16428-3	MLPV-IDW22-20230316	Solid	03/16/23 11:18	03/16/23 15:45
670-16428-4	MLPV-IDW23-20230316	Water	03/16/23 11:29	03/16/23 15:45
670-16428-5	MLPV-IDW24-20230316	Water	03/16/23 11:35	03/16/23 15:45
670-16428-6	MLPV-IDW25-20230316	Water	03/16/23 11:45	03/16/23 15:45

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-3310-1235.3
Client Contact: Teresa Amentt Jennings	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin:	Page: Page 3 of 3
Company: AECOM Technical Services Inc.	PWSID:			Job #:
Address: 150 North Orange Avenue Suite 200	Due Date Requested:			
City: Orlando	TAT Requested (days):			
State, Zip: FL, 32801	Compliance Project: Δ Yes Δ No			
Phone: 919-461-1282(Tel)	PO #: 148569			
Email: teresa.amentt.jennings@aecom.com	WO #: 60615493.4			
Project Name: NASA KSC MLPV	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Sunshine Waiver # 15-14	PFAS (537) # 15-2	Nitrate (300.0)	Total Phosphorous (365.1)	8260B Waiver # 15-37	6010D TCLP	Total Number of containers	Special Instructions/Note:
			Preservation Code:				D	Z	Z	S	Z	Z		
MLPV - IDW 20 - 20230316	3/16/23	1109	G	S							1	1	2	
MLPV - IDW 21 - 20230316	3/16/23	1112	G	S							1	1	2	
MLPV - IDW 22 - 20230316	3/16/23	1118	G	S							1	1	2	
MLPV - IDW 23 - 20230316	3/16/23	1129	G	W			3	2	1	1			7	
MLPV - IDW 24 - 20230316	3/16/23	1135	G	W			3	2	1	1			7	
MLPV - IDW 25 - 20230316	3/16/23	1145	G	W			3	2	1	1			7	

670-16428 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	3/16/23 1400	AECOM	[signature] James W Gregory	3/16/23 1400	EET
2				[signature]	3/16/23 1545	
3					5.5/5.0°C	

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-6568.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 1
Company: Eurofins Lancaster Laboratories Environm		Accreditations Required (See note): NELAP - Florida		Job #: 670-16428-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 3/27/2023			
City: Lancaster	TAT Requested (days):			
State, Zip: PA, 17601				
Phone: 717-656-2300(Tel)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV IDW	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA/3535_PFC (MOD) PFAs WS#15-2 non DOD	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MLPV-IDW23-20230316 (670-16428-4)	3/16/23	11:29 Eastern		Water			X	2	
MLPV-IDW24-20230316 (670-16428-5)	3/16/23	11:35 Eastern		Water			X	2	
MLPV-IDW25-20230316 (670-16428-6)	3/16/23	11:45 Eastern		Water			X	2	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 3/17 1200	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 3-18-23 0927	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: D.9

Ver: 06/08/2021

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins

3/30/2023

Client Information (Sub Contract Lab)	Sampler	Lab PM: Dylnicki, Kaitlin	Carrier Tracking No(s):	COC No: 670-6564.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kaitlin.dylnicki@et.eurofinsus.com	State of Origin: Florida	Page: Page 1 of 1
Company: Eurofins Environment Testing South Centr		Accreditations Required (See note): NELAP Florida		Job #: 670-16428-1
Address: 4145 Greenbriar Dr	Due Date Requested: 3/20/2023			
City: Stafford	TAT Requested (days):			
State, Zip: TX, 77477				
Phone: 281-240-4200(Tel)	PO #:			
Email:	WO #:			
Project Name: NASA KSC MLPV IDW	Project #: 67001428			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A	HCL	M	Hexane
B	NaOH	N	None
C	Zn Acetate	O	AsNaO2
D	Nitric Acid	P	Na2O4S
E	NaHSO4	Q	Na2SO3
F	MeOH	R	Na2S2O3
G	Amchlor	S	H2SO4
H	Ascorbic Acid	T	TSP Dodecahydrate
I	Ice	U	Acetone
J	DI Water	V	MCAA
K	EDTA	W	pH 4-5
L	EDA	Y	Trizma
		Z	other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=wasteoil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010D/1311T_M (MOD) TCLP As Cd Cr Pb	Moisture	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MLPV-IDW20-20230316 (670-16428-1)	3/16/23	11:09 Eastern		Solid			X	X	2	
MLPV-IDW21-20230316 (670-16428-2)	3/16/23	11:12 Eastern		Solid			X	X	2	
MLPV-IDW22-20230316 (670-16428-3)	3/16/23	11:18 Eastern		Solid			X	X	2	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I II III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	3/17 1200			3/18/23 917	Eurofins
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks:

Ver 06/08/2021

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16428-1

Login Number: 16428
List Number: 1
Creator: Ferguson, Craig

List Source: Eurofins Orlando

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16428-1

Login Number: 16428
List Number: 3
Creator: Torres, Sandra

List Source: Eurofins Houston
List Creation: 03/18/23 07:25 PM

Question	Answer	Comment
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-16428-1

Login Number: 16428
List Number: 2
Creator: McCaskey, Jonathan

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 03/18/23 12:39 PM

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	

APPENDIX R

RIS COMPLETION TICKETS

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Data Checker

Completion Ticket

On 9/13/2023 at 10:51 AM the following files were submitted to Tetra Tech

COMPLETION_AECOM_MLPV_Mar2022_20220913.txt

LITHOLOGY_AECOM_MLPV_Mar2022_20220913.txt

LOCATION_AECOM_MLPV_Mar2022_20220913.txt

PROJECT_AECOM_MLPV_Mar2022_20220913.txt

RESULT_AECOM_MLPV_Mar2022_20220913.txt

SAMPLE_AECOM_MLPV_Mar2022_20220913.txt

WATER_AECOM_MLPV_Mar2022_20220913.txt

The following comment was provided with this submission:
Hello TT! Attached is MLPV GW data from March 2022. There are also new wells MLPV MW 76-110, MLPV-IW0002IR, WCPS-IW0002SRR and MLPV BSW 32-36. If you have any questions please let me know. thanks! Jennifer Chastain

If you need to identify this session at a later date you may use the Ticket Key:

TetraTechExternalClientsProtectedDataRepository2023913_3081877118_kedd_AECOM

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Data Checker

Completion Ticket

On 9/13/2023 at 11:03 AM the following files were submitted to Tetra Tech

COMPLETION_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

LITHOLOGY_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

LOCATION_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

PROJECT_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

RESULT_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

SAMPLE_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

WATER_AECOM_MLPV_Dec2022Mar2023IDW_20220912.txt

The following comment was provided with this submission:
Hello TT! Attached are the MLPV Dec 2022 GW and Mar 2023 IDW data. Please let me know if there are any issues. thanks! Jennifer Chastain

If you need to identify this session at a later date you may use the Ticket Key:

TetraTechExternalClientsProtectedDataRepository2023913_1168937835_kedd_AECOM

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Data Checker

Completion Ticket

On 9/13/2023 at 11:06 AM the following files were submitted to Tetra Tech

COMPLETION_AECOM_MLPV_MarApr2023_20220912.txt

LITHOLOGY_AECOM_MLPV_MarApr2023_20220912.txt

LOCATION_AECOM_MLPV_MarApr2023_20220912.txt

PROJECT_AECOM_MLPV_MarApr2023_20220912.txt

RESULT_AECOM_MLPV_MarApr2023_20220912.txt

SAMPLE_AECOM_MLPV_MarApr2023_20220912.txt

WATER_AECOM_MLPV_MarApr2023_20220912.txt

The following comment was provided with this submission:
Hello TT! Attached is the March and April 2023 MLPV groundwater sampling data. Please let me know if you have any questions. thanks! Jennifer Chastain

If you need to identify this session at a later date you may use the Ticket Key:

TetraTechExternalClientsProtectedDataRepository2023913_1453730246_kedd_AECOM

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APPENDIX S

WATER LEVEL LOGS

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Date: 4-21-22_____

MLP/VAB Water Level Log

Former Hot Spot 2 (Air Sparge System Area)

Well ID	Diam.	SI.	Time	Depth (feet below top of casing)	Notes
MLPV-IW0011I	2	35-40	1033	2.33	
MLPV-IW0032	0.75	30-40	1037	0.92	
MLPV-IW0033	0.75	40-50	1037	0.61	
MLPV-IW0034	0.75	30-40	1039	2.59	
MLPV-IW0035	0.75	40-50	1039	3.29	
MLPV-IW0036	0.75	40-45	1035	3.65	
MLPV-IW0037	0.75	40-50	1044	2.55	
MLPV-IW0038	0.75	30-40	1045	1.88	
MLPV-IW0039	0.75	40-50	1046	1.8	
MLPV-IW0040	0.75	30-40	1048	3.62	
MLPV-IW0041	0.75	40-50	1045	3.02	
MLPV-IW0042	0.75	30-40	1038	1.3	
MLPV-IW0043	0.75	40-50	1039	1.29	
MLPV-IW0044	0.75	40-50	1050	1.05	
MLPV-IW0045	0.75	40-50	1042	-	can't get meter down
SAMW0004I	1	35-40	1036	3.34	
SAMW0004D	1	45-50	1037	3.31	

Biosparge Area

Well ID	Diam.	SI.	Time	Depth (feet below top of casing)	Notes
MLPV-IW0057	0.75	40-50	1019	-	can't get meter down
MLPV-IW0058	0.75	45-50	1017	4.32	
MLPV-IW0059	0.75	45-50	1019	4.85	
MLPV-IW0060	0.75	40-50	0959	0.75	
MLPV-ASMW0004	1	35-40	1001	0.91	
MLPV-ASMW0005	1	35-40	1000	1.48	
MLPV-ASMW0006	1	35-40	0958	0.73	
MLPV-IW0031	1	25-35	1006	1.53	
MLPV-IW0061	0.75	35-40	1012	4.64	
MLPV-IW0062	0.75	40-45	1013	4.75	
MLPV-IW0063	0.75	35-40	1005	2.68	
MLPV-IW0064	0.75	40-45	1004	2.57	
MLPV-IW0028I	1	28-33	1008	1.65	
MLPV-IW0046	1	35-45	1007	1.61	
MLPV-IW006IR	1	28-33	1003	1.73	

Groundwater Elevation Log

Well Location	Well ID	Screen Interval	DTW March 7, 2023 (North side)
BSA/Bechtel	MLPV-MW0097 (D9)	35 to 45	5.84
	MLPV-IW0047	35 to 45	4.91
	MLPV-IW0002IR (C4)	28 to 33	5.69
	MLPV-MW0096 (D1)	35 to 45	5.88
	MLPV-MW0095 (C1)	25 to 35	5.58
	MLPV-MW0094 (D2)	35 to 45	5.7
	MLPV-IW0028I	28 to 33	CNL
	MLPV-IW0046	35 to 45	2.86
	MLPV-IW0031	25 to 35	2.00
	MLPV-IW0063	35 to 40	3.11
	MLPV-IW0064	40 to 45	3.04
	MLPV-IW0061	35 to 40	5.16
	MLPV-IW0062	40 to 45	5.18
	MLPV-IW0001D	50 to 55	3.82
	MLPV-IW0006IR	28 to 33	2.20
	MLPV-ASMW0004	35 to 40	1.40
	MLPV-ASMW0005	35 to 40	2.31
	MLPV-ASMW0006	35 to 40	1.24
	MLPV-IW0060	40 to 50	1.42
	MLPV-IW0027I	28 to 33	2.31
	MLPV-MW0108 (D5)	35 to 45	3.58
	MLPV-IW0057	40 to 50	3.58
	MLPV-IW0058	45 to 50	4.80
	MLPV-IW0059	45 to 50	5.39
	MLPV-MW0102 (C2)	25 to 35	0.82
	MLPV-MW0106 (C3)	25 to 35	1.89
	MLPV-MW0103 (D3)	35 to 45	0.50
	MLPV-MW0107 (D4)	35 to 45	1.85
	MLPV-MW0104 (E1)	47 to 57	0.91
	MLPV-MW0105 (E2)	47 to 57	1.47
West Crawler Park/ Boeing	WCPS-IW0015S	3 to 13	CNL
	WCPS-IW0005S	2 to 12	3.74
	MLPV-MW0100 (B3)	15 to 25	4.01
	WCPS-IW0001SR	2.5 to 12.5	3.42
	WCPS-IW0016	15 to 25	3.91
	WCPS-IW0002SRR (B1)	3 to 13	4.81
	MLPV-MW0098 (C10)	20 to 30	5.47
	MLPV-MW0099 (E6)	40 to 50	5.05
	MLPV-IW0054	40 to 50	No guard on duty
	MLPV-MW0110 (A1)	1 to 10	2.72
	MLPV-MW0109 (C5)	20 to 30	5.01
Former HS2 / Gravel R Lot	MLPV-IW0032	30 to 40	CNL
	MLPV-IW0033	40 to 50	CNL
	MLPV-MW0092 (E5)	47 to 57	4.54
	MLPV-IW0044	40 to 50	CNL
	MLPV-IW0038	30 to 40	2.51
	MLPV-IW0039	40 to 50	2.56
	MLPV-IW0034	30 to 40	4.61
	MLPV-IW0035	40 to 50	4.73
	MLPV-IW0011I	35 to 40	5.75
	MLPV-IW0037	40 to 50	5.11
	MLPV-IW0042	30 to 40	2.11
	MLPV-IW0043	40 to 50	2.11

Groundwater Elevation Log

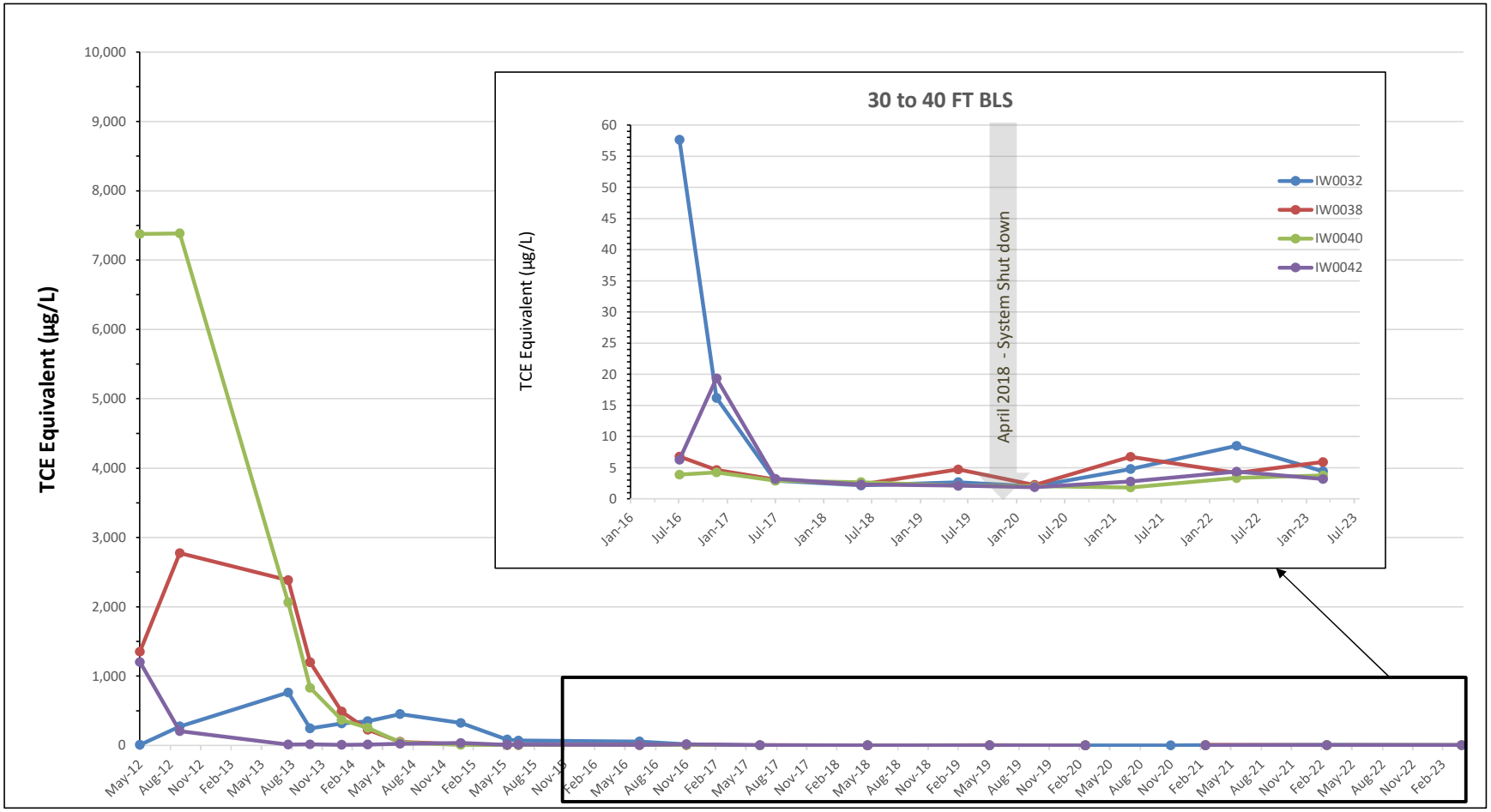
Well Location	Well ID	Screen Interval	DTW March 7, 2023 (North side)
Former HS2 / Gravel R Lot	MLPV-IW0040	30 to 40	4.64
	MLPV-IW0041	40 to 50	4.75
	MLPV-IW0009D	45 to 50	3
	MLPV-IW0009I	28 to 33	3.05
	MLPV-IW0053	35 to 45	CNL
	MLPV-IW0045	40 to 50	2.1
	MLPV-MW0091 (E3)	47 to 57	5.16
	MLPV-IW0017I	35 to 40	4.68
	MLPV-IW0012D	45 to 50	3.88
	MLPV-MW0093 (D8)	35 to 45	COVERED by building material
	MLPV-MW0087 (E4)	47 to 57	4.72
	MLPV-SAMW0001	43 to 48	3.81
	MLPV-IW0014I	35 to 40	3.96
	MLPV-SAMW0003	43 to 48	4.15
	MLPV-SAMW0004I	35 to 40	4.28
	MLPV-SAMW0004D	45 to 50	4.21
	MLPV-IW0036	40 to 45	4.55
	MLPV-MW0088 (D6)	35 to 45	4.06
	MLPV-MW0090 (E14)	47 to 57	COVERED by building material
	MLPV-MW0086 (Z1)	15 to 25	4.38
VAB Area	MLPV-MW0101 (E7)	40 to 50	7.14
	MLPV-IW0055	40 to 55	6.28
	MLPV-IW0029D	42 to 47	4.55
	MLPV-IW0052	40 to 50	6.13
	MLPV-MW0089 (D7)	35 to 45	6.84
	MLPV-IW0018D	50 to 55	Pending Access
	MLPV-IW0020D	45 to 50	Pending Access
	MLPVIW0022D	48 to 55	Pending Access
	MLPV-IW0049	38 to 48	Pending Access
	VABU-IW0001I	20 to 30	Pending Access
	MLPV-IW0056	30 to 40	Pending Access
	MLPV-MW0078 (C6)	25 to 35	5.51
	MLPV-MW0076 (E11)	47 to 57	5.71
	MLPV-MW0077 (C7)	25 to 35	5.43
	MLPV-MW0079 (C9)	25 to 35	5.60
	SATV-IW0009I	22 to 27	5.52
	MLPV-MW0080 (E12)	47 to 57	5.69
	MLPV-MW0081 (C8)	25 to 35	5.57
	MLPV-MW0082 (D10)	35 to 45	5.64
	MLPV-MW0083 (E13)	47 to 57	5.69
	MLPV-MW0084 (E10)	47 to 57	6.20
	MLPV-MW0085 (E9)	47 to 57	6.39
	MLPV-VAB-IW0005D	52 to 57	4.55
	MLPV-IW0050	40 to 50	5.81
	MLPV-IW0051	45 to 55	4.83
	PRES-IW0009	40 to 50	4.12

APPENDIX T

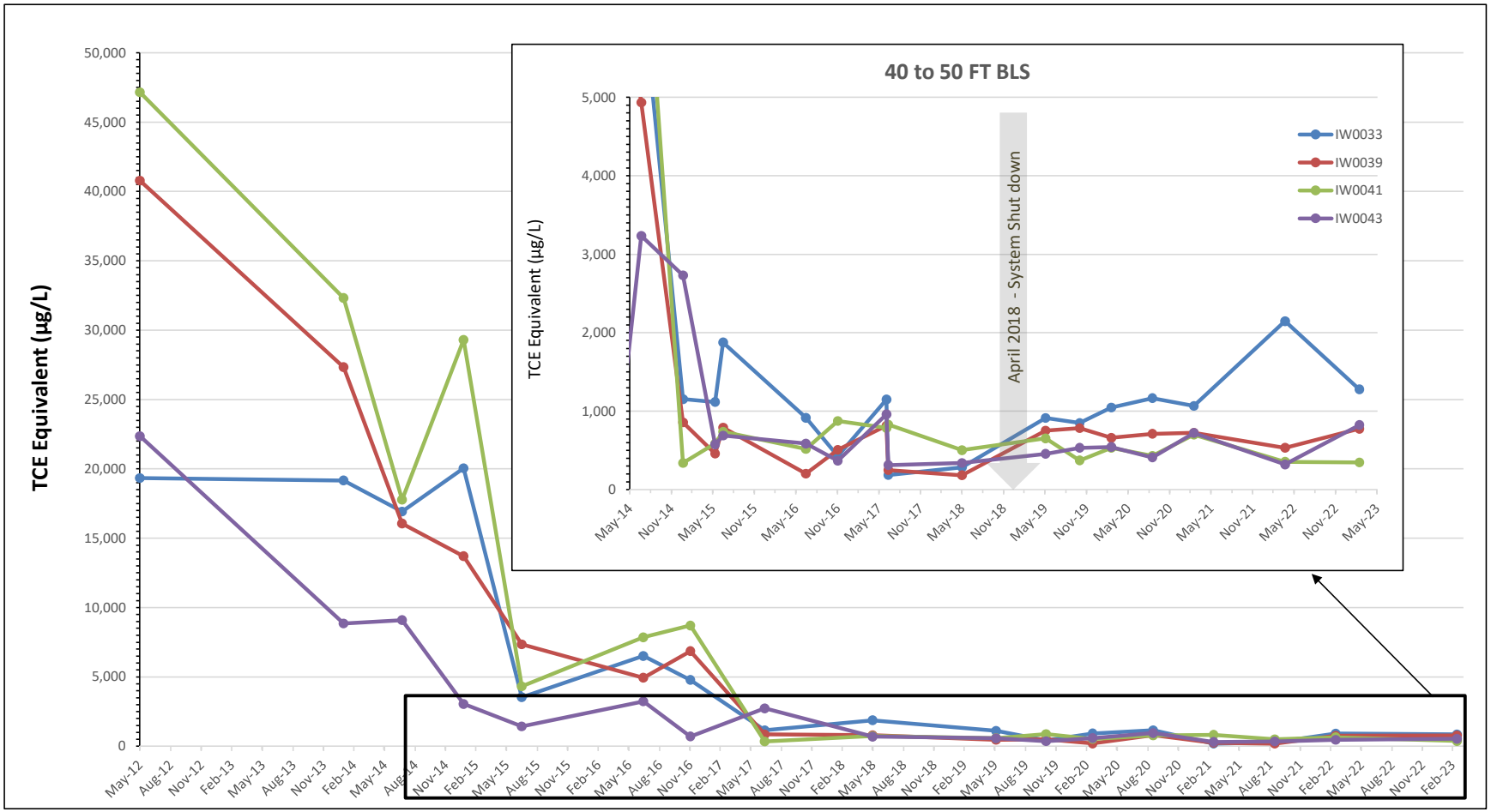
TREND CHARTS

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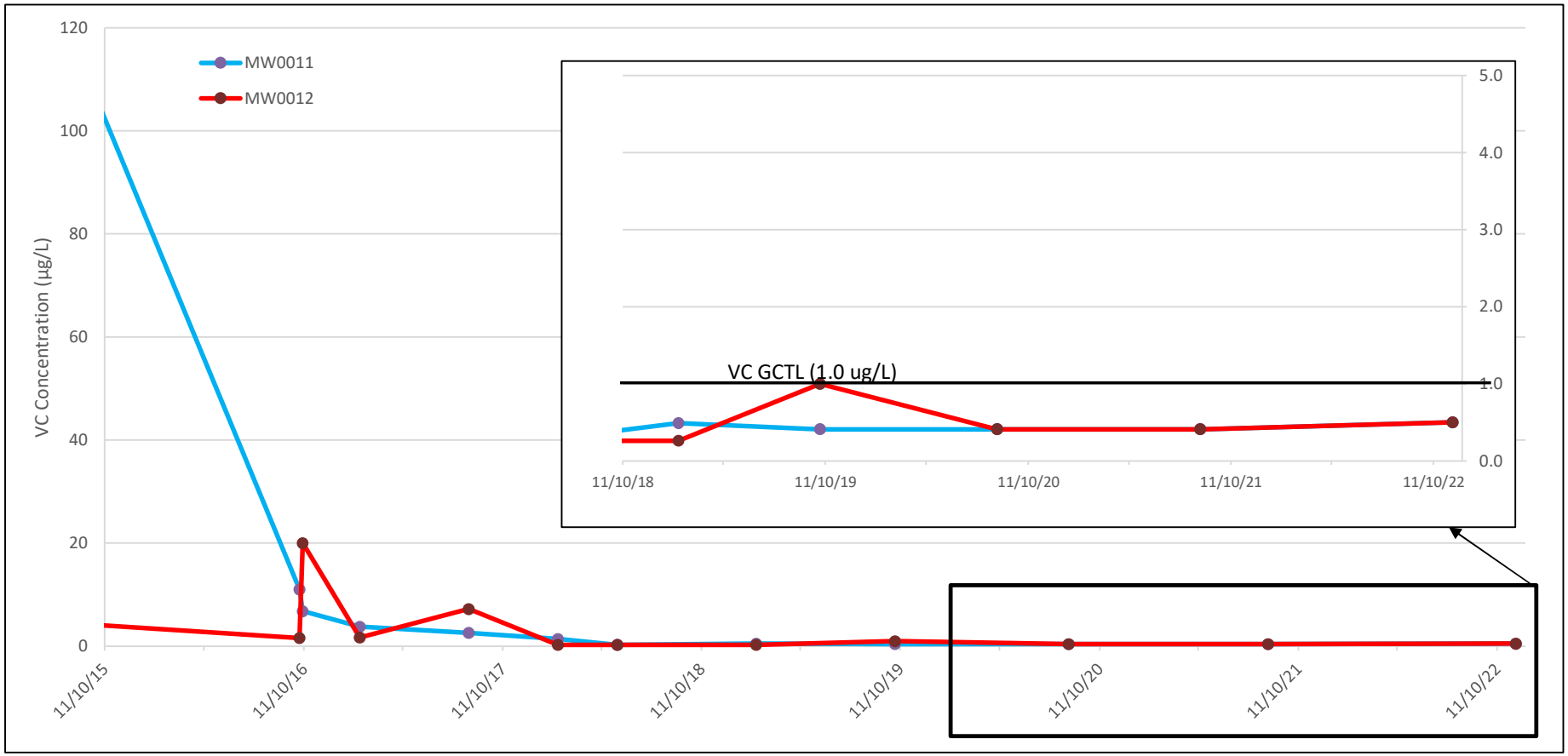
Former Hot Spot 2 (Air Sparge Area)
Trend Chart



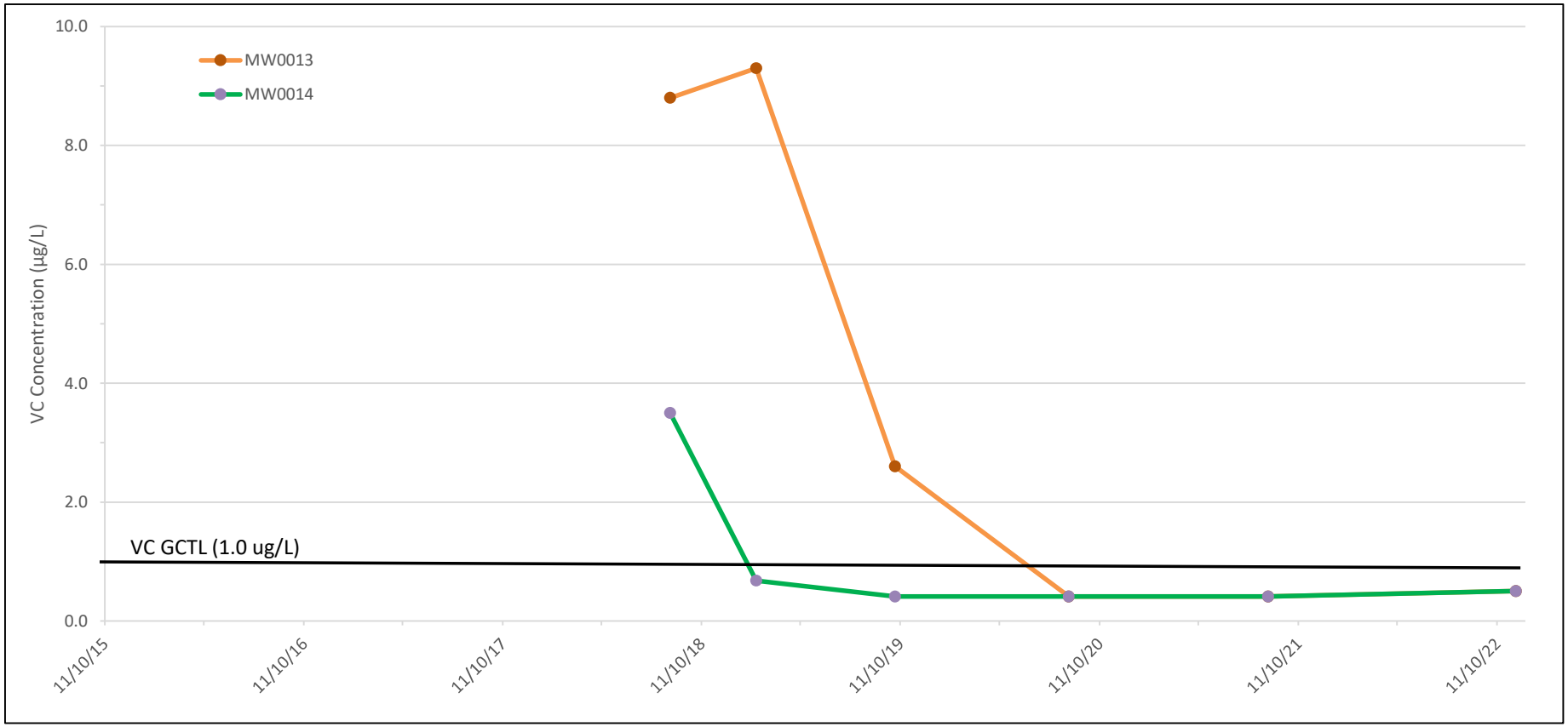
Former Hot Spot 2 (Air Sparge Area)
Trend Chart

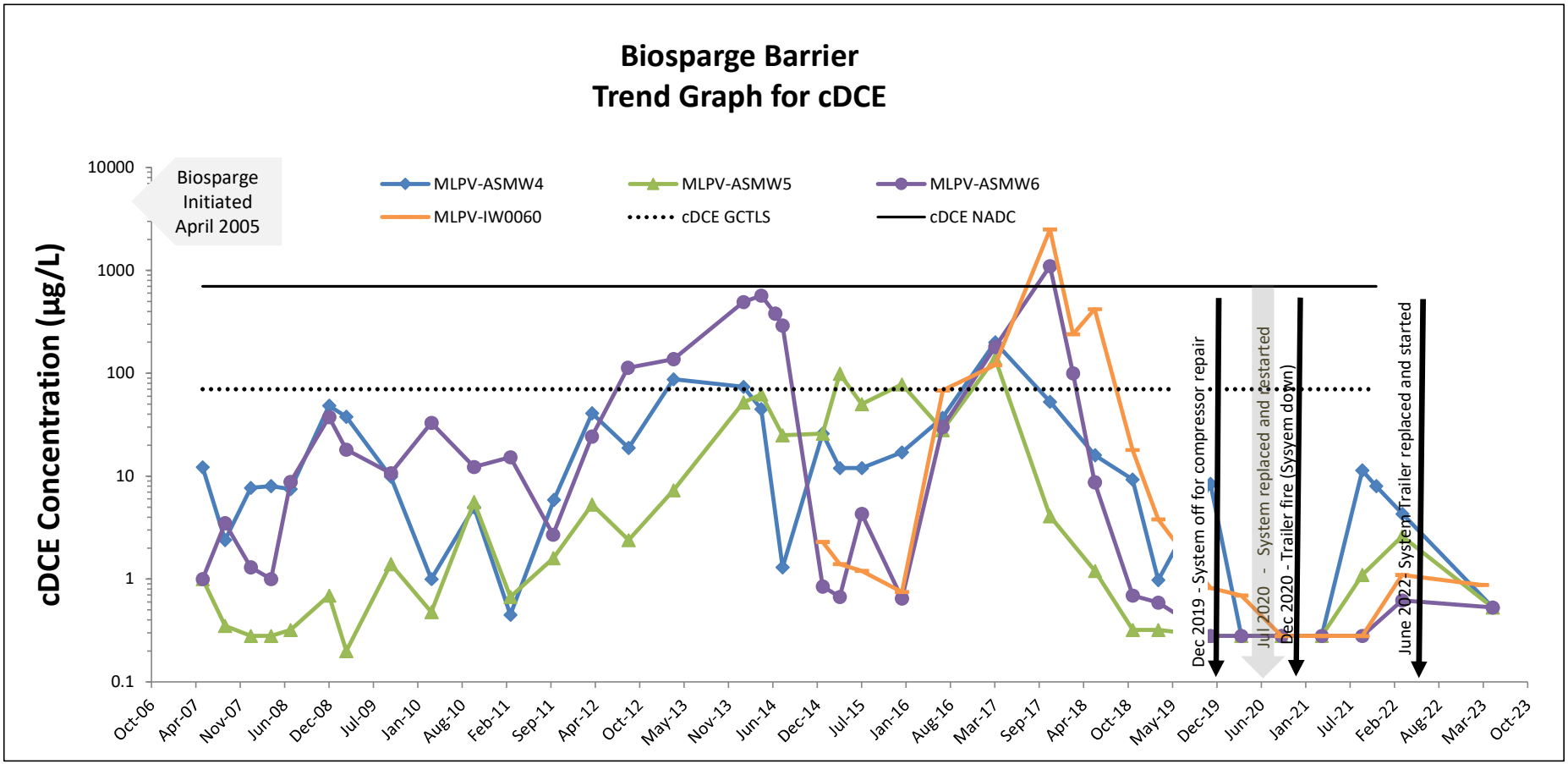


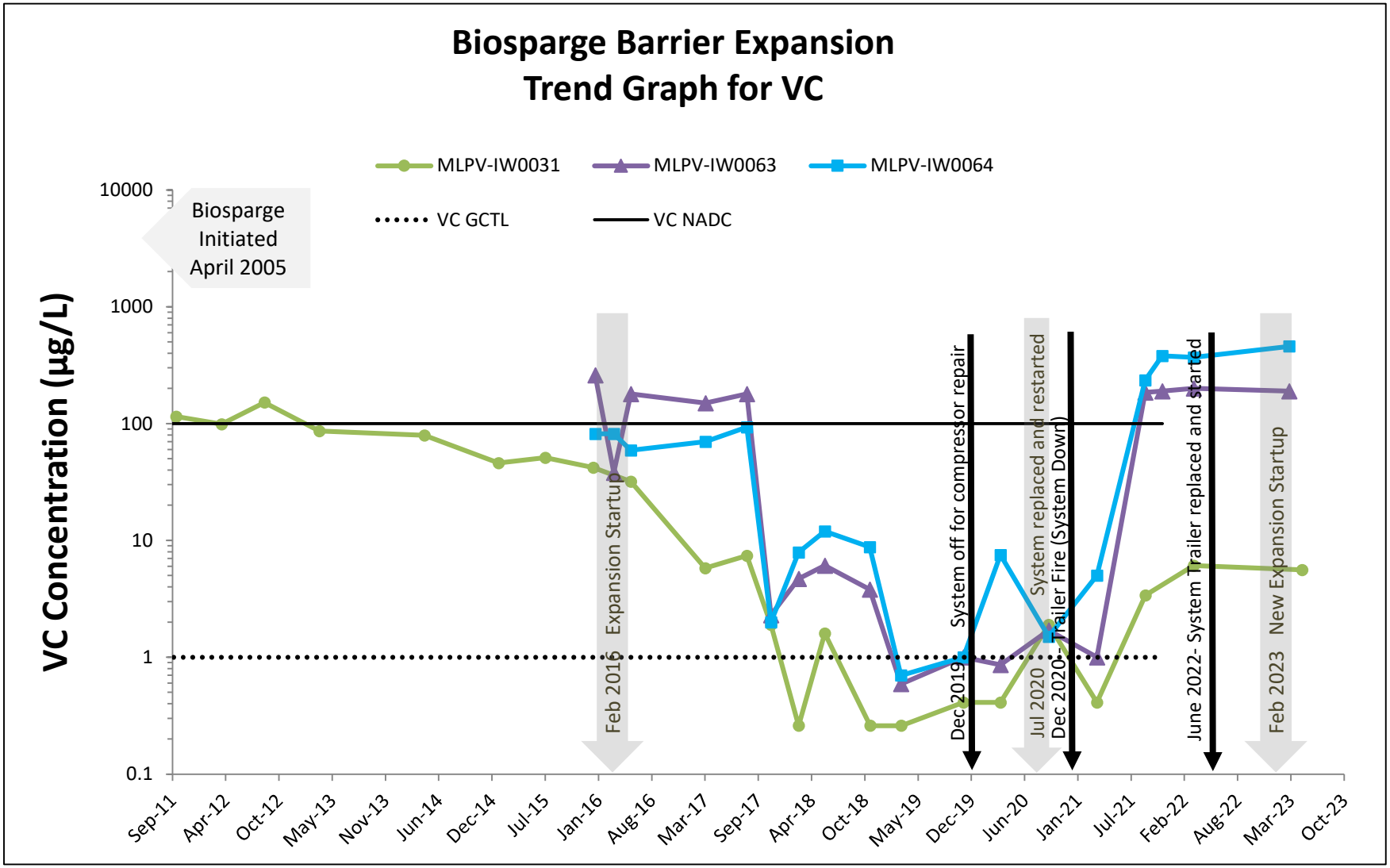
Hot Spot 3 (OFW Area)
Trend Chart



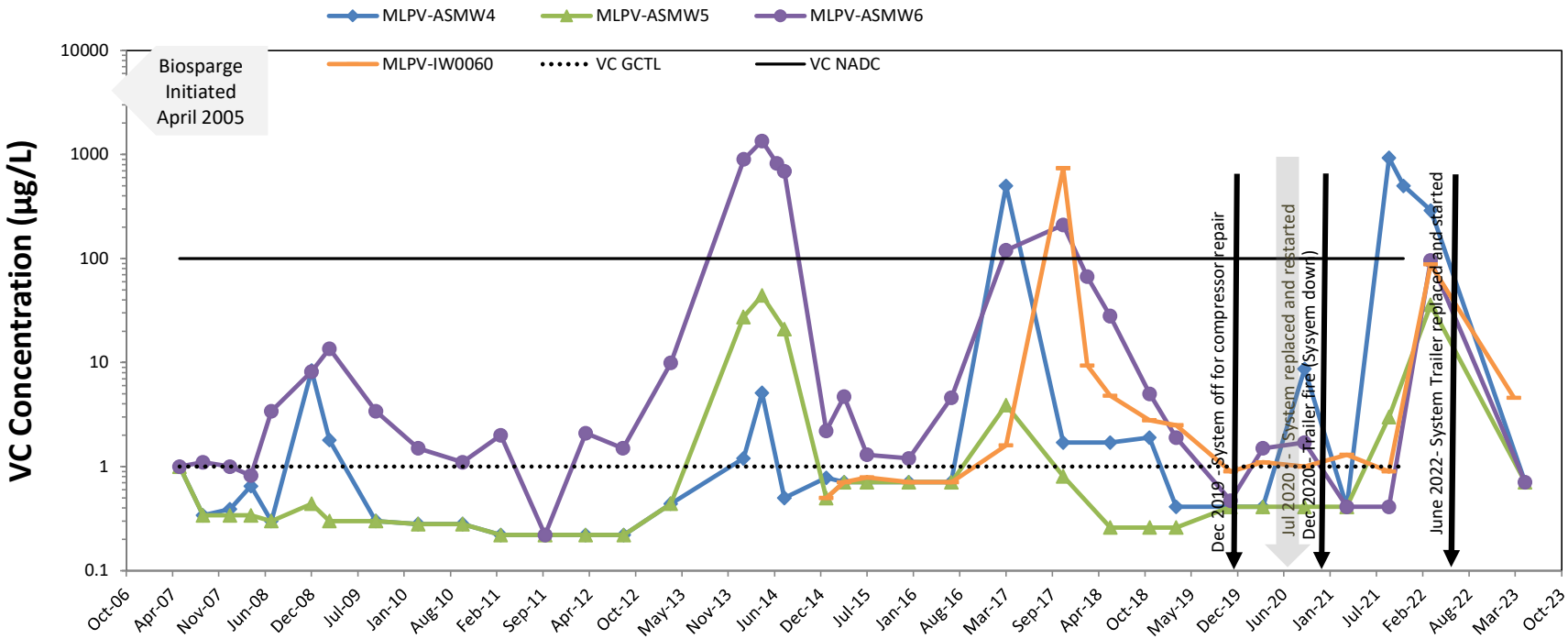
Hot Spot 3 (OFW Area)
Trend Chart




Biosparge Barrier
Trend Graph for cDCE
cDCE Concentration (µg/L)
10000
1000
100
10
1
0.1
Biosparge Initiated April 2005
MLPV-ASMW4
MLPV-ASMW5
MLPV-ASMW6
MLPV-IW0060
cDCE GCTLS
cDCE NADC
Dec 2019 - System off for compressor repair
Jul 2020 - System replaced and restarted
Dec 2020 - Trailer fire (Sysyem down)
June 2022 - System Trailer replaced and started
Oct-06
Apr-07
Nov-07
Jun-08
Dec-08
Jul-09
Jan-10
Aug-10
Feb-11
Sep-11
Apr-12
Oct-12
May-13
Nov-13
Jun-14
Dec-14
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
Jun-20
Jan-21
Jul-21
Feb-22
Aug-22
Mar-23
Oct-23


Biosparge Barrier Expansion
Trend Graph for VC
MLPV-IW0031
MLPV-IW0063
MLPV-IW0064
VC GCTL
VC NADC
Biosparge Initiated April 2005
VC Concentration (µg/L)
10000
1000
100
10
1
0.1
Feb 2016 Expansion Startup
Dec 2019 System off for compressor repair
Jul 2020 System replaced and restarted
Dec 2020 Trailer Fire (System Down)
June 2022 System Trailer replaced and started
Feb 2023 New Expansion Startup
Sep-11
Apr-12
Oct-12
May-13
Nov-13
Jun-14
Dec-14
Jul-15
Jan-16
Aug-16
Mar-17
Sep-17
Apr-18
Oct-18
May-19
Dec-19
Jun-20
Jan-21
Jul-21
Feb-22
Aug-22
Mar-23
Oct-23

Biosparge Barrier
Trend Graph for VC



APPENDIX U

HOT SPOT 3 IMWP ADP

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AECOM
150 North Orange Avenue, Suite 200
Orlando, Florida 32801
www.aecom.com

August 30, 2023

Mr. Ryan O'Meara
Remediation Project Manager
National Aeronautics and Space Administration
Mail Code SI-E2
Building K6-1547 (Logistics Facility)
John F. Kennedy Space Center
Kennedy Space Center, FL 32899-0001

Subject: **Mobile Launch Platform (MLP) Rehabilitation Sites and the Vehicle Assembly Building (VAB) Area, (Solid Waste Management Unit [SWMU] 056), Former Hot Spot 2 (HS 2) Remedial Alternative Evaluation (RAE) Advanced Data Package (ADP) for the October 2023 Kennedy Space Center Remediation Team (KSCRT) Meeting**

Reference: **Indefinite Delivery Indefinite Quantity (IDIQ) Contract 80KSC019D0010**

Dear Mr. O'Meara:

AECOM Technical Services, Inc. (AECOM) is pleased to provide Kennedy Space Center (KSC), National Aeronautics and Space Administration (NASA), with the ADP for the MLP/VAB Area (SWMU 056). The purpose of the ADP is to present the evaluation of alternative remediation approaches within the former HS 2 area, especially targeting the finer grained clayey unit where matrix diffusion to sand of predominantly vinyl chloride (VC) is prolonging natural attenuation and operation of the down-gradient biosparge barrier.

The objective of the selected approach is to reduce mass flux and achieve Groundwater Cleanup Target Levels upgradient of the biosparge barrier to eliminate the need for continued operation. Using the most recent groundwater monitoring data and known soil characteristics, three options are presented and evaluated for sustainability, feasibility, cost, timeframe, and effectiveness. The recommended alternative includes in-situ chemical reduction (ISCR) using two permeable reactive barriers (PRB). The first barrier will mitigate mass flux in sand from the former source area. The second barrier will mitigate mass flux upgradient of the biosparge barrier.

The following consensus statements will be presented to the KSCRT:

1. Option 2 - ISCR PRBs is the recommended remedial alternative to achieve corrective action objectives.
2. Model the fate and transport of VC at the site to support selection and optimal design of an ISCR remedy to manage matrix diffusion, and to support cost evaluation and confirm shorter remediation time frame for ISCR alternatives.

Should you require additional information, please contact Linnea King Clark at linnea.king@aecom.com or via phone at 407.456.1535.

Sincerely,

AECOM Technical Services, Inc.

Linnea King Clark
Task Order Manager

Jennifer Gootee, PE
Program Manager

Enclosure

Cc: FDEP
Richard Smith, HGL
Mark Speranza, Tetra Tech

Former Hot Spot 2
Remedial Alternatives Evaluation

Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB)

Solid Waste Management Unit (SWMU) 056

October 2023

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This Advance Data Package (ADP) was prepared for NASA to aid in evaluation of site conditions and remedial actions. This is not a decision document. New information may come to light that makes this ADP outdated.

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Outline

1. Former Hot Spot 2 History
2. Site Characterization Summary
3. Remedial Alternative Evaluation (RAE)
4. Recommendations and Proposed Path Forward
5. Test Consensus

Goal

- Present RAE
- Obtain team consensus on the remedial alternative
- Obtain team consensus on modeling to develop optimal remedy design

Response to Comments

- HGL Comment #1: Slide #2 – Please note that the second goal, obtain team consensus on the treatment area, does not appear to align with the second consensus statement in the cover letter. The second consensus statement in the cover letter is to conduct fate and transport modeling to support the remedial design.
- *Response: The goals were revised to be consistent with the consensus statements.*

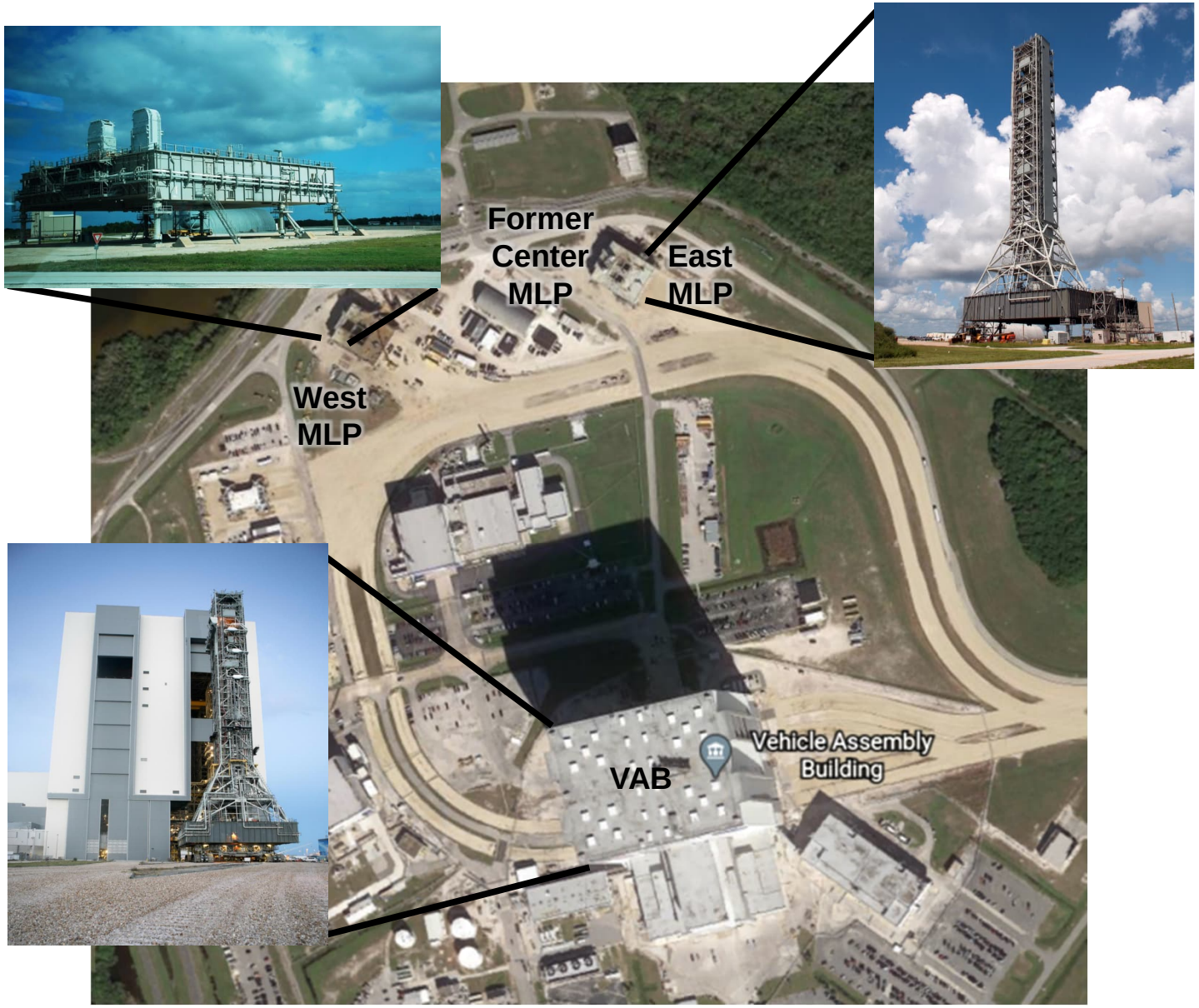
Abbreviations and Acronyms

ADP	Advanced Data Package
AS	Air Sparging
Bls	Below Land Surface
CAO	Corrective Action Objective
CCR	Construction Completion Report
cDCE	Cis 1,2-dichloroethane
CMD	Corrective Measures Design
CMI	Corrective Measures Implementation
COCs	Contaminants of concern
CVOC	Chlorinated Volatile Organic Compounds
DPT	Direct-push Technology
ERD	Enhanced Reductive Dechlorination
EZVI	Emulsified Zero Valent Iron
GCTL	Groundwater Cleanup Target Level
GHG	Greenhouse Gases
HCP	High Concentration Plume
HS2	Former Hot Spot 2
IGM	Interim Groundwater Monitoring
IM	Interim Measures
ISCO	In-situ Chemical Oxidation
ISCR	In-situ Chemical Reduction
LCP	Low Concentration Plume
LTM	Long-term Monitoring
LUCIP	Land Use Control Implementation Plan
MLP/VAB	Mobile Launcher Platform Rehabilitation Sites/Vehicle Assembly Building Area
MMBTU	One million British thermal units
NADC	Natural Attenuation Default Concentration
NOx	Nitrous Oxides
PM10	Particulate matter smaller than 10 microns in diameter
PRB	Permeable Reactive Barrier
RAE	Remedial Alternative Evaluation
ROI	Radius of Influence
RCRA	Resource Conservation and Recovery Act
SB	Soil Boring
SOx	Sulfur Oxides
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
tDCE	Trans 1,2-dichloroethane
VC	Vinyl chloride
10xNADC	10x Natural Attenuation Default Concentration
µg/L	Micrograms per liter
µm	Micrometers

Former Hot Spot 2 History

Site Use

- Mobile Launcher Platform (MLP) area and Vehicle Assembly Building (VAB) were constructed in the mid-1960s
- MLP area historical site use:
  - Original construction sites for the Apollo Mobile launchers; consisted of three park sites
  - Area was used to repair corrosion and blast damage on the mobile launchers following launches
  - Center MLP site was replaced with a storage building in 1991.
- VAB historical use:
  - Used to stack and prepare the space vehicles prior to launch.
- Current Use:
  - VAB and MLP areas are construction sites
  - Facilities within the Solid Waste Management Unit (SWMU) boundary have been leased to tenants



Former Hot Spot 2 History

Timeline

2000 2005 2010 2015 2020

2000-2003 RFI 2004 CMD

- **Delineate 115-acre CVOC Plume**

LTM of low-concentration plume in VAB Area

Biosparge Barrier **2016 Expanded**

- **Source: Hot Spot 1 (HS1)**

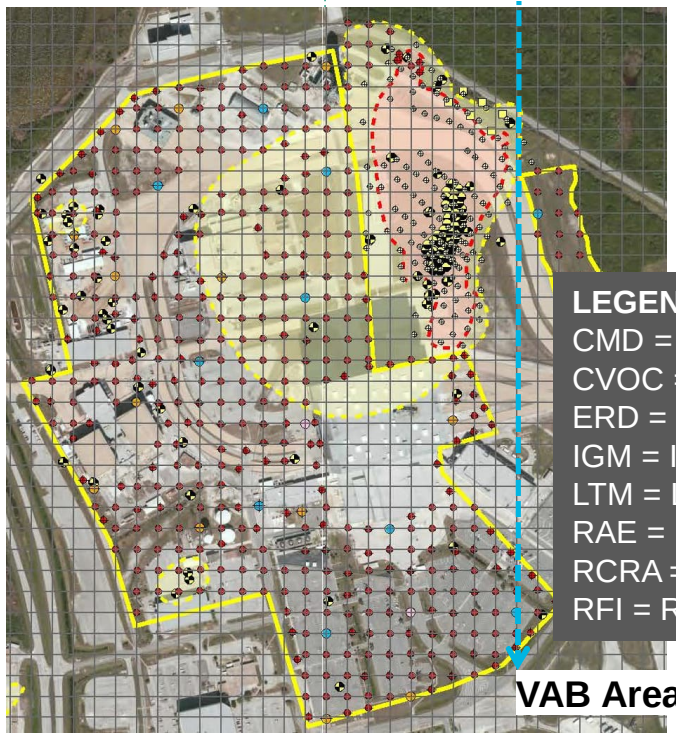
Bio-ERD **IGM** **LTM**

2011
- Assessment
- RAE

2021 **2022**
Site characterization

Becomes "former" Hot Spot 2

Hot Spot 2 (HS2) **Air Sparge** **IGM**



VAB Reassessment sampling locations (2012-2015)

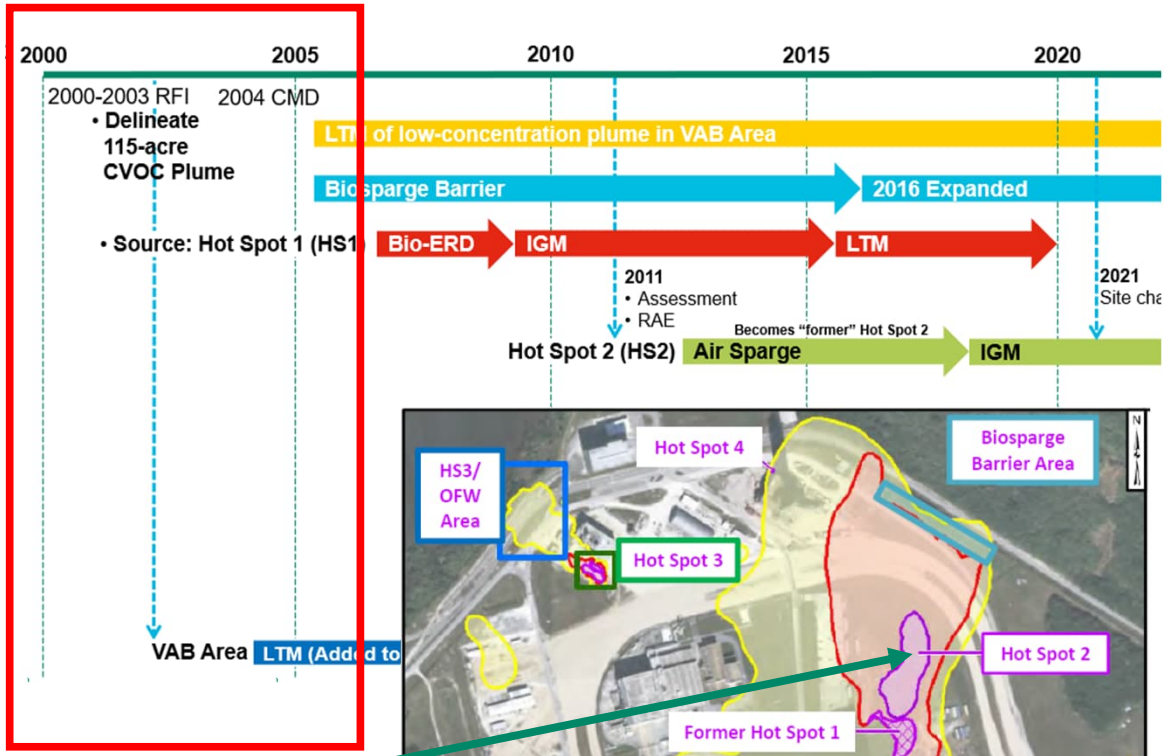
LEGEND
CMD = Corrective Measures Design
CVOC = Chlorinated Volatile Organic Compounds
ERD = Enhanced Reductive Dechlorination
IGM = Interim Groundwater Monitoring
LTM = Long-term Monitoring
RAE = Remedial Alternatives Evaluation
RCRA = Resource Conservation and Recovery Act
RFI = RCRA Facility Investigation

VAB Area **LTM (Added to the MLP Rehabilitation Sites and the VAB Area in 2020)**

Former Hot Spot 2 History

Timeline

- **2000 and 2003** – Resource Conservation and Recovery Act (RCRA) Facility Investigation
  - Delineated 115-acre chlorinated volatile organic compound (CVOC) plume
- **2004** – Corrective Measures Design (CMD) incorporated multi-component remedial strategy
  - Biosparge barrier to treat vinyl chloride (VC) plume swath above Natural Attenuation Default Criteria (NADC) migrating northeast of VAB area (downgradient of former Hot Spot 2)
  - Biostimulation using ethyl lactate in source area (Former Hot Spot 1, upgradient of former Hot Spot 2)
  - Long-term Monitoring (LTM) of low concentration dissolved plume (primarily VC) surrounding Hot Spot 2
    - LTM details were reported separately through 2018 under a VAB LTM program
- After Corrective Measures Implementation (CMI)
  - 3 Hot Spots identified during multiple assessment phases
    - Hot Spot 2 (1.17 acres) identified during MLP/VAB Assessment activities. Defined as area where trichloroethene (TCE) > 300 micrograms per liter (µg/L) and cis-1,2-dichloroethylene (cDCE) > 7,000 µg/L

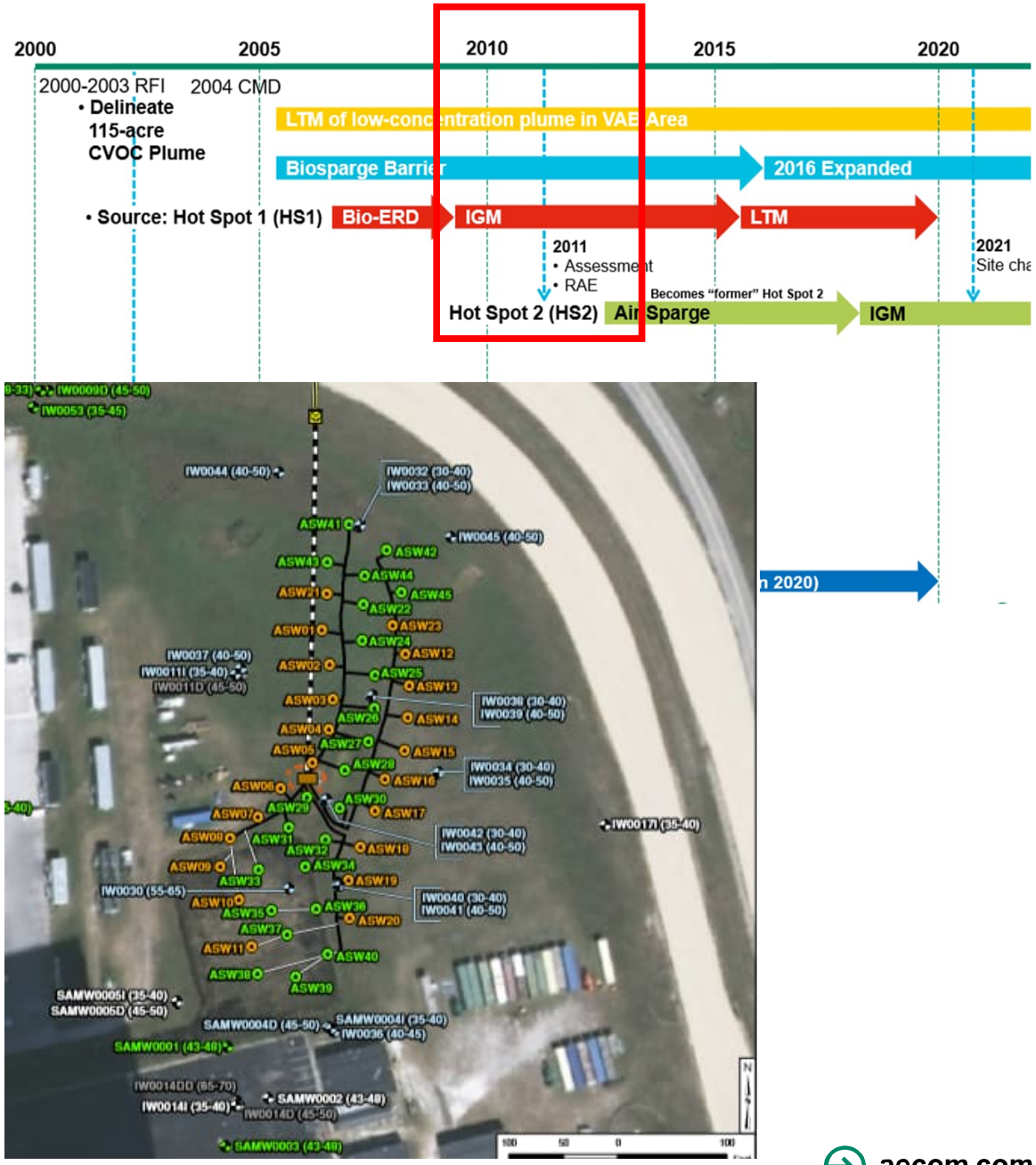


Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

Former Hot Spot 2 History

Timeline

- 2011 - RAE presented in May 2011 received Florida Department of Environmental Protection approval for air sparge system installation with objective of reducing CVOCs to less than NADC within the treatment area
- 2012 [October Construction Completion Report (CCR)]
  - Air sparging installed Treatment area was the area with TCE greater than 300 µg/L and cDCE greater than 7,000 µg/L
  - 45 Air sparge wells set ~42 feet below land surface (bls) and ~46 feet bls (wells set just above lower permeability layer)
  - Corrective action objectives were achieved
  - This area is now referred to as the former Hot Spot 2 area
  - Semi-annual groundwater sampling is on-going



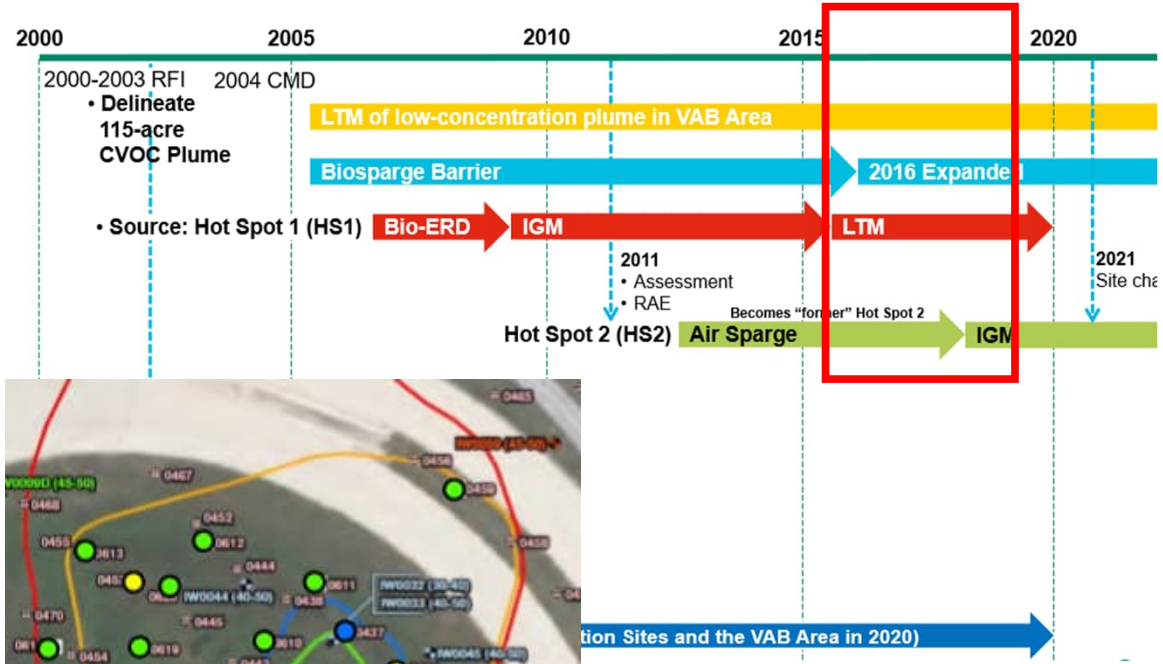
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Former Hot Spot 2 History

Timeline

- 2016 [2016 Annual CMI and Interim Measures (IM) Advanced Data Package (ADP)] – System operated through 2018.
  - Direct-Push Technology (DPT) groundwater sampling conducted to evaluate CVOC reduction in low permeability lithology within air sparge treatment area
  - CVOC concentrations reduced, but remained above NADCs

- 2018 (2019 Annual CMI and IM ADP) – Additional DPT groundwater sampling performed in treatment area to:
  1. Evaluate concentrations within cDCE above NADC and VC above 10xNADC
  2. Utilize data to evaluate necessity for expansion of air sparge system

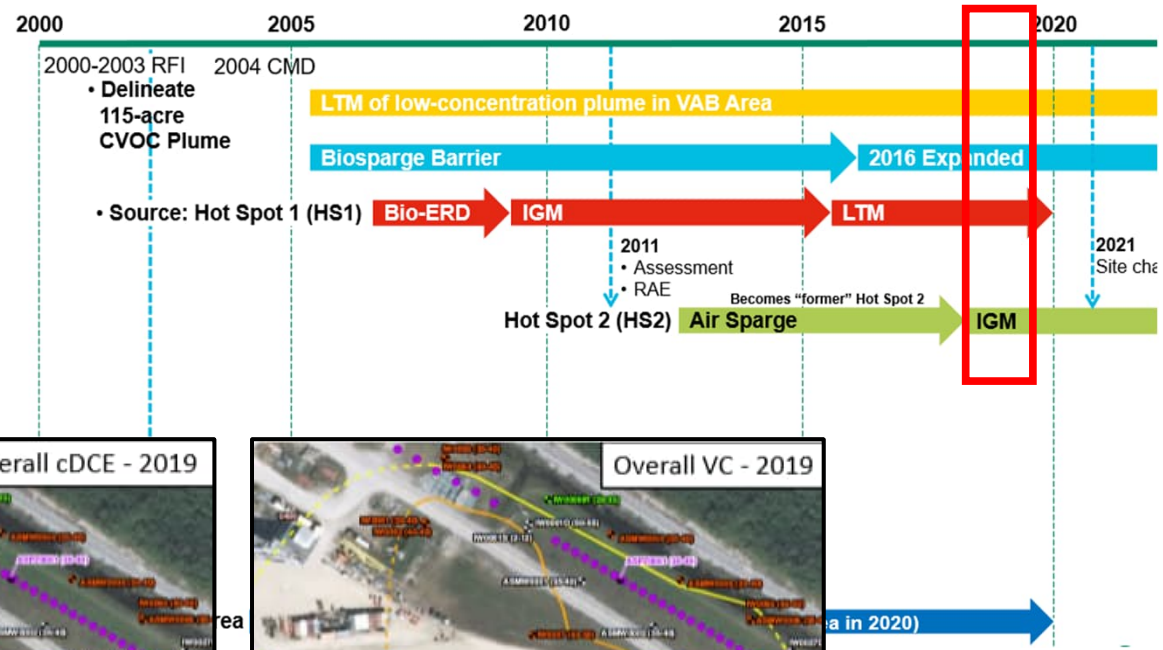




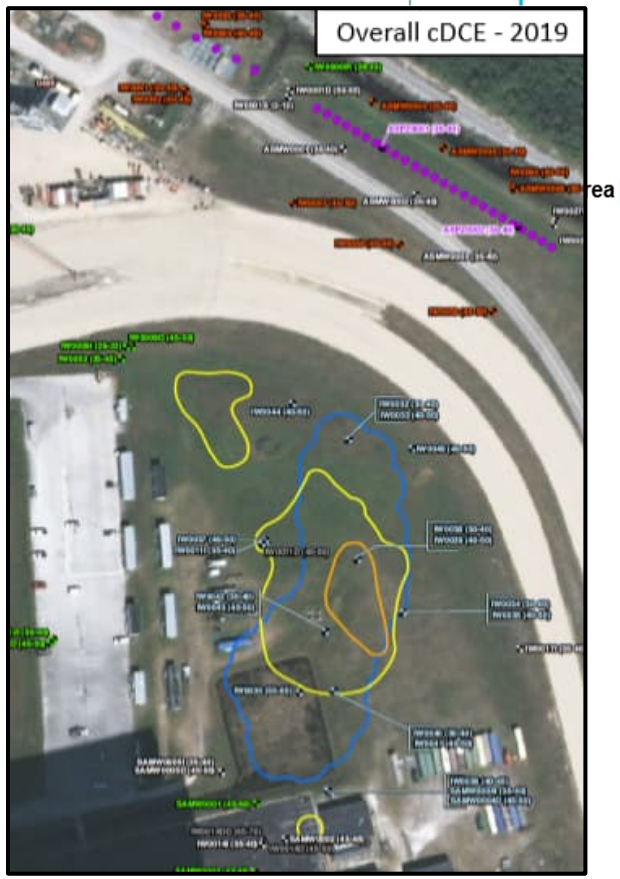
Former Hot Spot 2 History

Timeline

- 2019 (2019 Annual CMI and IM ADP) – Transition site to Interim Groundwater Monitoring (IGM) based on overall sampling results.
  - IGM continued through present day.



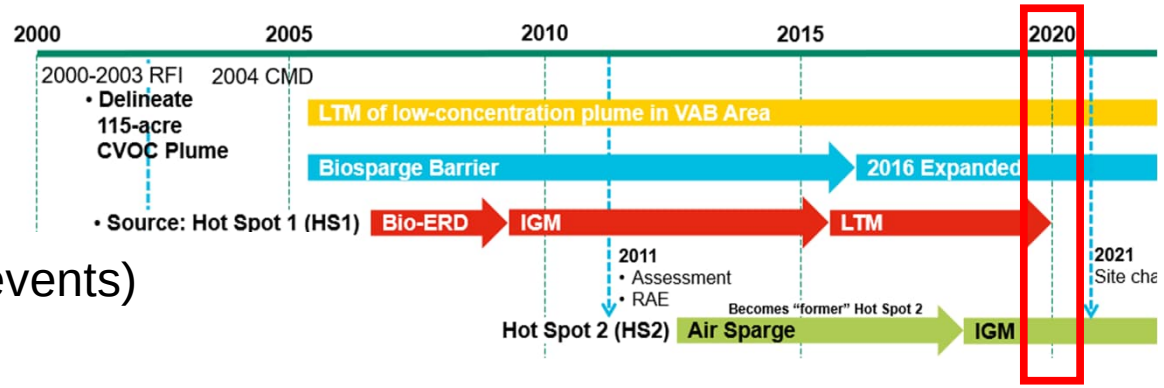






Former Hot Spot 2 History

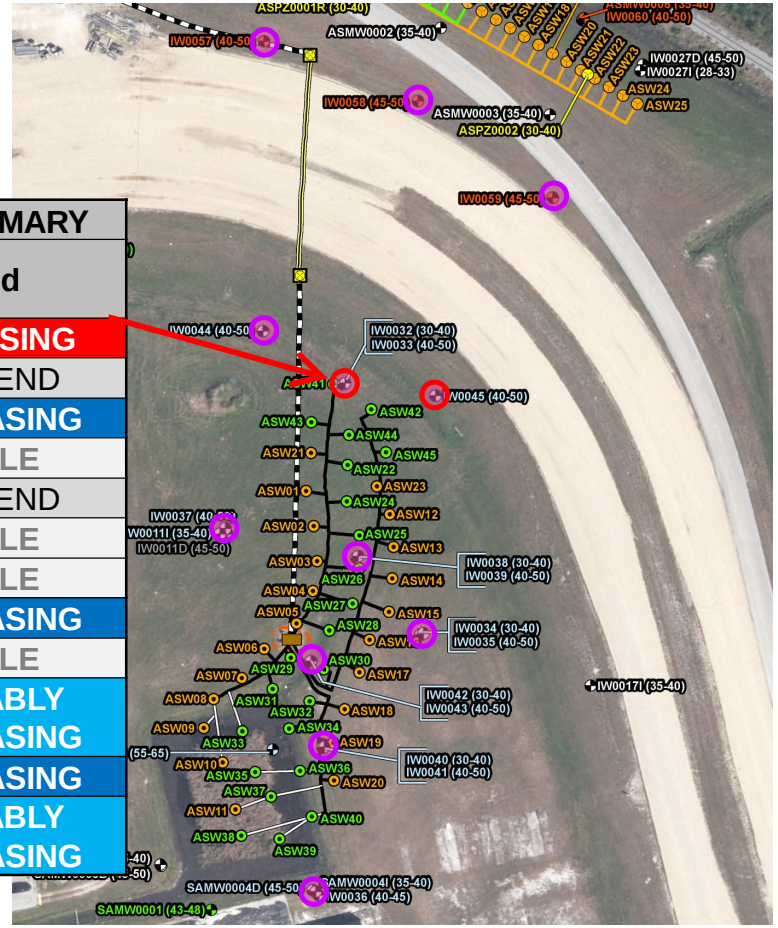
Timeline



- **2020** (2021 CMI and IM Update ADP) – Plume analytics conducted with data from 2018 through 2020 (5 sampling events)
  - Concluded CVOC plume is primarily stable
  - Significant mass and concentration of cDCE and VC remain in deep groundwater (40 to 50 ft bls)
  - Evaluate alternatives to decrease cDCE and VC mass in deep groundwater to shorten the lifetime of IGM and operation of the down-gradient biosparge system

cis-1,2-DICHLOROETHENE MANN-KENDALL ANALYSIS SUMMARY			
Well	M-K Statistic (S)	Confidence in Trend	Trend
MLPV-IW0033	8	95.8%	INCREASING
MLPV-IW0035	-2	59.2%	STABLE
MLPV-IW0036	-3	67.5%	STABLE
MLPV-IW0037	-4	75.8%	STABLE
MLPV-IW0039	0	40.8%	STABLE
MLPV-IW0041	0	40.8%	NO TREND
MLPV-IW0043	4	75.8%	NO TREND
MLPV-IW0044	-6	88.3%	STABLE
MLPV-IW0045	8	95.8%	INCREASING
MLPV-IW0057	-11	97.2%	DECREASING
MLPV-IW0058	-13	99.2%	DECREASING
MLPV-IW0059	-9	93.2%	PROBABLY DECREASING

VINYL CHLORIDE MANN KENDALL ANALYSIS SUMMARY			
Well	M-K Statistic (S)	Confidence in Trend	Trend
MLPV-IW0033	8	95.8%	INCREASING
MLPV-IW0035	2	59.2%	NO TREND
MLPV-IW0036	-8	95.8%	DECREASING
MLPV-IW0037	-6	88.3%	STABLE
MLPV-IW0039	4	75.8%	NO TREND
MLPV-IW0041	-2	59.2%	STABLE
MLPV-IW0043	0	40.8%	STABLE
MLPV-IW0044	-10	99.2%	DECREASING
MLPV-IW0045	-2	59.2%	STABLE
MLPV-IW0057	-9	93.2%	PROBABLY DECREASING
MLPV-IW0058	-13	99.2%	DECREASING
MLPV-IW0059	-9	93.2%	PROBABLY DECREASING



Response to Comments

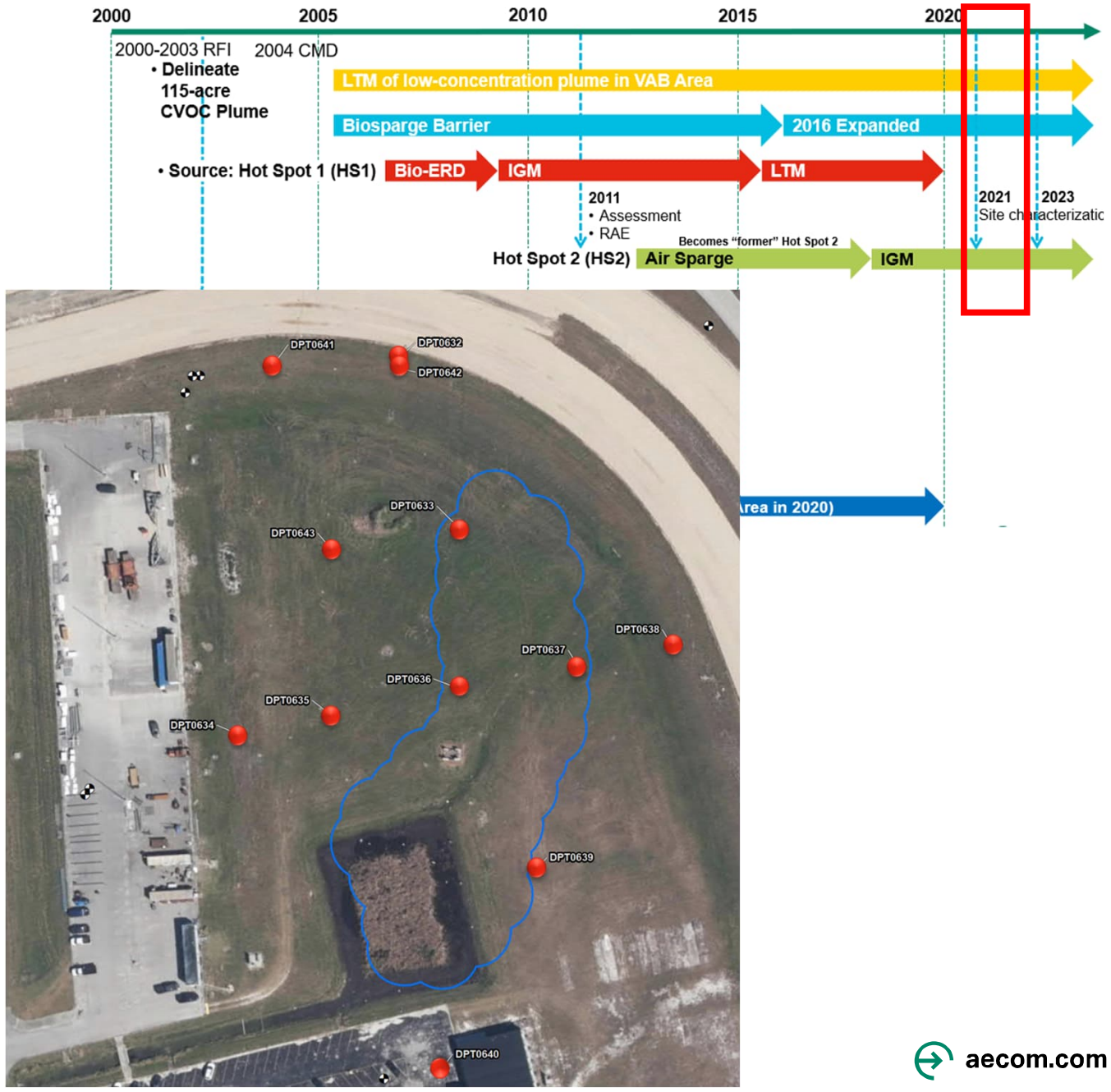
- HGL Comment #2: Slide #10 (new slide #11) – It would be helpful to specify the depths associated with the deep groundwater referenced on this slide. How many data points were used in the Mann-Kendall analysis?
- *Response: The first bullet was revised to state 5 sampling events were included in the Mann-Kendall trend analysis. At the time of the analysis, 5 groundwater sampling events were available for the analysis since shutdown of the air sparge system in April 2018. The second sub bullet was revised to show that deep groundwater refers to groundwater from 40 to 50 ft bls at the time of the Mann-Kendall trend analysis.*

Former Hot Spot 2 History

Timeline

- **2021** (2022 Annual CMI and IM Report) – DPT groundwater sampling in March and April to:

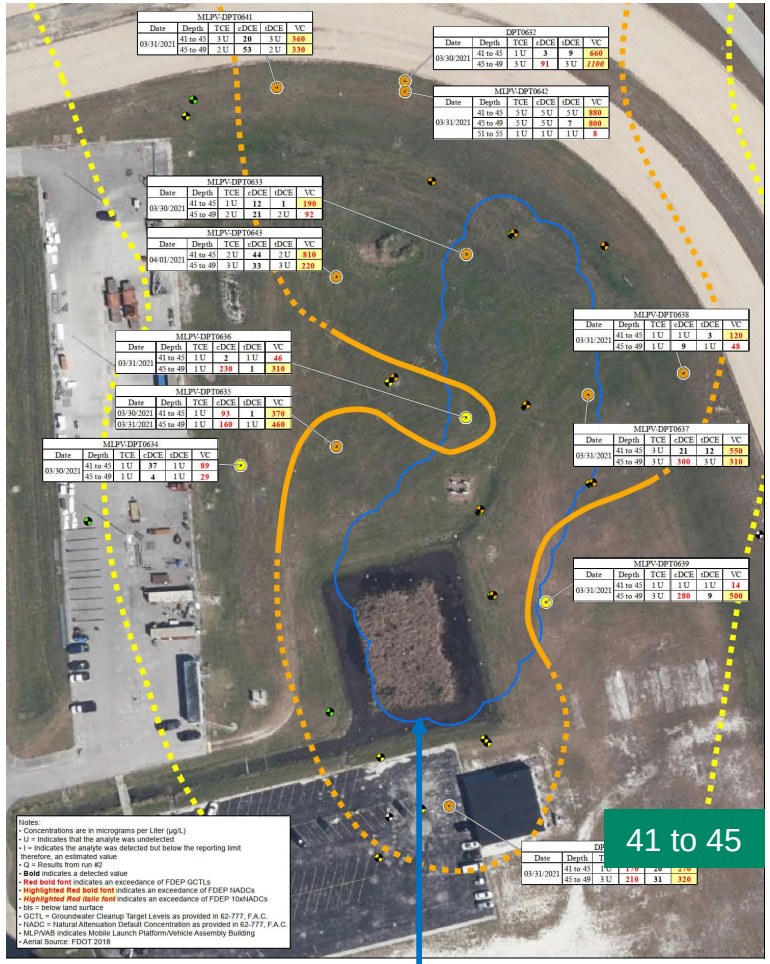
  1. Better evaluate current site conditions
  2. Determine possible remediation alternatives for treatment options in the fine-grained unit.
     - 25 samples from 12 locations collected from 4-foot intervals to depths of 41 to 55 feet bls
     - Samples analyzed for CVOCs [TCE, cDCE, trans-1,2-dichloroethane (tDCE) and VC]

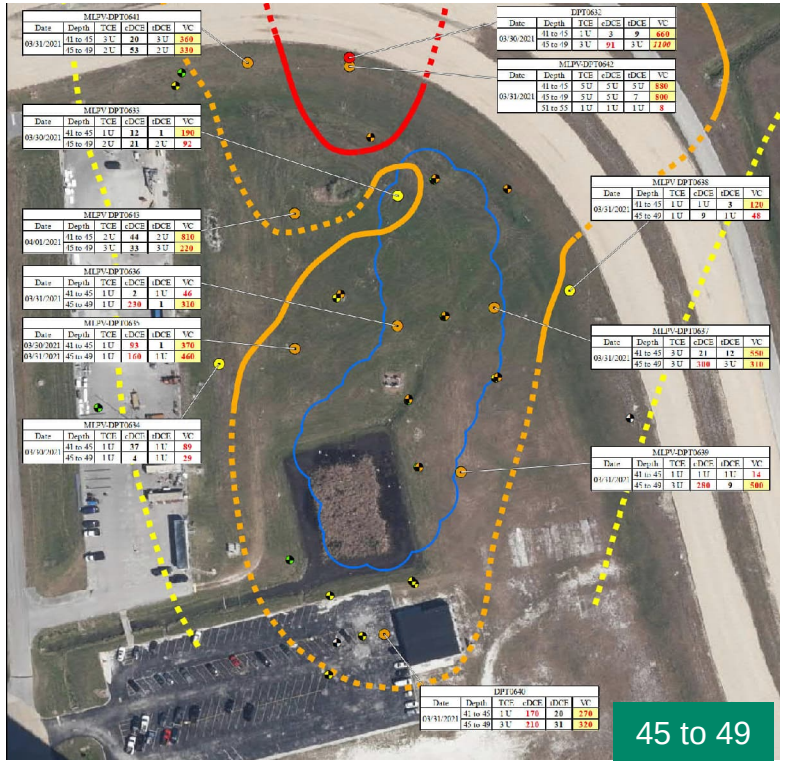


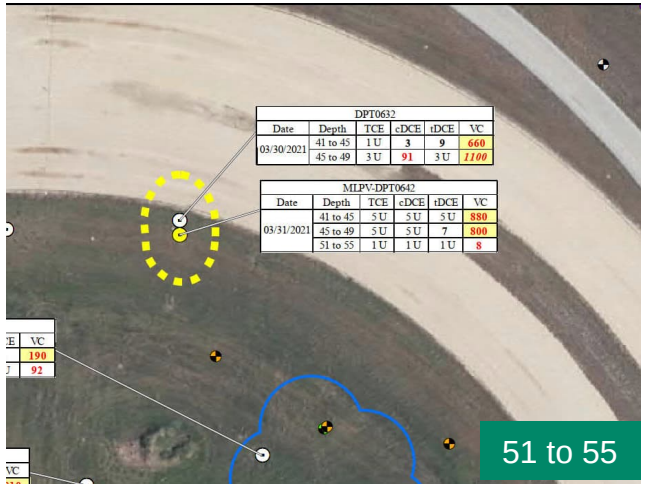
Former Hot Spot 2 History

2021 DPT Groundwater Sampling Summary

- **41 to 45 feet bls:**
  - VC exceeds NADC at 9 locations and Groundwater Cleanup Target Level (GCTL) only at 3 locations
  - cDCE exceeds GCTL at 2 locations
- **45 to 49 feet bls:**
  - VC exceeds 10xNADC at 1 location, NADC at 8 locations, and GCTL only at 3 locations
  - cDCE exceeds GCTL at 5 locations
- **51 to 55 feet bls:**
  - Only 1 sample collected to verify groundwater quality below treatment interval
  - VC exceeds GCTL







Former Air Sparge Area Radius of Influence (ROI)

Symbology Color Coding

- CVOC concentration less than or equal to GCTLs
- CVOC concentration greater than GCTLs
- CVOC concentration greater than NADCs and less than or equal to 10xNADC
- CVOC concentration greater than 10xNADC
- CVOC concentration greater than 100xNADC
- CVOC detection limit greater than GCTLs

Abbreviation	Analyte	GCTL	NADC
TCE	Trichloroethene	3	300
cDCE	cis-1,2-Dichloroethene	70	700
tDCE	trans--Dichloroethene	100	1000
VC	Vinyl Chloride	1	100

Greater than GCTL
Greater than NADC
Greater than 10xNADC

Former Hot Spot 2 History

2021 IGM

MLPV-IW0032 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	0.26 U
05/31/2018	0.61 U	**0.36 I**	0.39 U	0.26 U
03/06/2019	0.61 U	**0.74 I**	0.39 U	0.26 U
03/18/2020	0.35 U	**0.35 I**	0.22 U	0.41 U
11/30/2020	NS	**0.68 I**	0.22 U	**0.49 I**
03/16/2021	NS	**0.84**	0.22 U	1.6

MLPV-IW0011I (35 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**1.1**	0.67 U	0.26 U
5/31/2018	0.61 U	**0.93 I**	0.39 U	1.9
3/6/2019	0.61 U	**0.72 I**	0.39 U	1.4
10/31/2019	0.35 U	0.28 U	0.22 U	**0.48 I**
3/18/2020	0.35 U	**0.35 I**	0.22 U	**0.92 I**
9/15/2020	NS	0.28 U	0.22 U	0.41 U
3/16/2021	NS	0.28 U	0.22 U	**0.46**
9/13/2021	NS	0.28 U	0.22 U	0.41 U

MLPV-IW0034 (30 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	13.0
05/31/2018	0.61 U	**0.4 I**	0.39 U	5.5
03/06/2019	0.61 U	**1.4**	0.39 U	2.4
10/31/2019	0.35 U	0.28 U	0.22 U	0.41 U
3/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
9/15/2020	NS	0.28 U	0.22 U	0.41 U
3/15/2021	NS	**0.41**	0.22 U	0.41 U
9/14/2021	NS	0.28 U	0.22 U	0.41 U

MLPV-IW0042 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**0.86 I**	0.67 U	0.26 U
05/30/2018	0.61 U	**0.32 I**	0.39 U	**0.34 I**
03/06/2019	0.61 U	0.32 U	0.39 U	0.26 U
03/18/2020	0.35 U	0.28 U	0.22 U	0.41 U
03/16/2021	NS	**1.2**	0.22 U	**0.42**

MLPV-IW0040 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	0.26 U
05/30/2018	0.61 U	**0.58 I**	0.39 U	**0.36 I**
03/05/2019	0.61 U	0.32 U	0.39 U	0.26 U
03/18/2020	0.35 U	**0.39 I**	0.22 U	0.41 U
03/15/2021	NS	**0.50**	0.22 U	0.41 U

MLPV-IW0044 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	6.1 U	**18.0**	**14.0**	1,500
05/30/2018	1.2 U	**7.5**	**6.4**	810
03/05/2019	1.2 U	**3.7**	**2.9 I**	510
10/31/2019	0.35 U	**2.9**	**1.8**	458
3/18/2020	0.35 U	**6.9**	**2.2**	325
11/30/2020	NS	**2.8**	**0.88 I**	307
3/16/2021	NS	**3.4**	**1.0**	249
9/14/2021	CNL			

MLPV-IW0033 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	100	**17.0**	470
11/07/2017	0.61 U	**24.0**	**6.3**	68.0
05/31/2018	0.61 U	**21.0**	**3.0**	120
03/06/2019	1.2 U	**46.0**	**6.0**	400
10/31/2019	1.7 U	**58.4**	1.1 U	365
3/18/2020	**0.44 I**	**55.9**	**9.6**	455
11/30/2020	NS	82.3	**7.7**	497
3/16/2021	NS	**49.6**	**6.3**	471
9/14/2021	CNL			

MLPV-IW0045 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**7.7**	**7.9**	200
05/30/2018	0.61 U	**2.4**	**10.0**	270
03/06/2019	0.61 U	**3.2**	**6.8**	170
10/31/2019	0.35 U	**4.8**	**3.6**	97.2
03/18/2020	0.35 U	**20**	**5.7**	207
09/15/2020	NS	**6.4**	**4.2**	205
03/16/2021	NS	75.8	**7.8**	295
09/14/2021	CNL			

MLPV-IW0037 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	150	**1.2**	280
05/31/2018	0.61 U	94.0	**1.2 I**	360
03/06/2019	0.61 U	160	**0.89 I**	270
10/31/2019	0.69 U	135	0.44 U	178
3/18/2020	0.86 U	132	**0.67 I**	245
9/15/2020	NS	**55.4**	**0.52 I**	208
03/16/2021	NS	138	**0.71**	269
09/13/2021	NS	**25.1**	**0.47**	99.3

MLPV-IW0038 (30 - 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**0.78 I**	0.67 U	0.26 U
5/31//2018	0.61 U	**0.48 I**	0.39 U	0.26 U
03/06/2019	0.61 U	**0.94 I**	0.39 U	**1.1**
03/18/2020	0.35 U	**0.54 I**	0.22 U	0.41 U
03/15/2021	NS	**1.2**	0.22 U	2.3

MLPV-IW0039 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	**2.6**	200	**11.0**	250
11/07/2017	**1.5**	92.0	**5.1**	55.0
05/31/2018	**1.3 I**	**45.0**	**3.2**	55.0
03/06/2019	**0.83 I**	160	**7.1**	250
10/31/2019	0.86 U	198	**4.6**	241
3/18/2020	0.86 U	128	**4.4**	228
9/15/2020	NS	92.1	**3.9**	276
3/15/2021	NS	161	**6.5**	236
9/14/2021	NS	76.9	**3.3**	191

MLPV-IW0035 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	**1.8**	**5.4**	220
05/31/2018	0.61 U	**1.2**	**6.9**	330
03/06/2019	0.61 U	**2.3**	**3.3**	150
10/31/2019	0.86 U	0.69 U	0.55 U	152
3/18/2020	0.35 U	**3.2**	**4.0**	192
9/15/2020	NS	0.28 U	**3.0**	205
3/15/2021	NS	**3.2**	**2.5**	124
9/14/2021	CNL			

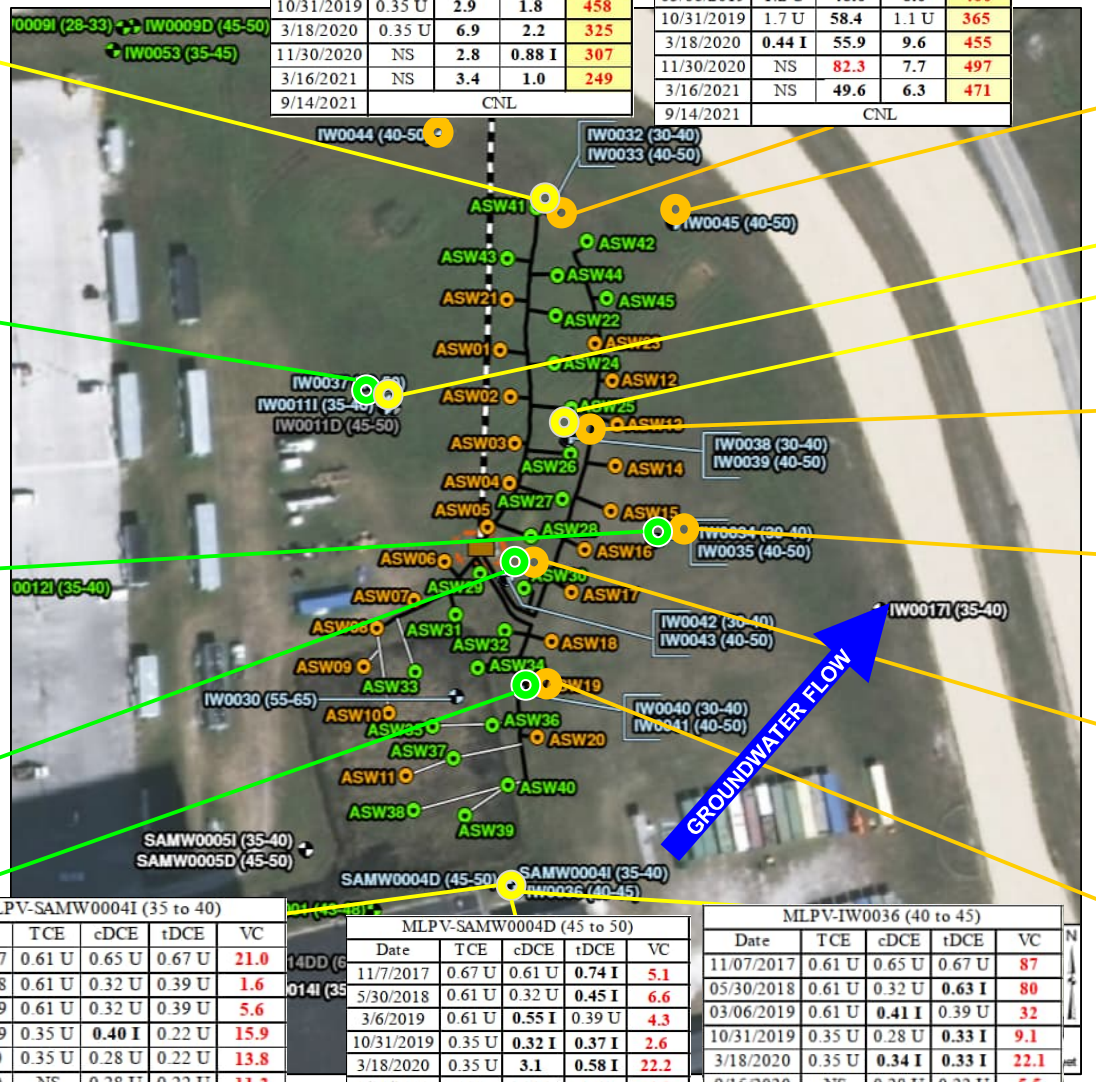
MLPV-IW0043 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	190	**4.9**	330
11/07/2017	0.61 U	**42.0**	**1.9**	120
05/30/2018	0.61 U	**31.0**	**0.96 I**	140
03/06/2019	**0.77 I**	100	**2.7**	150
10/31/2019	0.86 U	149	**2.4 I**	155
3/18/2020	**0.97 I**	193	**3.0**	131
9/15/2020	NS	73.2	**2.4**	146
3/16/2021	NS	249	**3.7**	180
9/14/2021	Well Submerged			

MLPV-IW0041 (40 to 50)				
Date	TCE	cDCE	tDCE	VC
03/07/2017	0.61 U	**63**	**3.8**	330
11/07/2017	0.61 U	140	**5.2**	300
05/30/2018	0.61 U	**9.7**	**3.9**	230
03/05/2019	**0.65 I**	76	**2.6**	260
10/31/2019	**0.39 I**	**14.0**	**2.3**	166
3/18/2020	0.35 U	106	**3.3**	183
9/15/2020	NS	**4**	**1.4**	201
3/16/2021	NS	113	**3.3**	259
9/14/2021	NS	**1.9 I**	**0.92**	146

MLPV-SAMW0004I (35 to 40)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	21.0
05/30/2018	0.61 U	0.32 U	0.39 U	1.6
03/06/2019	0.61 U	0.32 U	0.39 U	5.6
10/31/2019	0.35 U	**0.40 I**	0.22 U	15.9
3/18/2020	0.35 U	0.28 U	0.22 U	13.8
9/15/2020	NS	0.28 U	0.22 U	11.3
3/15/2021	NS	**0.61**	**0.41**	19.4
9/14/2021	NS	0.28 U	0.22 U	15.5

MLPV-SAMW0004D (45 to 50)				
Date	TCE	cDCE	tDCE	VC
11/7/2017	0.67 U	0.61 U	**0.74 I**	5.1
5/30/2018	0.61 U	0.32 U	**0.45 I**	6.6
3/6/2019	0.61 U	**0.55 I**	0.39 U	4.3
10/31/2019	0.35 U	**0.32 I**	**0.37 I**	2.6
3/18/2020	0.35 U	**3.1**	**0.58 I**	22.2
9/15/2020	NS	0.28 U	**0.60**	4.2
3/15/2021	NS	**2.4**	**0.59**	14.6
9/14/2021	NS	**0.65 I**	**0.67**	5.0

MLPV-IW0036 (40 to 45)				
Date	TCE	cDCE	tDCE	VC
11/07/2017	0.61 U	0.65 U	0.67 U	87
05/30/2018	0.61 U	0.32 U	**0.63 I**	80
03/06/2019	0.61 U	**0.41 I**	0.39 U	32
10/31/2019	0.35 U	0.28 U	**0.33 I**	9.1
3/18/2020	0.35 U	**0.34 I**	**0.33 I**	22.1
9/15/2020	NS	0.28 U	0.22 U	5.5
3/15/2021	NS	**0.47**	0.22 U	24.9
9/14/2021	NS	**0.60**	0.22 U	32.3



97.2	indicates > GCTL
207	Indicates > NADC

<GCTL

>GCTL

>NADC

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Former Hot Spot 2 History

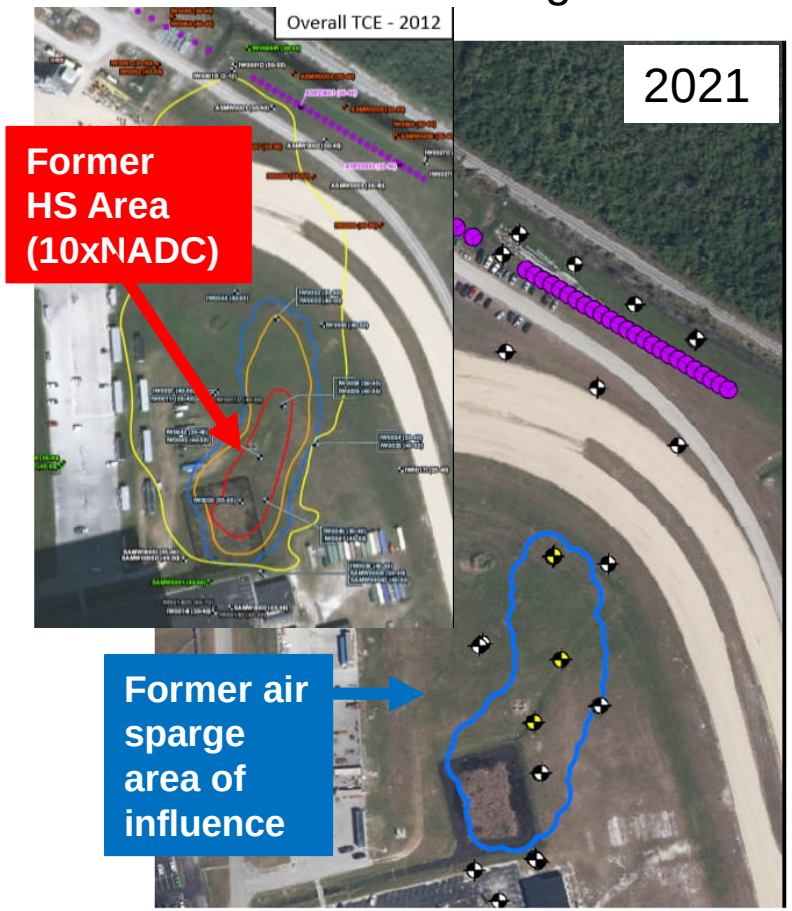
2021 IGM

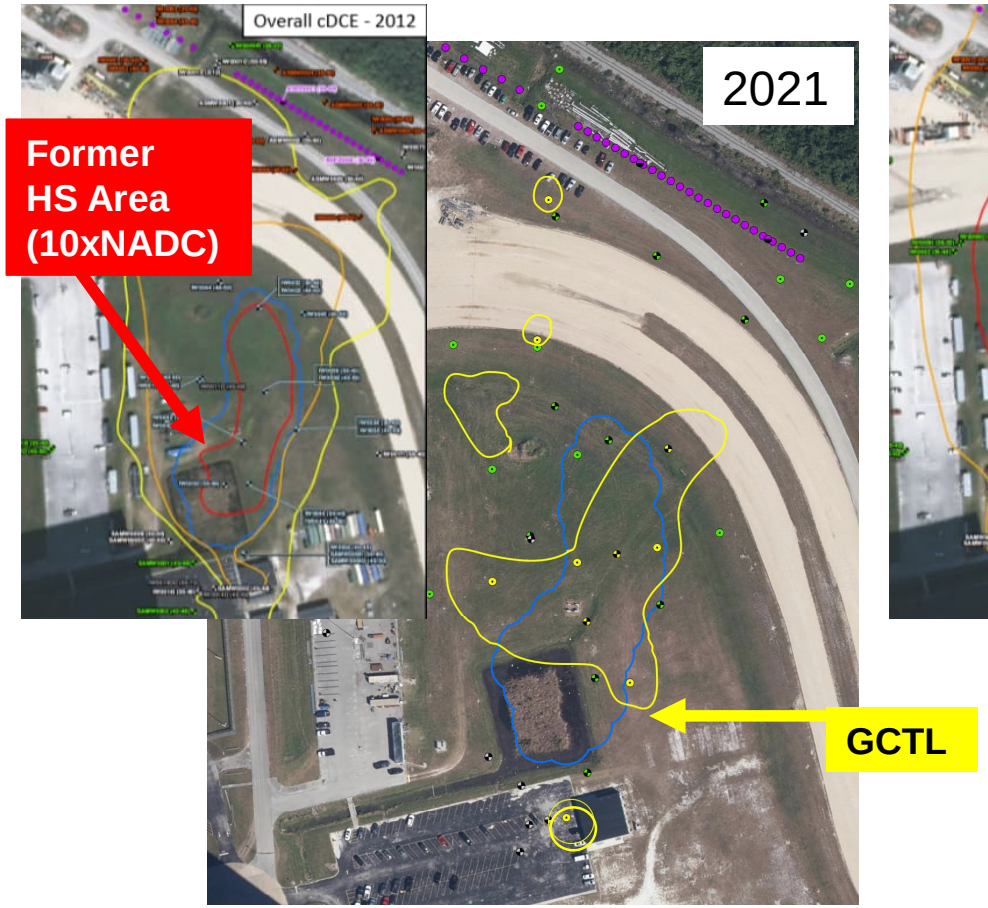
- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC: SAMW0004I (15.5 µg/L) exceeded GCTL in September 2021 – relatively unchanged since October 2019 (15.9 to 15.5 µg/L); IW0032 (1.6 µg/L) and IW0038 (2.3 µg/L) – first exceedances since 2015. Construction activities prevented subsequent sampling in September to evaluate trend
- **40 – 50 ft bls:**
  - cDCE: IW0039 (161 µg/L), IW0043 (249 µg/L), and IW0045 (75.8 µg/L) exceeded GCTL.
  - tDCE: less than GCTL
  - VC: IW0036 (24.9 µg/L) and SAMW0004D (14.6 µg/L) exceeded GCTL – relatively unchanged concentrations. Flux recorded in March correlates with a 1.5-to-2-foot average drop in the water table elevation (seasonal fluctuation). September sampling indicated IW0036 (32.3 µg/L) and SAMW0004D (5.0 µg/L) remained above GCTL
  - VC exceeds NADC in IW0033 (471 µg/L), IW0035 (124 µg/L), IW0037 (269 µg/L), IW0039 (236 µg/L), IW0041 (259 µg/L), IW0043 (180 µg/L), IW0044 (249 µg/L), and IW0045 (295 µg/L). September sampling indicated: IW0037 decreased below NADC (99.3 µg/L); and IW0039 (191 µg/L) and IW0041 (146 µg/L) remained relatively unchanged. Remaining wells could not be evaluated due to construction activities in the area.

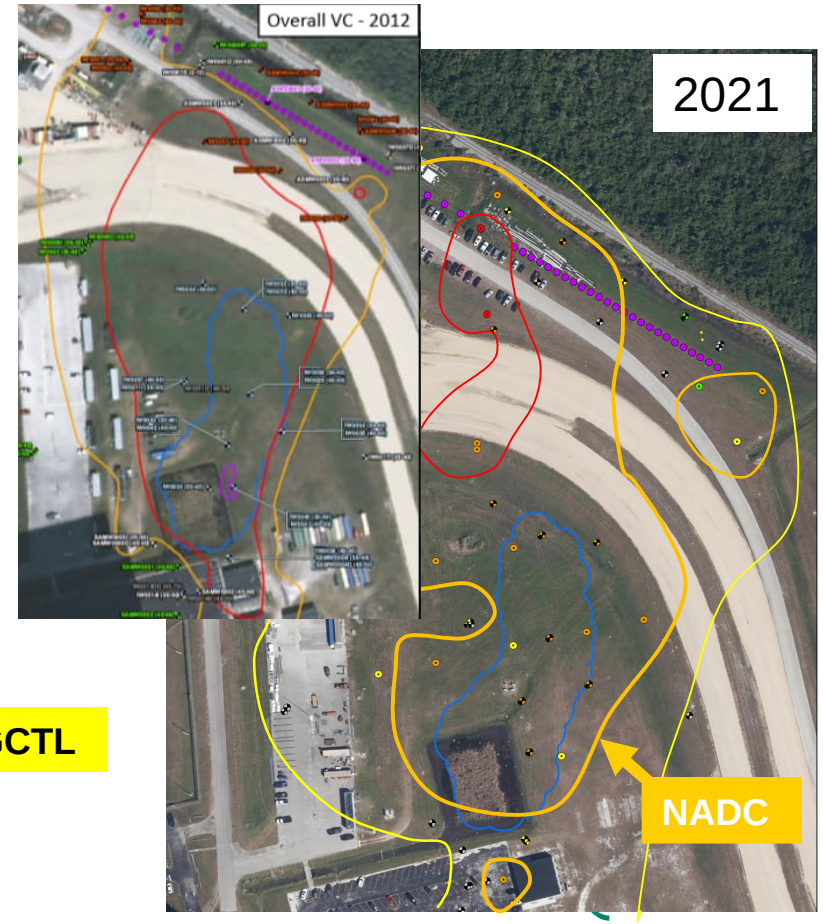
Former Hot Spot 2 History

2021 DPT and Monitoring Well Combined Data

- Overall reduction since 2012
- Though the 2020 plume analytics evaluation of groundwater monitoring data indicated a stable plume, DPT data indicated the high concentration plume (HCP, with concentrations greater than NADCs) is migrating toward the treatment barrier at higher concentrations and confirms the need for additional remediation efforts







Historical Figures: Geosyntec Consultants MLP/VAB SWMU 056, June 2019 ADP for 2018 CMI and IM Annual Report

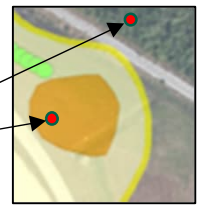
Former Hot Spot 2 History

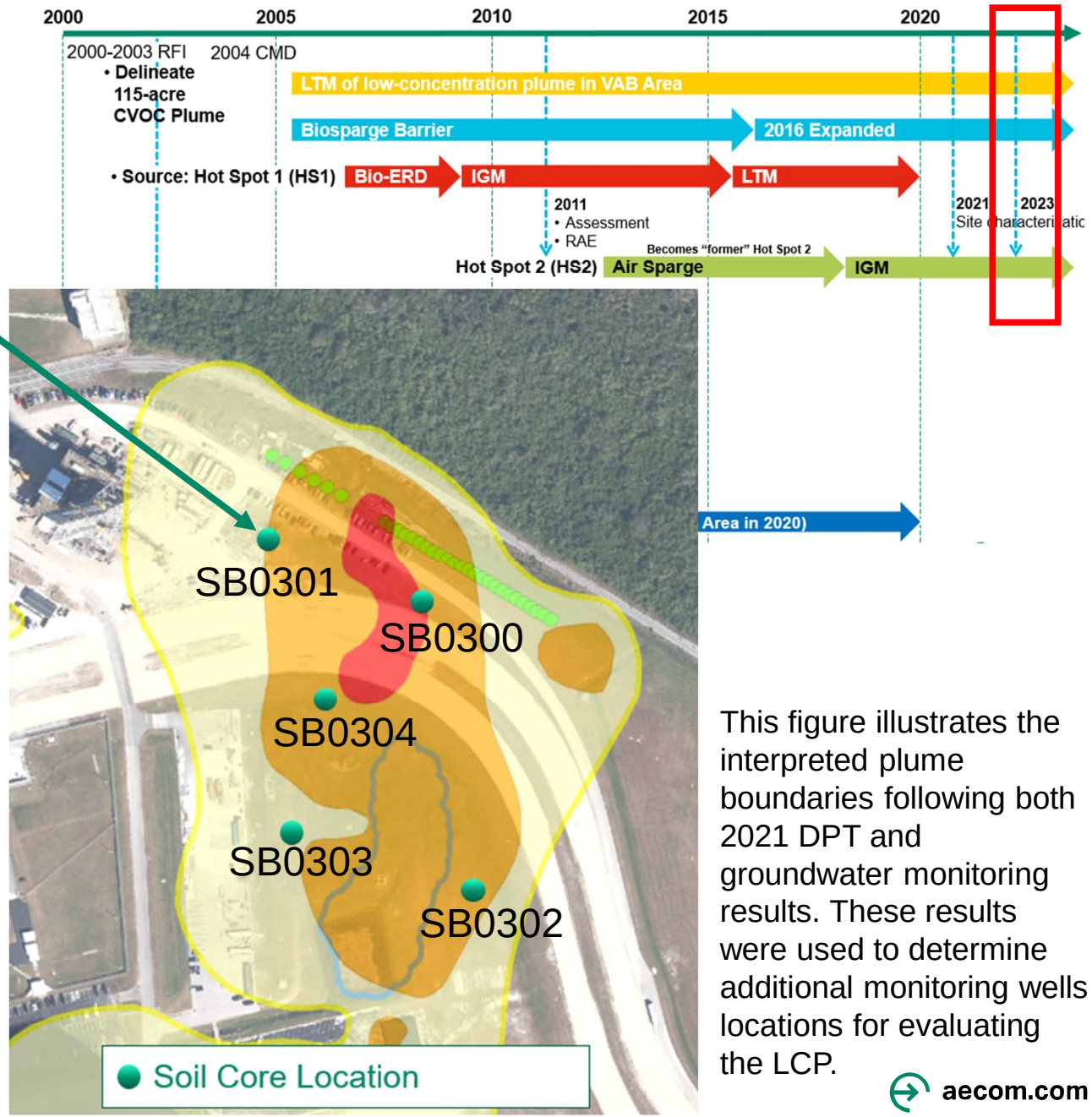
Timeline

- **2022** – IGM sampling continued, and five soil cores collected in areas with limited soil classifications for permeability analysis to:
  1. Gain an understanding of current soil characteristics in the lower permeability soil layer
  2. Aid in the RAE

- **2023** – IGM sampling along with sampling in low-concentration plume (LCP) monitoring well network performed in March and April throughout Biosparge Area and Former Hot Spot 2 for continued evaluation of site conditions

- **2024 (pending)** – Additional monitoring wells will be installed southeast of the biosparge barrier to verify NADC exceedances detected during 2021 DPT event.





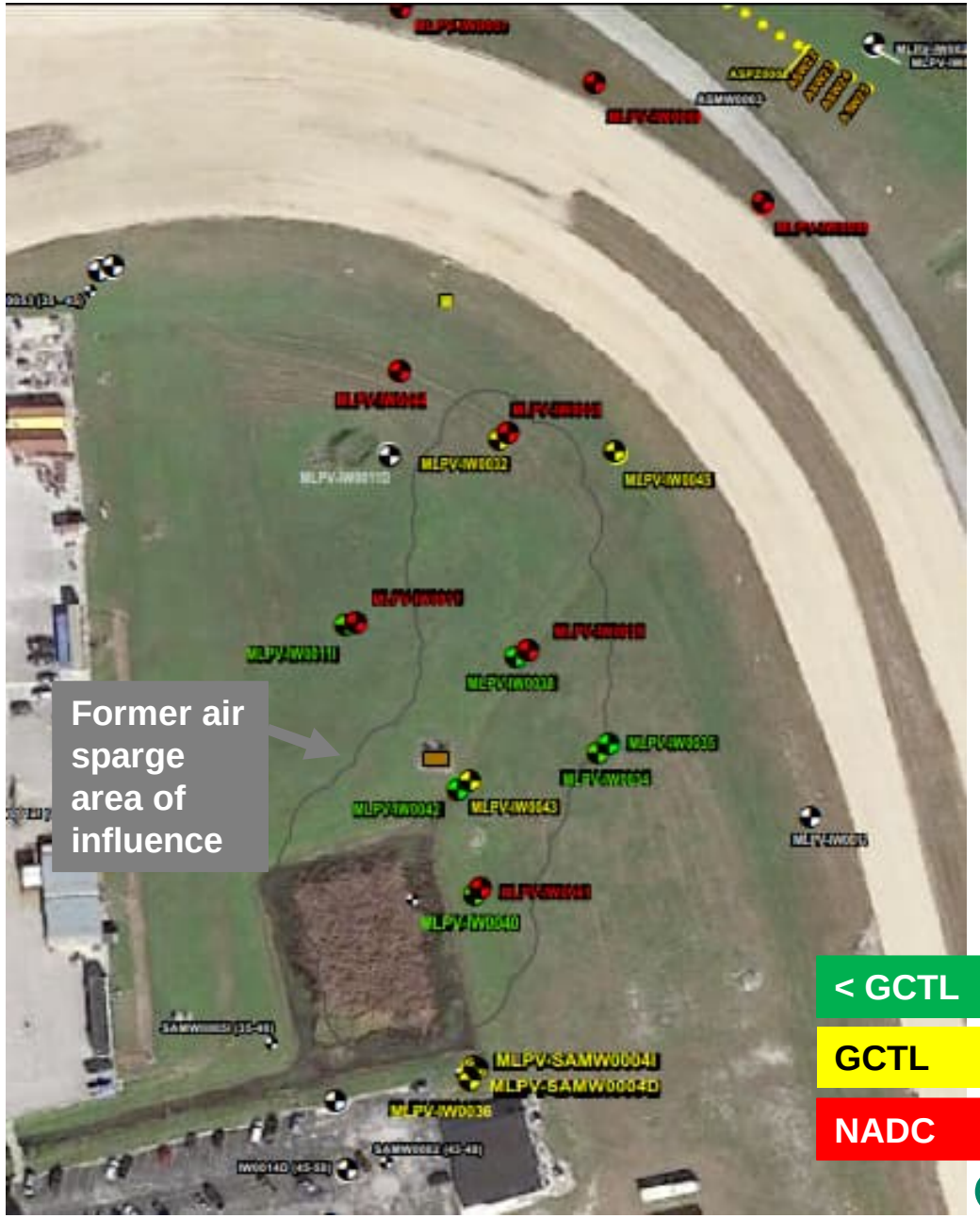
This figure illustrates the interpreted plume boundaries following both 2021 DPT and groundwater monitoring results. These results were used to determine additional monitoring wells locations for evaluating the LCP.

Source: 2021 CMI and IM Update ADP, Slide 44.

Former Hot Spot 2 History

Spring 2022 IGM

- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC exceeds GCTL in IW0032 (3.1 µg/L) and (SAMW0004I (15 µg/L)
- **40 – 50 ft bls:**
  - cDCE: IW0037 (100 µg/L), IW0039 (140 µg/L), and IW0043 (98 µg/L) exceeded GCTL
  - tDCE: less than GCTL
  - VC: IW0036 (44 µg/L), IW0043 (88 µg/L), IW0045 (92 µg/L), and SAMW0004D (17 µg/L) exceeded GCTL
  - VC exceeds NADC in IW0033 (950 µg/L), IW0037 (200 µg/L), IW0039 (160 µg/L), IW0041 (150 µg/L), and IW0044 (200 µg/L)

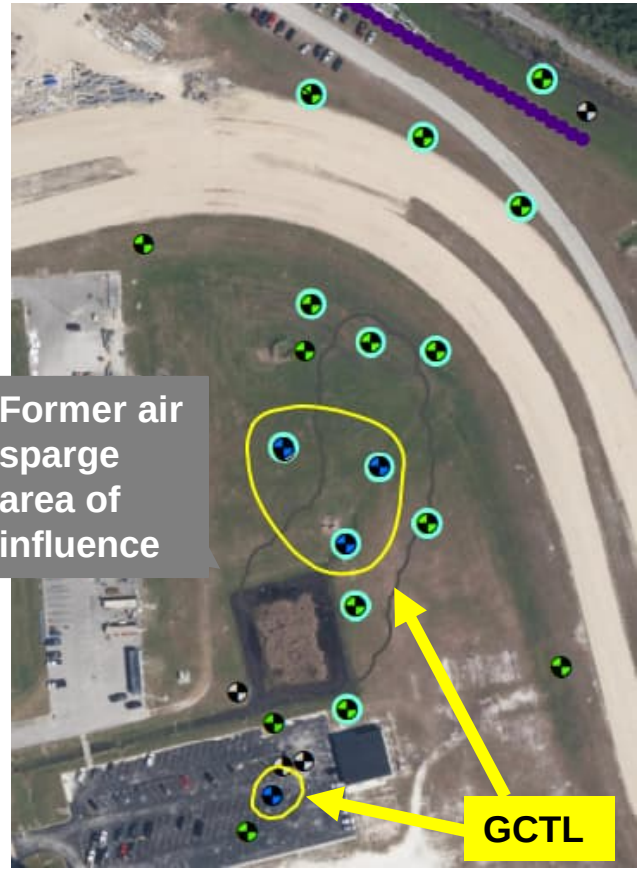


Former Hot Spot 2 History

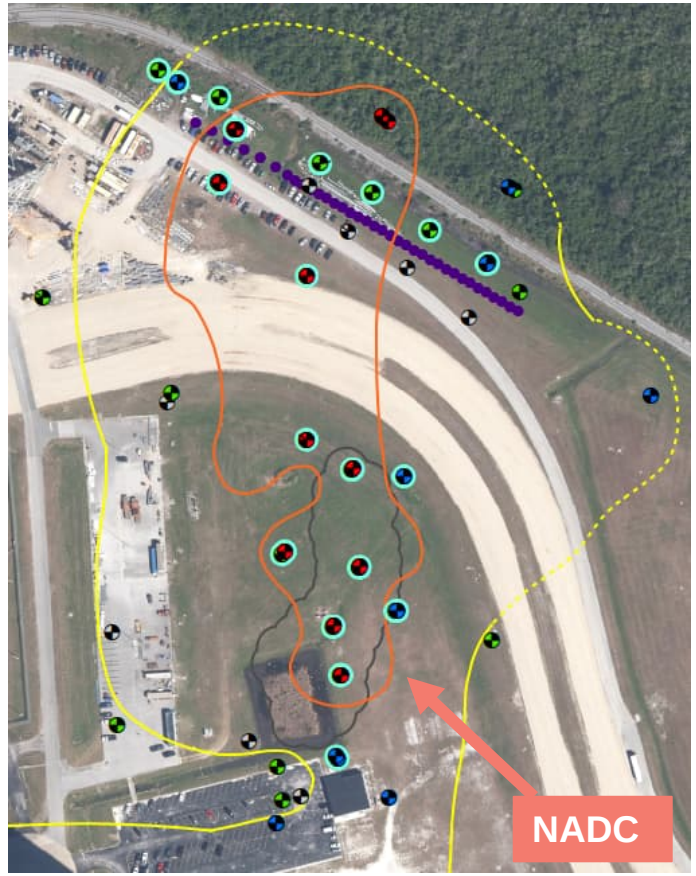
Spring 2023 IGM

- **30 – 40 ft bls:**
  - cDCE: less than GCTL
  - tDCE: less than GCTL
  - VC exceeding GCTL: SAMW0004I (12 µg/L) – relatively unchanged since October 2019 (15.9 to 12 µg/L); IW0038 (1.8 µg/L) – consistent with sampling results from March 2021 (2.3 µg/L)
- **40 – 50 ft bls:**
  - cDCE: IW0037 (79 µg/L), IW0039 (150 µg/L), and IW0043 (170 µg/L) exceeded GCTL
  - tDCE: less than GCTL
  - VC: IW0035 (78 µg/L), IW0036 (29 µg/L), IW0045 (59 µg/L), and SAMW0004D (18 µg/L) exceeded GCTL – IW0035 decreased to below NADC for first time in over 10 years, and IW0045 below NADC for second year
  - VC exceeds NADC in IW0033 (560 µg/L), IW0037 (170 µg/L), IW0039 (270 µg/L), IW0041 (130 µg/L), IW0043 (280 µg/L), and IW0044 (620 µg/L) – concentrations relatively unchanged since October 2019

2023 Composite cDCE Plume



2023 Composite VC Plume



Site Characterization Summary

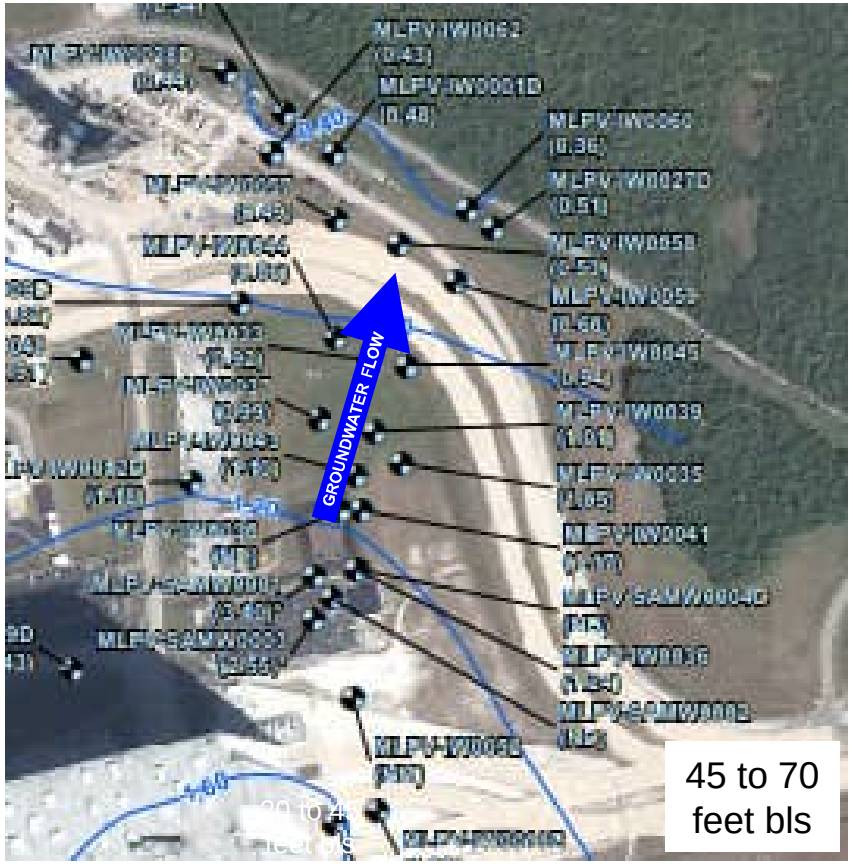
Site Characterization Summary

Site-Wide Hydrogeology

- 2021 Average depth to water in the dry season (November through April) ranged from 3 to 4 ft bls
- Wet season water level measurements are scheduled for 2023
- Groundwater generally flows to N and NE on the north side of the VAB in Former HS2 area



INTERMEDIATE

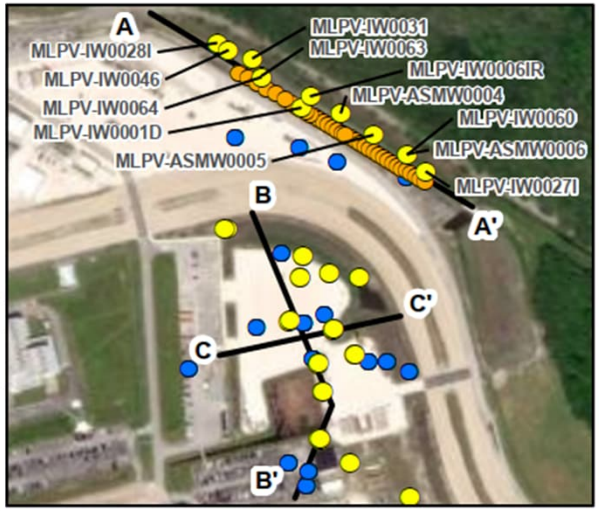


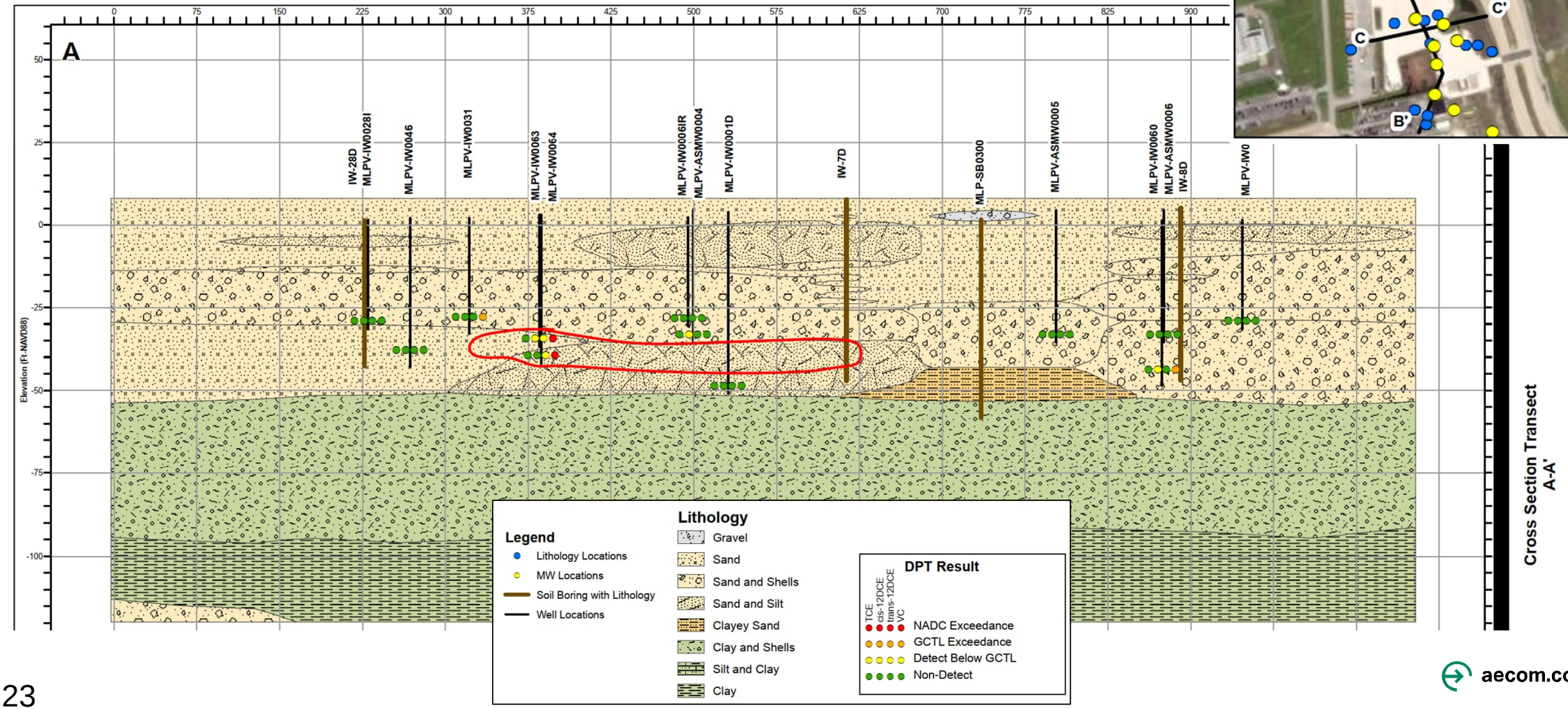
DEEP

Site Characterization Summary

Site-wide Lithology, North-South (A-A') – 2022-2023 MW Data

Lithology: NADC plume at 35-45 ft bls, silty sands, downgradient of former HS2 HCP



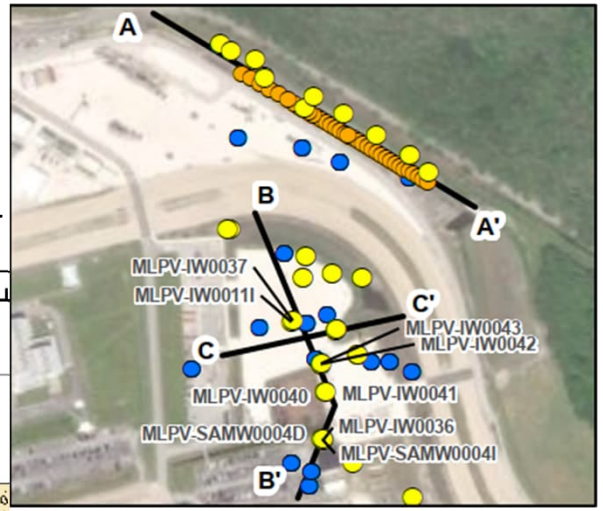


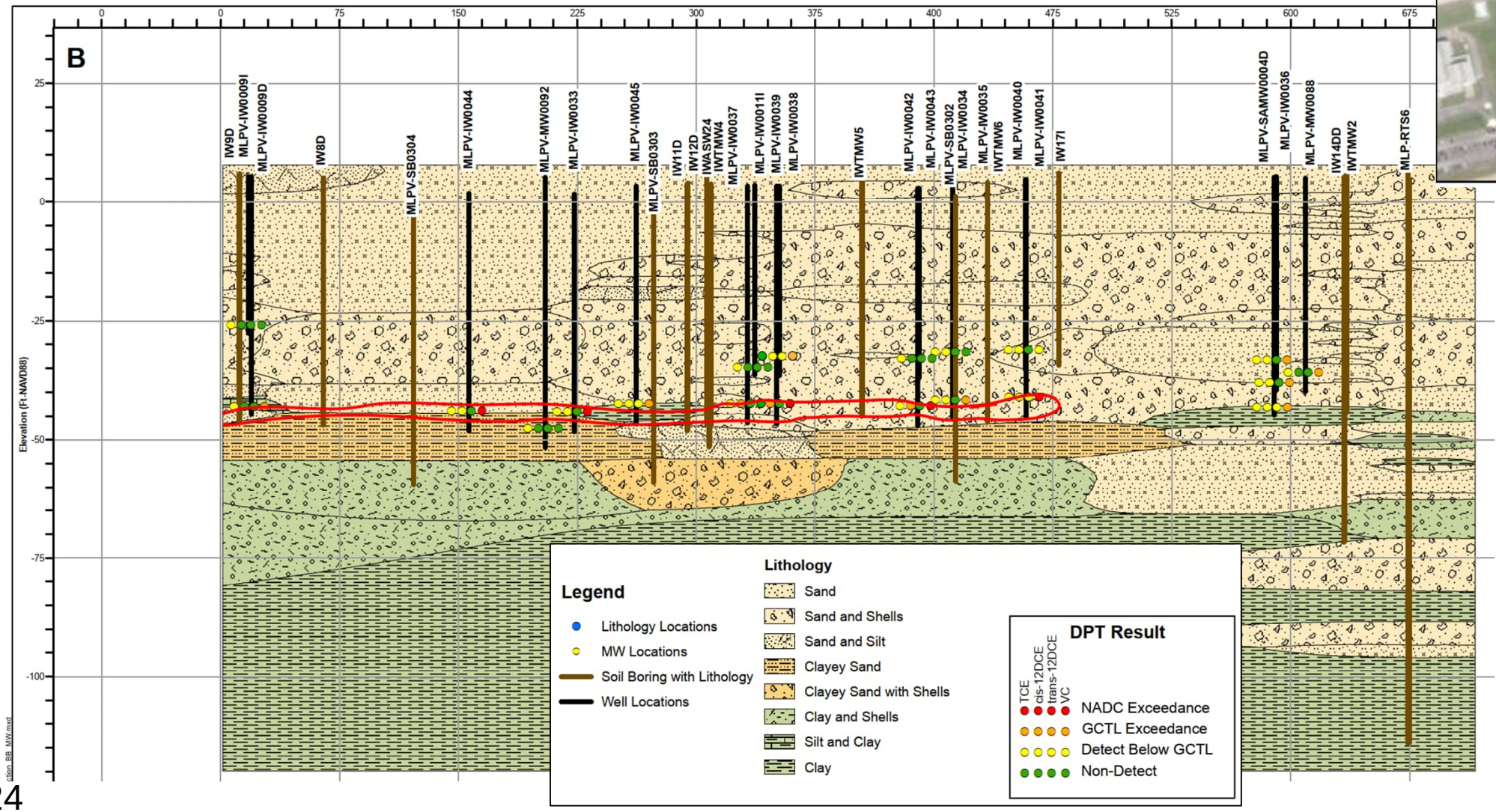
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Site Characterization Summary

Site-wide Lithology, North-South (B-B') – 2022-2023 MW Data

Lithology: NADC plume at 40 to 50 ft bls, silty sands, sands and shells, former HS2 area



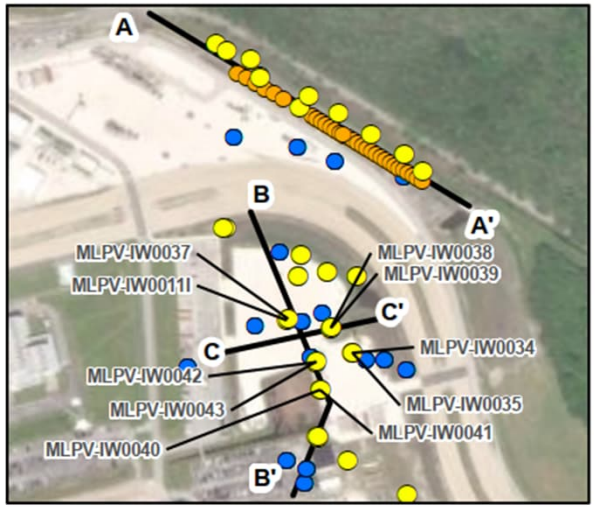


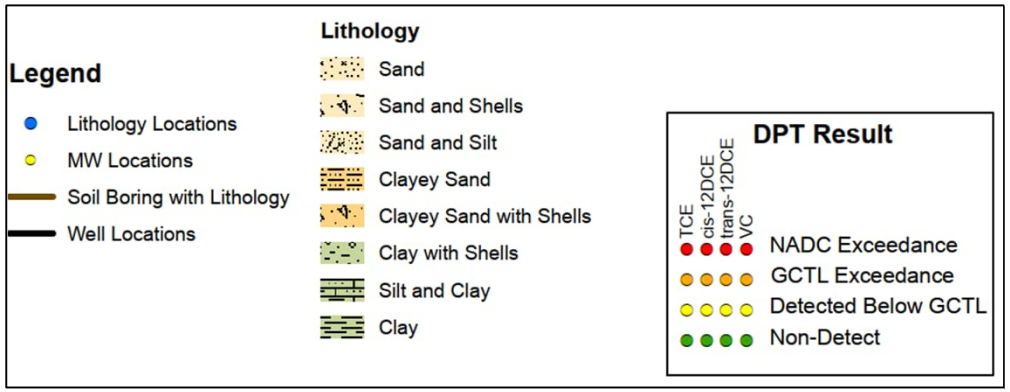
aecom.com

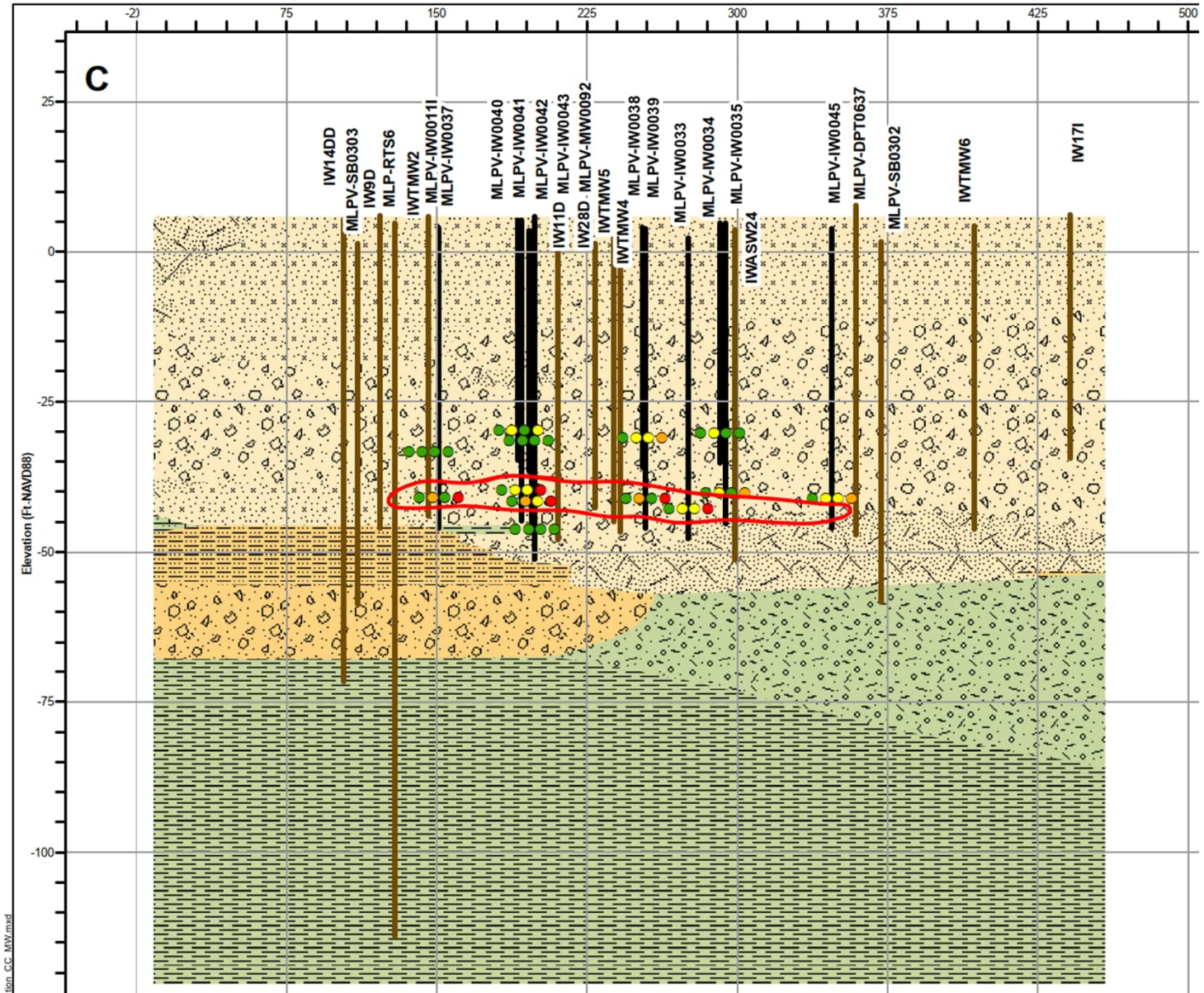
Site Characterization Summary

Site-wide Lithology, East-West (C-C') – 2022-2023 MW Data

Lithology: NADC plume at 35 to 45 feet bls, silty sands, sands and shells, former HS2 area







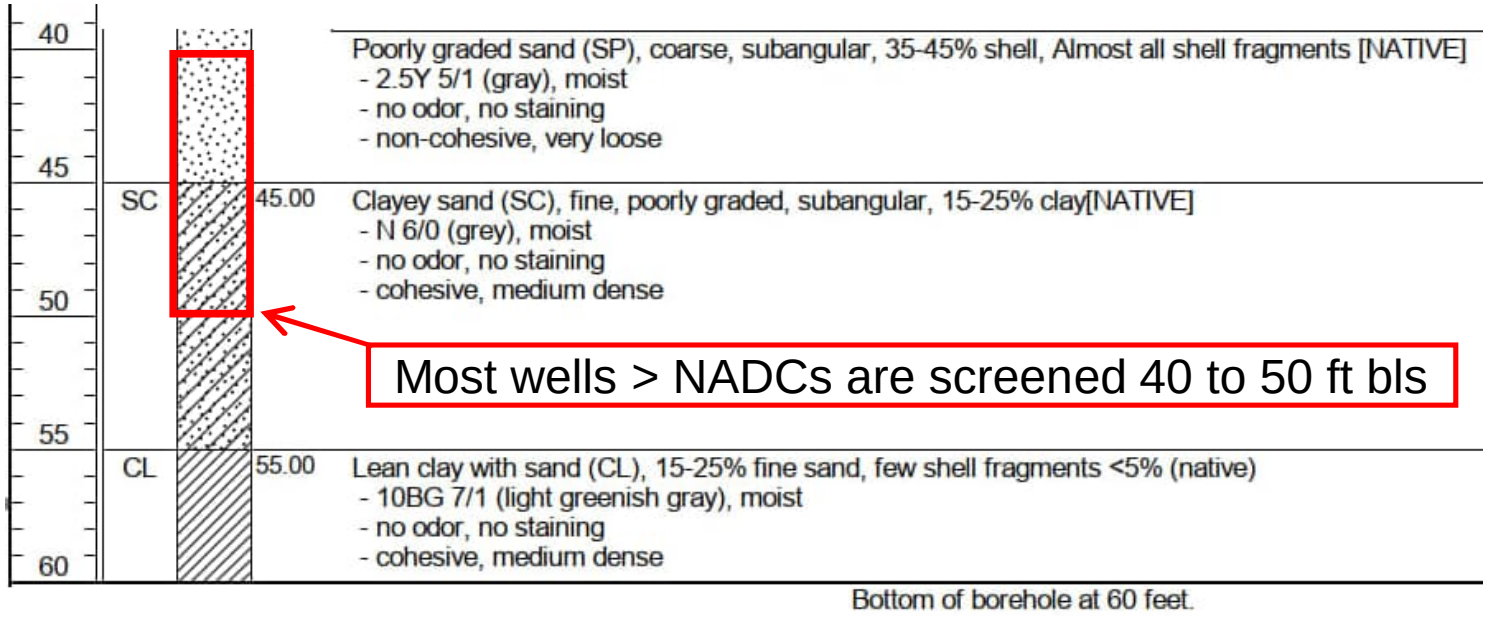
Site Characterization Summary

Relevant Site Conditions for RAE

Lithology

- Former HS2 air sparge wells were screened to approximately 46 bls to stay above finer-grained soil
- NADC plumes in former HS2 area are primarily located in groundwater below 45 bls.
- Five soil borings (MLPV-SB0300 to MLPV-SB0304) were collected in November 2022 to refine understanding of lithology
- Eight (8) soil samples were collected between 50 and 60 ft bls from the SBs to test for grain size and hydraulic conductivity (and evaluate feasibility of air sparging)

From MLPV-SB0300 (Typical)



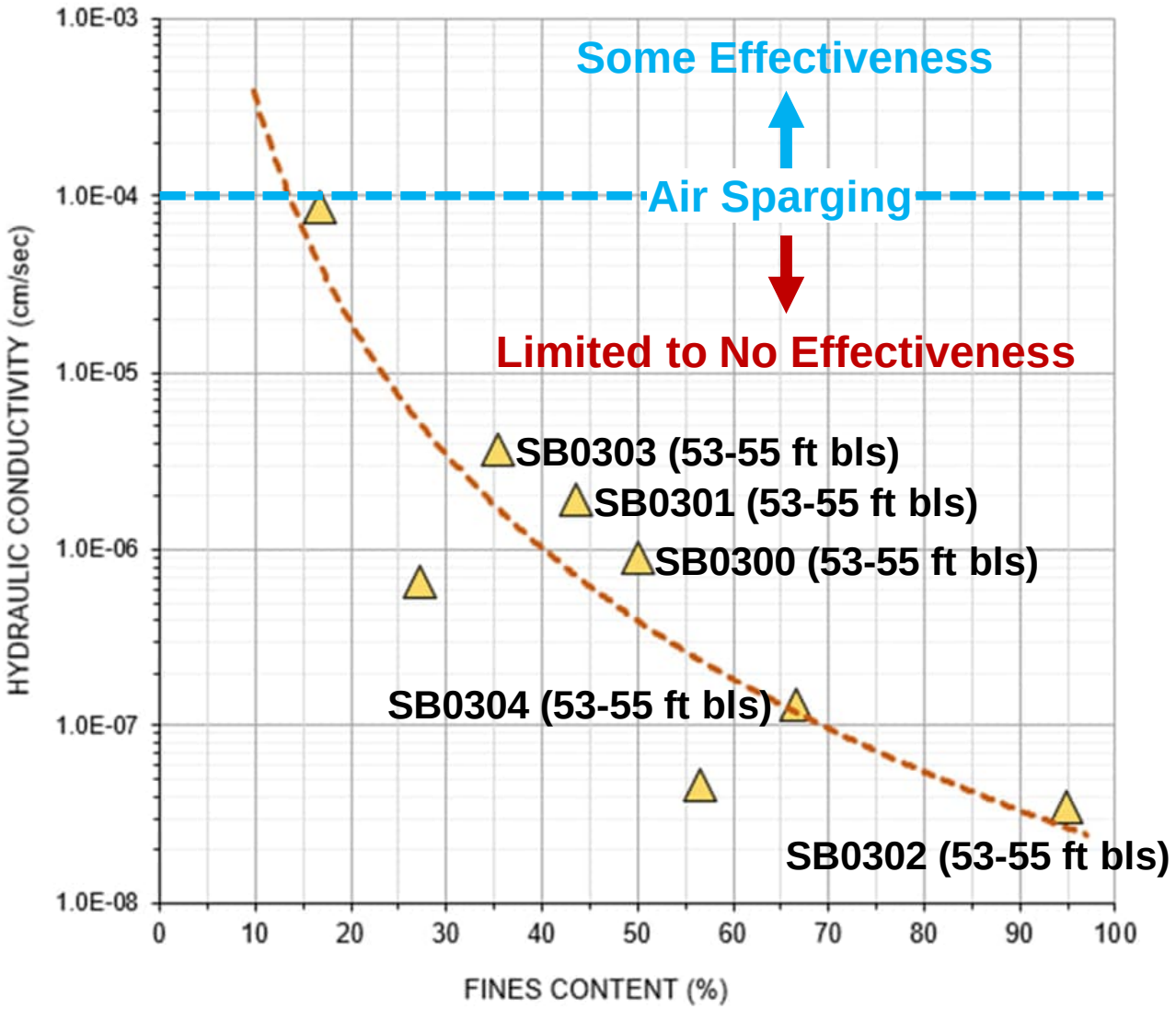
- Sands dominate to approximately 45 ft bls
- Clayey sand (or silty sand) observed from 45 to 55 ft bls
- Lean clay with sand observed from 55 to 60 ft bls

Site Characterization Summary

Relevant Site Conditions for RAE

Soil Geotech Results

- Fines content (<75µm, ≤silt) in soil samples ranged from 17 to 95%
- Hydraulic conductivity ranged from 3.5E-8 cm/s to 8.7E-5 cm/s
- Guidance documents from the Interstate Technology and Regulatory Council and Environmental Protective Agency indicate the practical hydraulic conductivity limit for air sparging is greater than 1E-3 to 1E-4 cm/s
- Air Sparging below 45 ft bls is not expected to be effective and is not retained during technology screening
  - Low K (high fines content) limits ability to inject air
  - ROI would be limited
  - Pilot study would be required



Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

Observations

- Groundwater above 40 ft bls is < GCTLs or NADCs
- Wells screened from 40 to 50 ft bls most likely represent groundwater conditions from 40 to 45 ft bls because of lithology changes around 45 ft bls from sand to clayey sand
- Limited monitoring network screened exclusively in (clayey sand) less permeable lithology below 45 ft bls

Objectives

- Monitor CVOC rebound/trends in former HS2 area after air sparging stopped in April 2018
- Evaluate CVOC trends in deep groundwater (40-45 ft bls and below 45 ft bls)
- Evaluate if natural attenuation can potentially mitigate mass flux to the biosparge barrier

Trend Analysis at Individual Wells

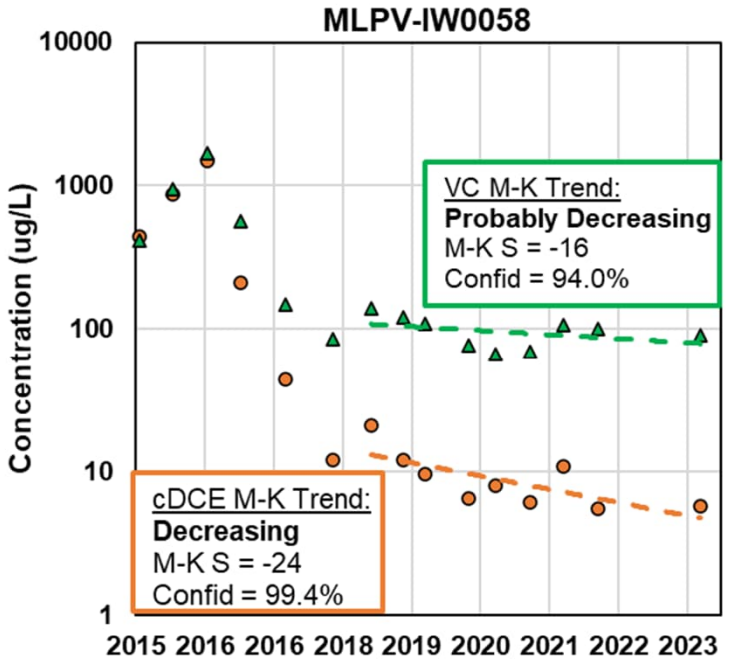
- IW0057, IW0058, IW0059, IW0062 located between former HS2 and immediately upgradient of biosparge barrier
- Concentration trends indicative of changes in mass discharge from former HS2 to biosparge barrier (40 to 45 ft bls at IW0057 and IW0062 and 45 to 50 ft bls at IW0058 and IW0059)

Plume Metrics (40 to 45 ft bls)

- Evaluated trends in plume area, dissolved mass, average concentration, and center of mass
- cDCE plume defined by GCTL (70 ug/L, no NADC exceedance)
- VC plume defined by NADC (100 ug/L)
- 5 snapshots of plumes available since April 2018

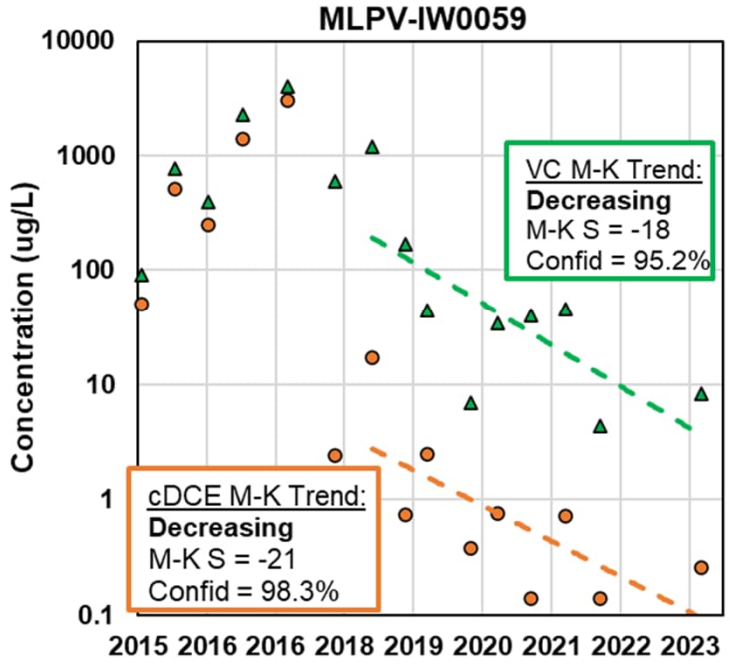
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



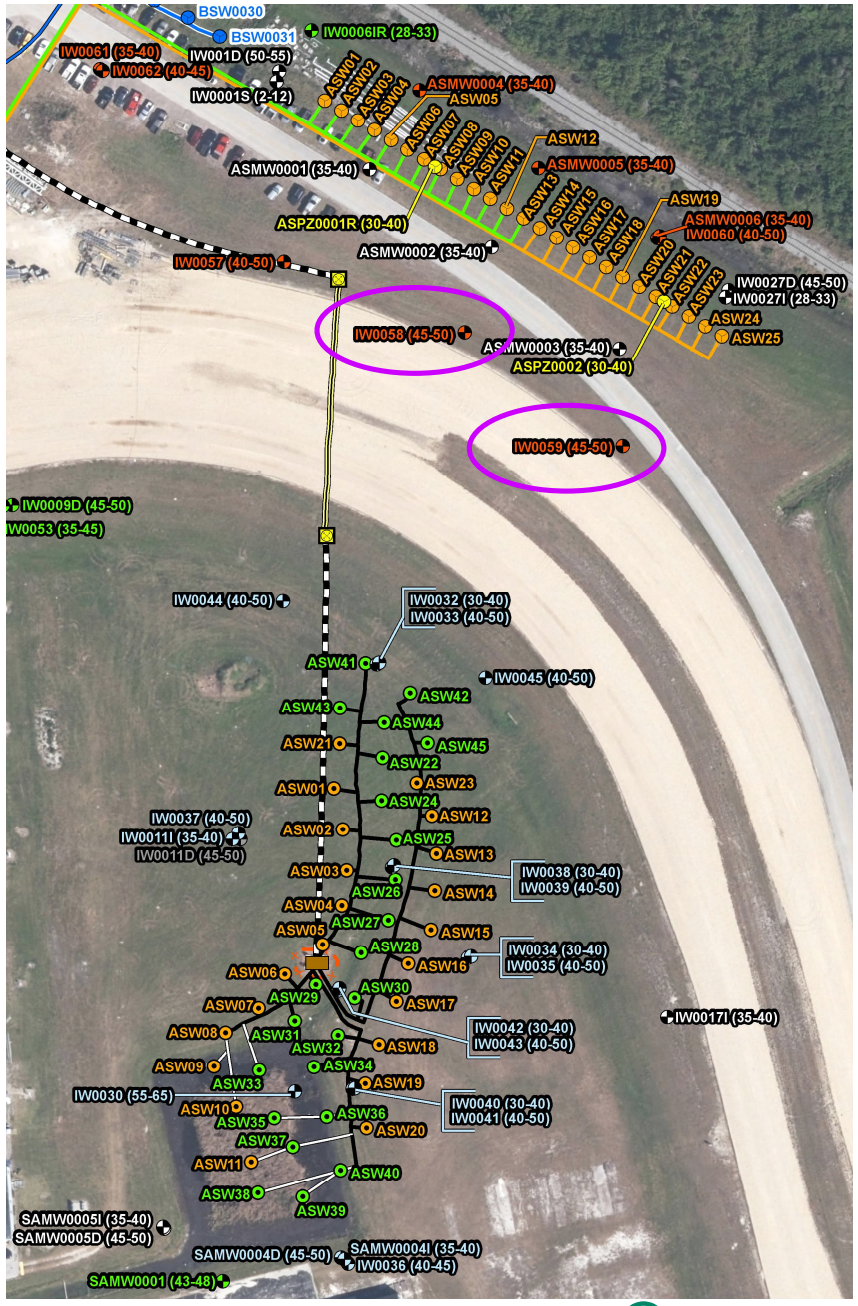
IW0058 (45-50)

- cDCE < GCTL
- VC < NADC and likely decreasing
- Indicates decreasing mass flux and discharge from former HS2 near plume center



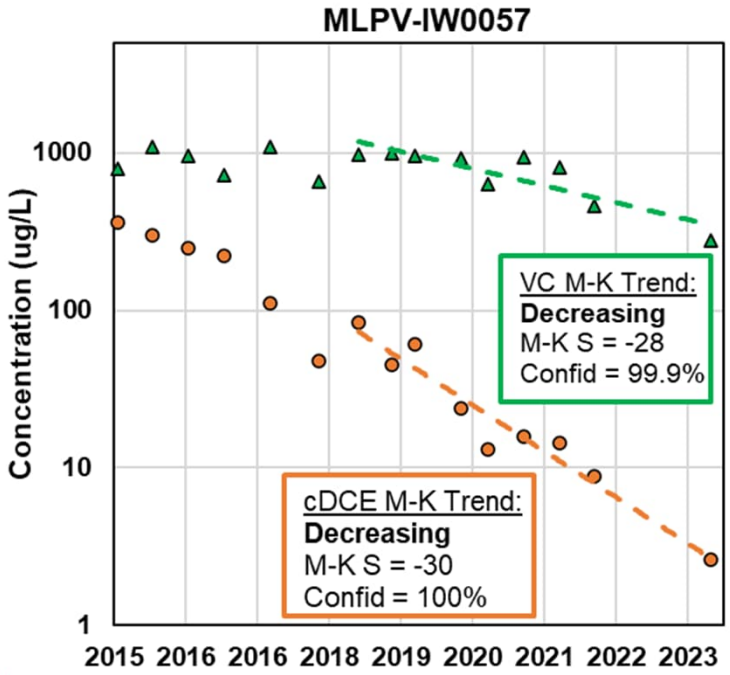
IW0059 (45-50)

- cDCE < GCTL
- VC < NADC and decreasing
- Indicates decreasing and minimal mass flux and discharge from former HS2 near plume eastern boundary



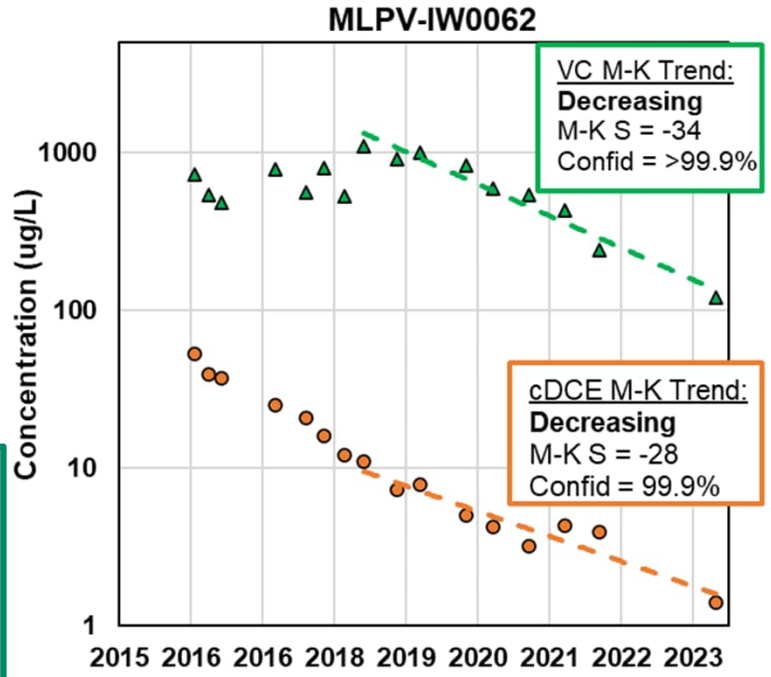
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



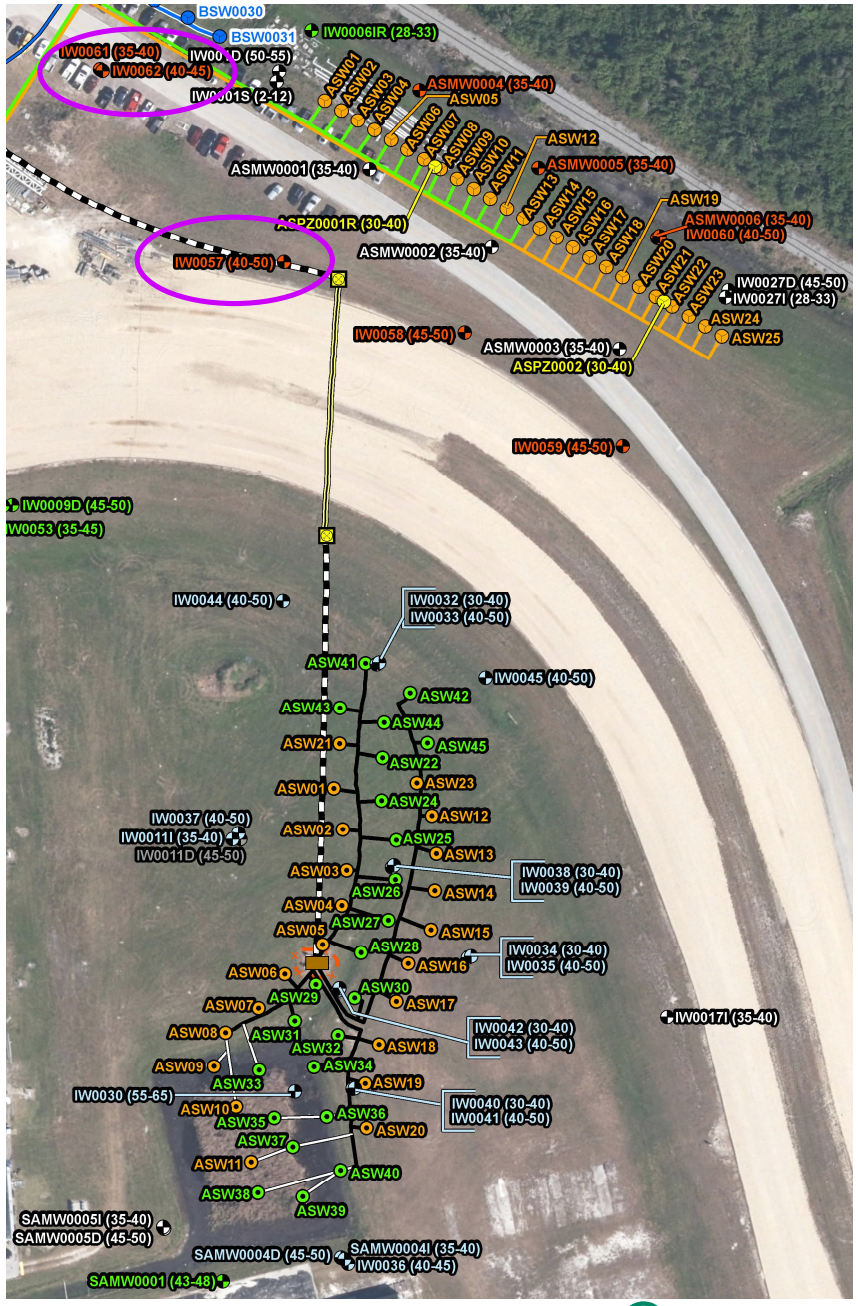
IW0057(40-50) & IW0062(40-45)

- cDCE is ND in 2023
- VC > NADC at IW0057
- VC > NADC at IW0062



Trend Analysis Summary

- Decreasing concentration trends for cDCE and VC indicates mass discharge to biosparge barrier is decreasing
- Greatest mass flux likely near center of biosparge barrier (IW0057 and IW0058)

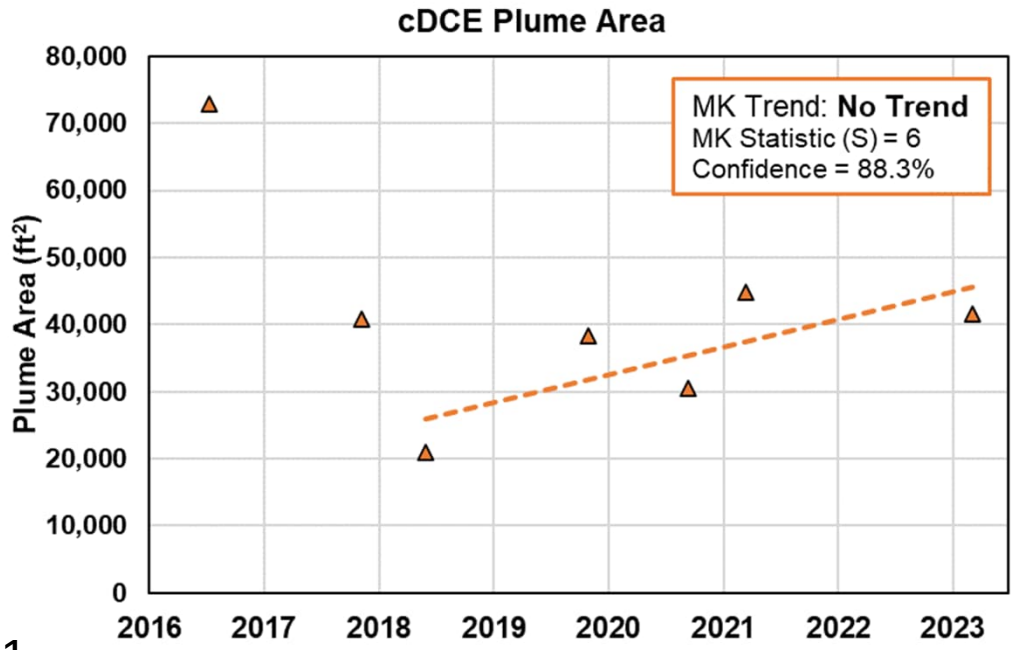


Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

cDCE Trend Analysis Summary (40 to 45 ft bls)

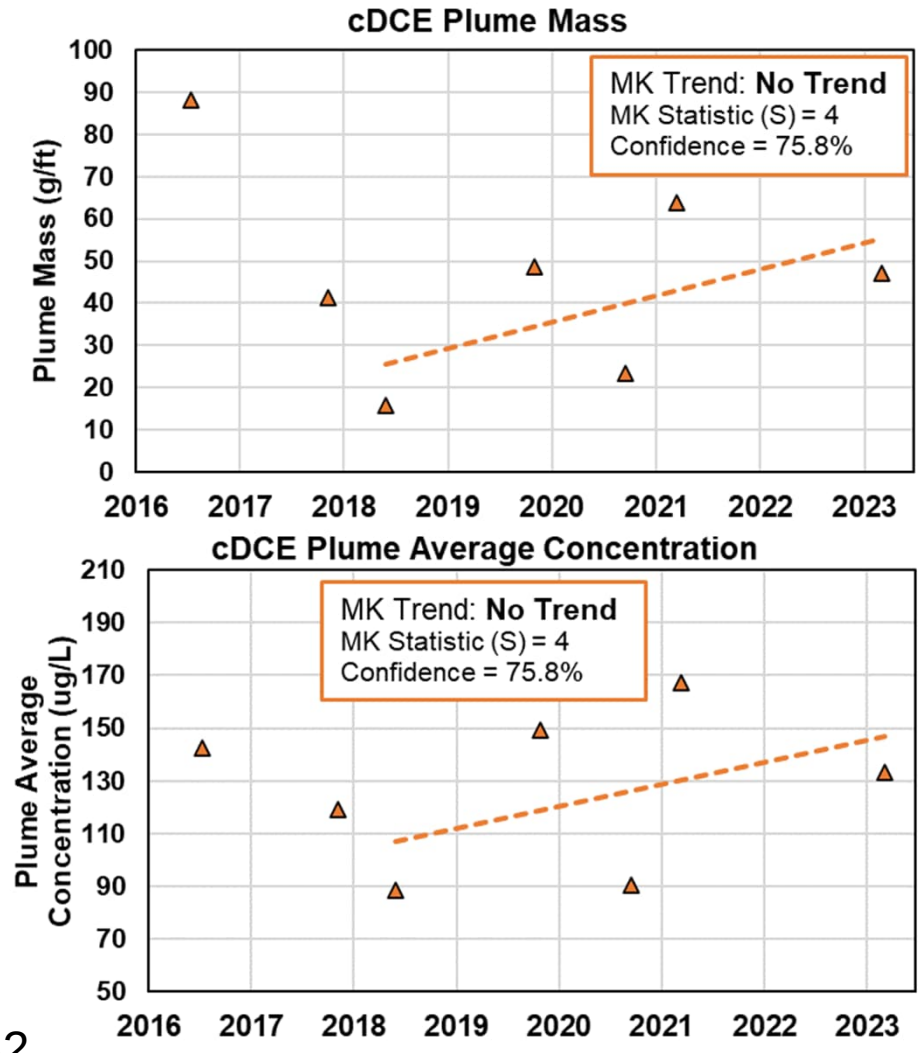
- cDCE < NADC in former HS2 area
- No statistically significant trends in plume area, mass, and average concentration since April 2018
- No significant movement in plume center of mass





Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)



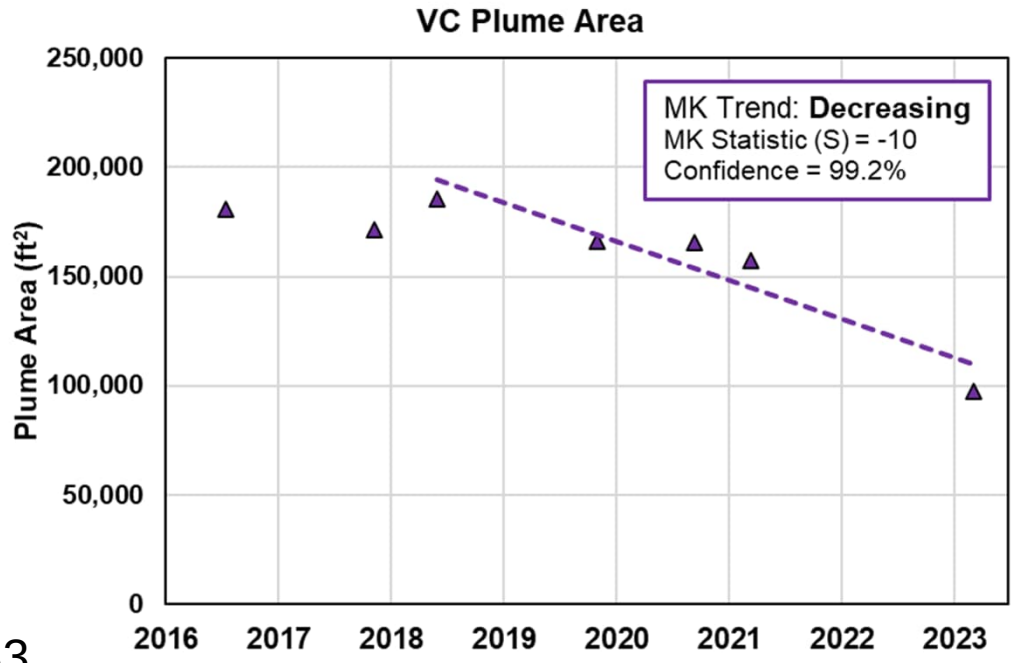


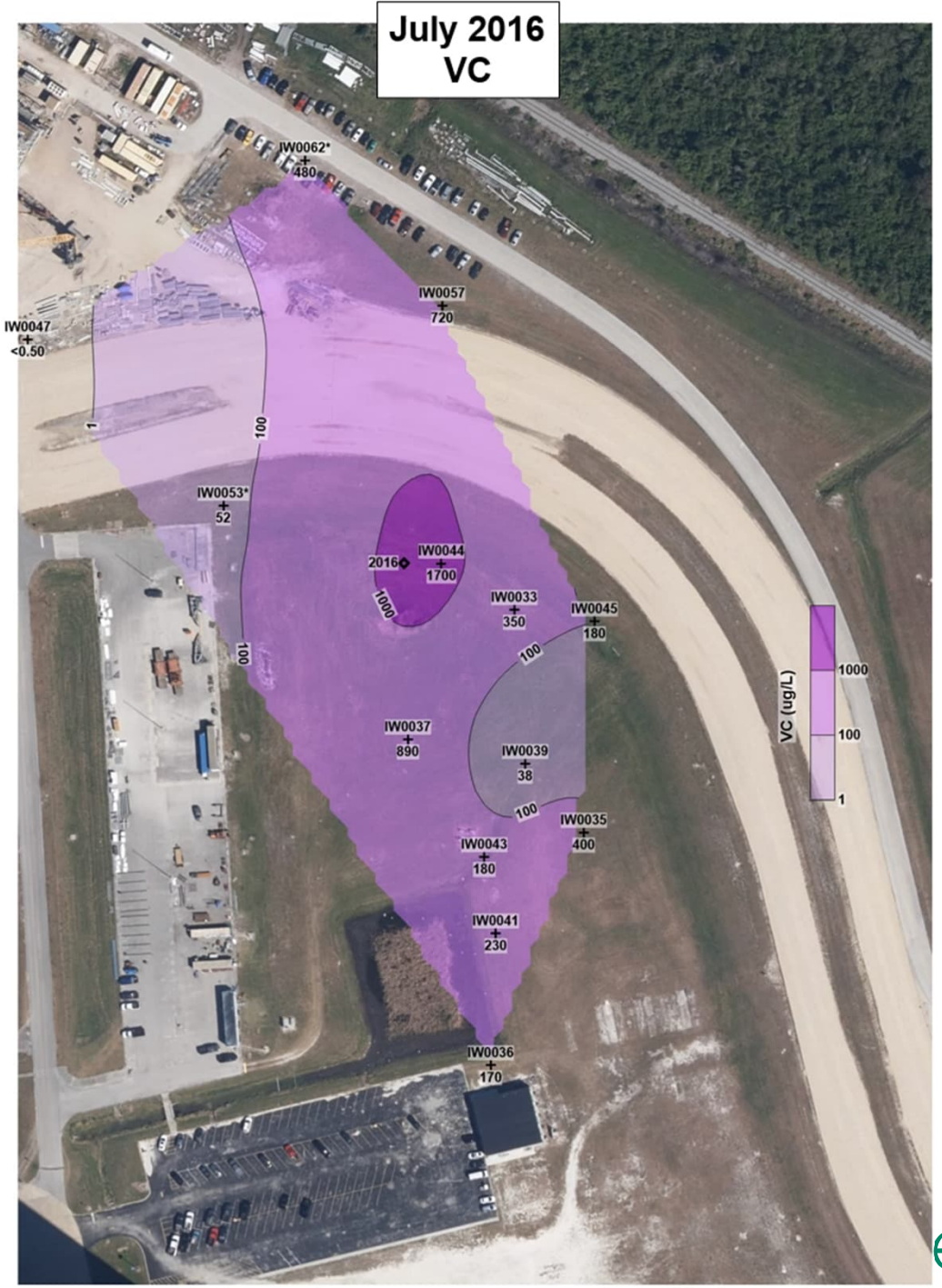
Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)

VC Trend Analysis Summary (40 to 45 ft bls)

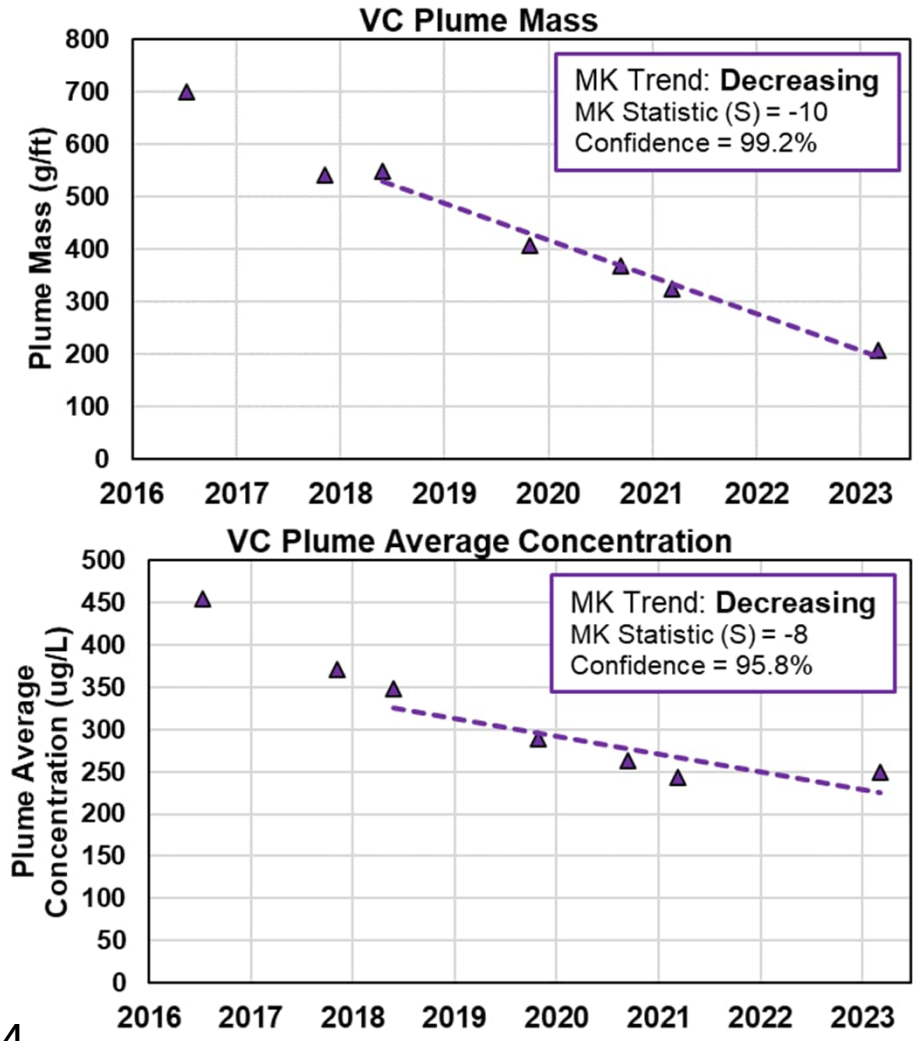
- VC > NADC in former HS2 area
- Decreasing trends in plume area, mass, and average concentration
- Plume center of mass moving opposite direction of groundwater flow (receding)

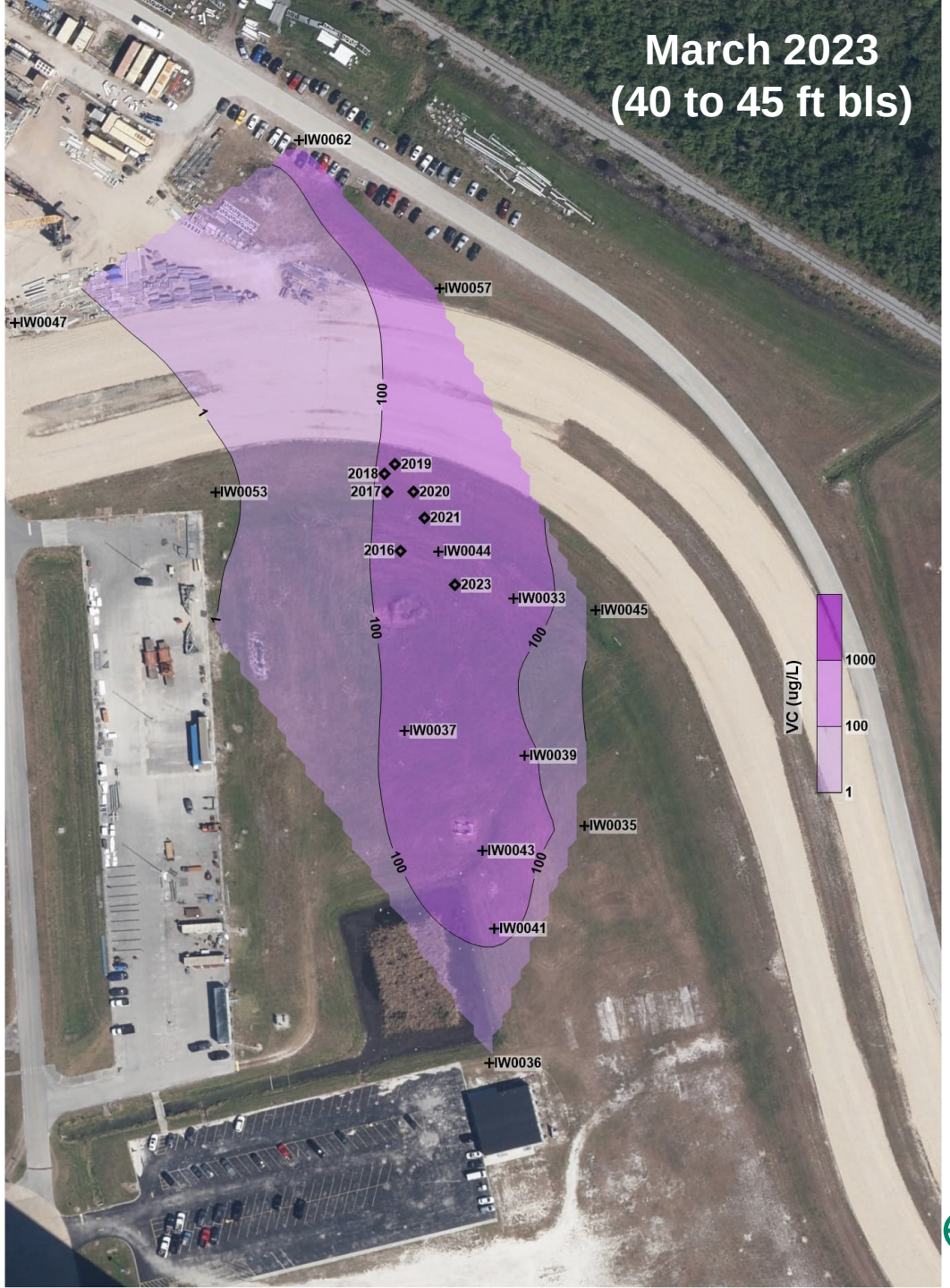




Site Characterization Summary

Relevant Site Conditions for RAE – Update to Plume Behavior (through 2023)





Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes (DPT versus IWs)

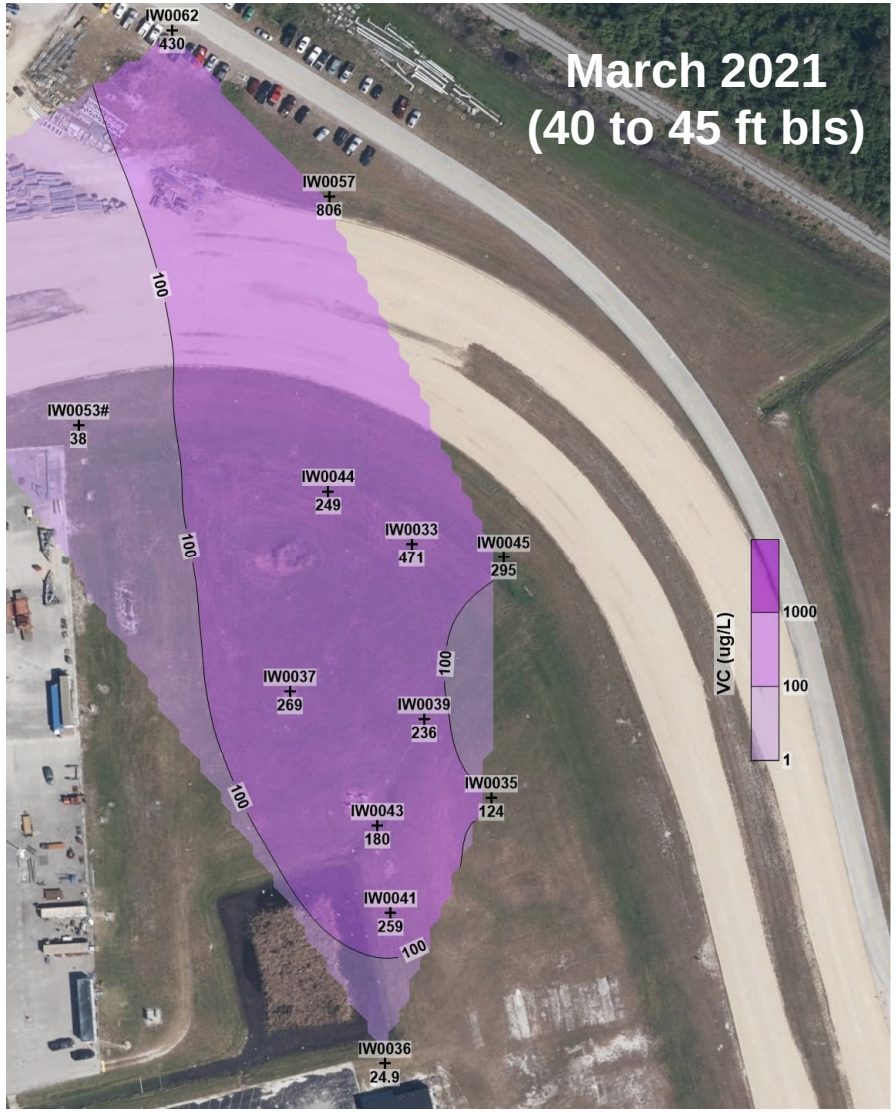


- cDCE concentrations at 2021 DPT and monitoring wells (IWs) generally agree from 40 to 45 ft bls
- 2021 DPT data indicates cDCE GCTL plume is not well defined to southwest by IW monitoring network

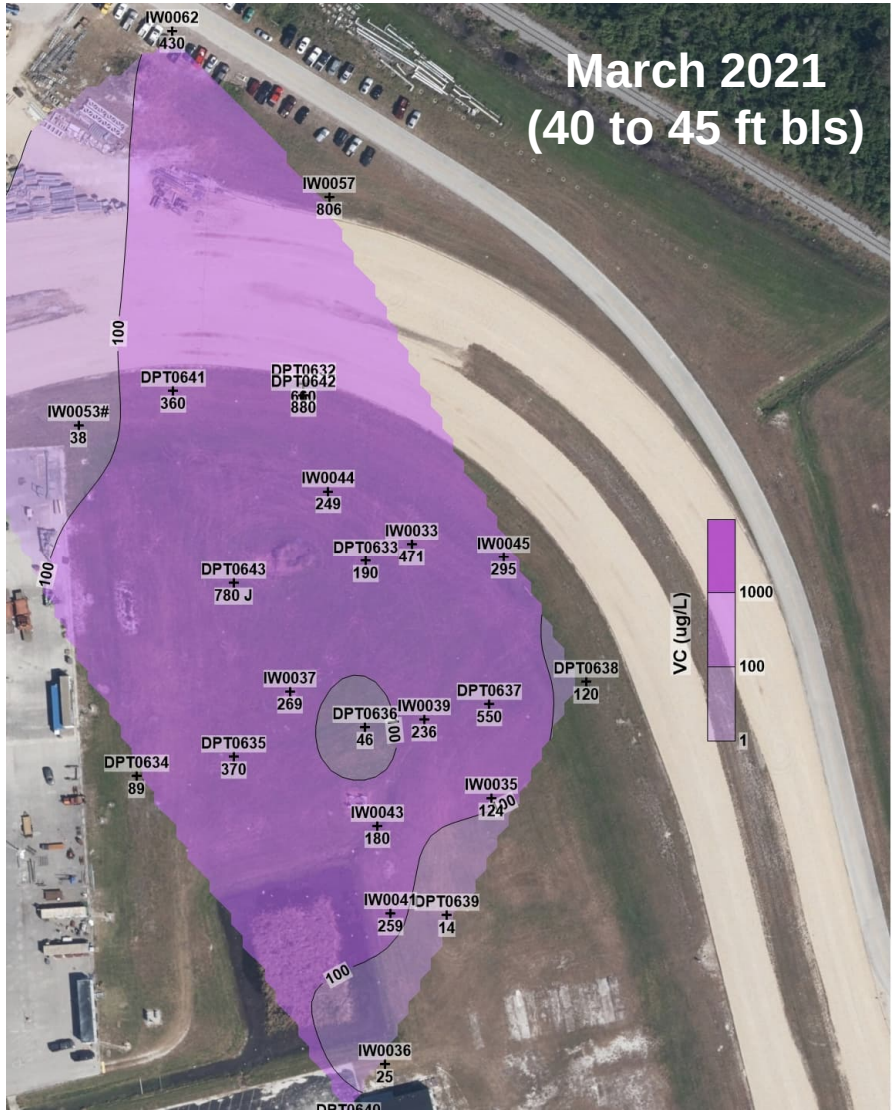


Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes (DPT versus IWs)

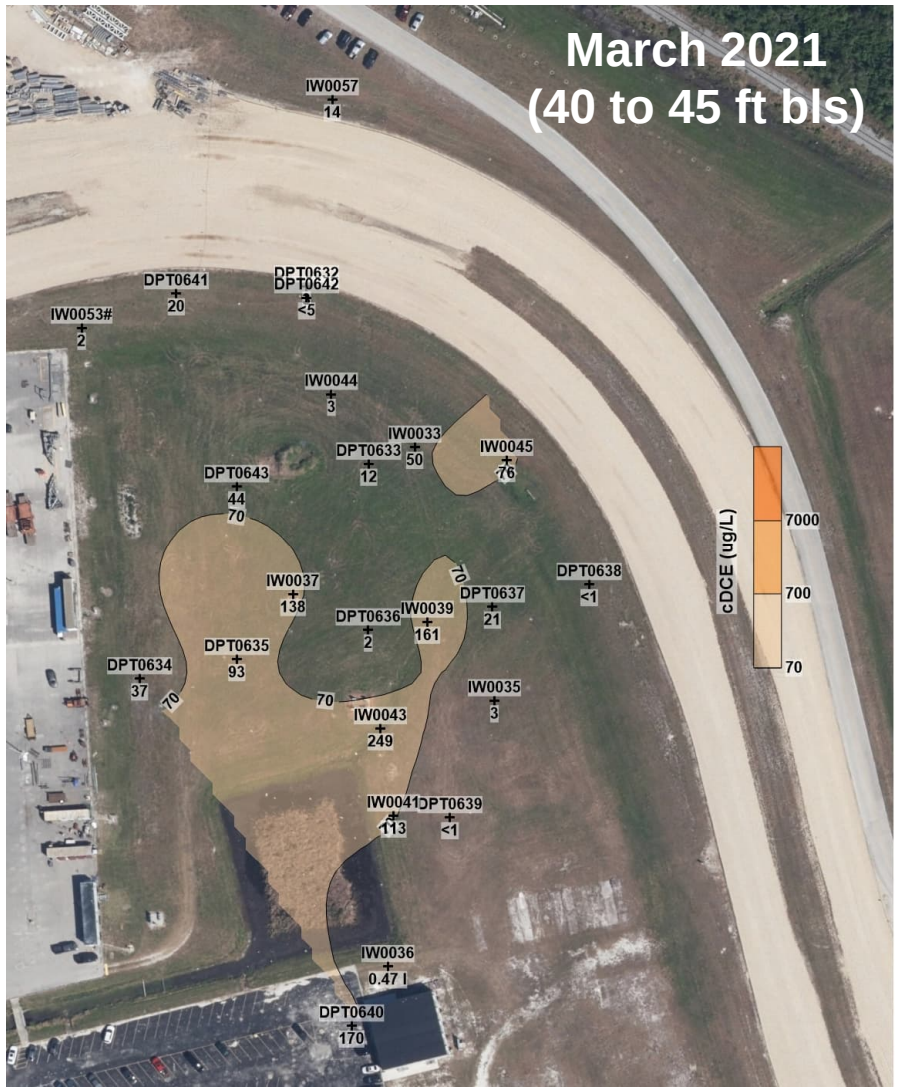


- VC concentrations at 2021 DPT and monitoring wells (IWs) generally agree from 40 to 45 ft bls
- 2021 DPT data indicates VC NADC plume may extend further west than estimated from monitoring network



Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes

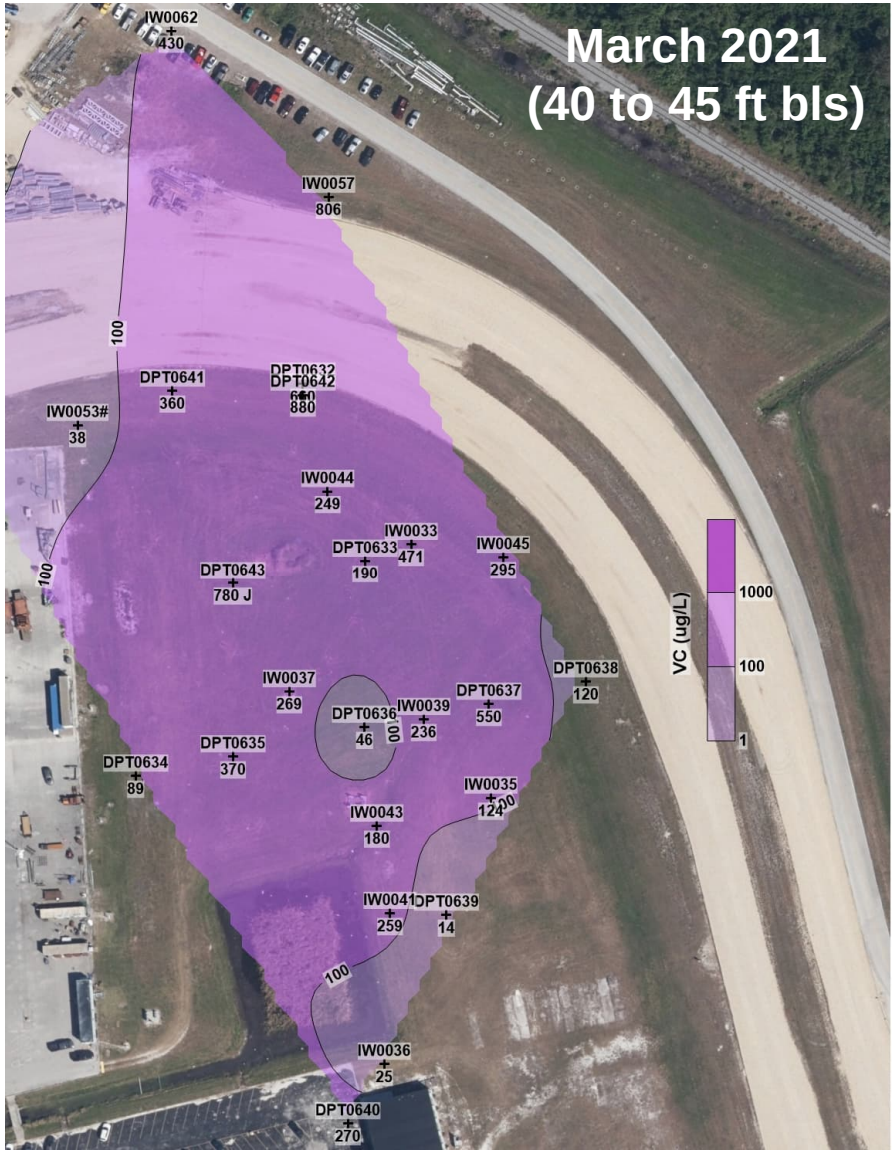


- Extents of cDCE GCTL plumes are similar in sand (40 to 45 ft bls) and clayey sand (45 to 50 ft bls)
- cDCE concentrations in GCTL plume are greater in the clayey sand (45 to 50 ft bls) and is likely current source of cDCE in sand (40 to 45 ft bls) via matrix diffusion

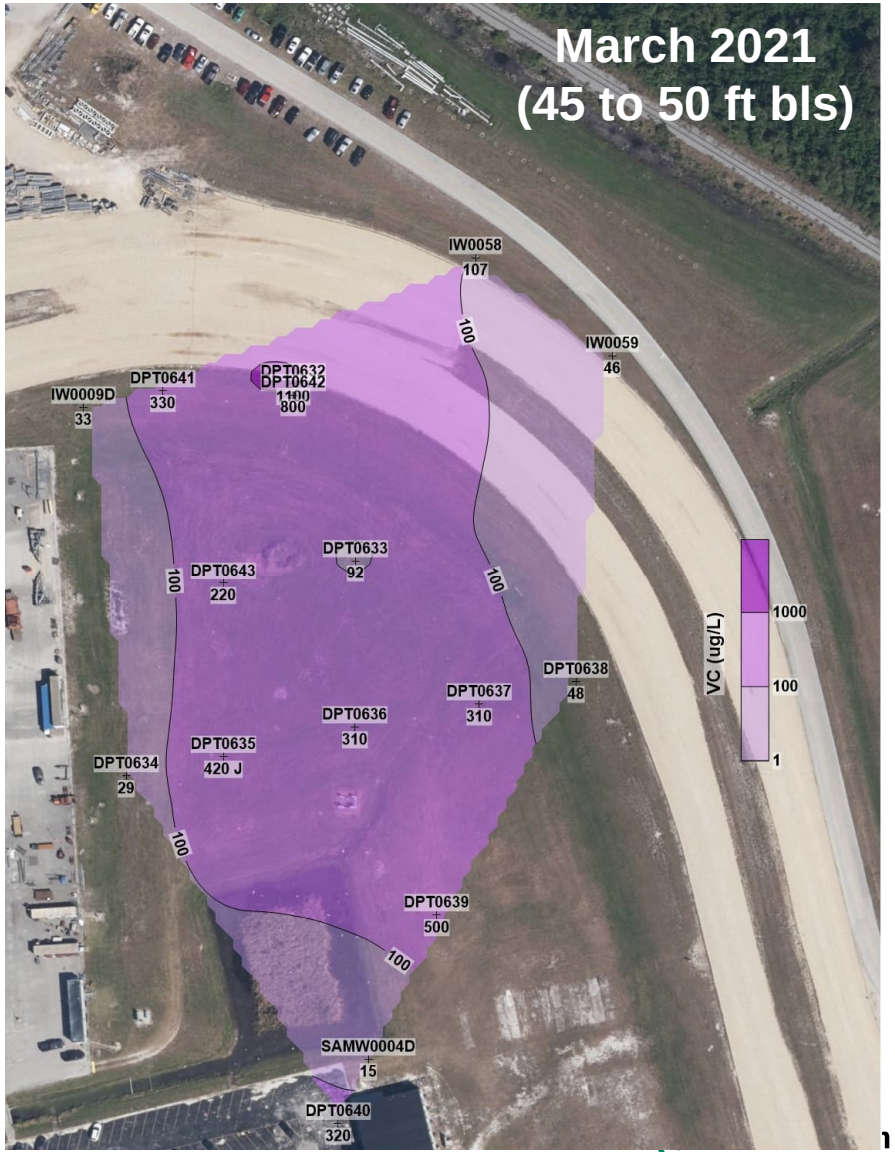


Site Characterization Summary

Relevant Site Conditions for RAE – Groundwater Plumes



- Extents of VC NADC plumes are similar in sand (40 to 45 ft bls) and clayey sand (45 to 50 ft bls)
- VC concentrations in NADC plumes in the clayey sand (45 to 50 ft bls) and sand (40 to 45 ft bls) are similar
- VC in clayey sand is a likely current source of VC in sand



Site Characterization Summary

Conceptual Site Model Summary

- Prior to implementation of Air Sparging in former HS2 area, CVOCs diffused into clayey sand (below 45 ft bls) from primary migration pathway in sands (above 45 ft bls) towards the current biosparge barrier location
- Air Sparging (2012 to 2018)
  - Targeted removal of CVOCs in sand (above 45 ft bls)
  - Enhanced diffusion and removal of CVOCs from clayey sand (below 45 ft bls)
  - Decreased CVOCs mass flux to biosparge barrier
- Following Air Sparging (post 2018)
  - Mass of CVOCs, primarily VC, in sand is attenuating
  - VC mass flux to biosparge barrier is decreasing
  - 2021 DPT investigation showed cDCE and VC mass remains in clayey sand and is the source of VC in the sand via matrix diffusion
  - Although natural attenuation of VC in the sand appears to be greater than the rate of matrix diffusion to the sand from the clayey sand, concentration trends indicate that VC concentrations are expected to remain greater than its NADC and GCTL and require operation of the biosparge barrier for many years

Remedial Alternatives Evaluation

Corrective Action Objective (CAO)

- Reduce VC mass flux from former Hot Spot 2 area and achieve GCTLs upgradient of the biosparge barrier to eliminate need for continued operation of the system, which serves to prevent downgradient migration of concentrations greater than GCTLs.

Technology Screening

- Considerations:
  - Technologies to treat NADC plumes within a lower permeability interval

No Action	No Action	No Activity	Eliminate	Not protective of human health and environment and does not provide for monitoring of effectiveness.
Limited Action	Institutional Controls	Groundwater Use Restrictions	Retain	Land Use Control Implementation Plan (LUCIP) prohibiting groundwater use is already in place. LUCIP is required until cleanup and closure.
	Natural Attenuation	Long-term Groundwater Monitoring	Retain	Statistical analyses indicate plume has been actively attenuating. Natural attenuation can be combined with other technologies to achieve GCTLs.
Containment	Hydraulic Containment	Groundwater Extraction and Treatment	Eliminate	Biosparge barrier is currently containing plume with less capital and long-term costs.
	Physical	Impermeable Barrier	Eliminate	Biosparge barrier is currently containing plume with less capital and long-term costs.
		Air Sparging Barrier	Eliminate	Biosparge barrier is currently containing plume using similar technology.
Removal	Physical Removal	Groundwater Extraction and Treatment	Eliminate	High costs and uncertainty with implementability.
		Soil Vapor Extraction	Eliminate	Not expected to be needed in combination with air sparging.
		Traditional Excavation	Eliminate	Not feasible for dissolved plumes and costs are high.
		Lage Diameter Auger	Eliminate	Not feasible for dissolved plumes and costs are high.
Ex-Situ Treatment	Physical Treatment	Air Stripping	Eliminate	Not needed since groundwater extraction was not retained.
		Adsorption	Eliminate	Not needed since groundwater extraction was not retained.

Technology Screening

- Retained Technologies:
  - Monitored Natural Attenuation
  - In Situ Chemical Reduction (ISCR) with Bioaugmentation
    - Grid
    - Permeable Reactive Barrier(s) (PRB)

In-Situ Treatment	Biological	Anaerobic Enhanced Bioremediation	Eliminate	Enhanced reductive dechlorination (ERD) only will not be retained because of electron donor longevity but will be part of an ISCR alternative.
		Aerobic Enhanced Bioremediation	Eliminate	Air sparging for mass removal is expected to be more effective for similar cost
		Bioaugmentation	Retain	ERD only is not retained, but bioaugmentation will be evaluated with in-situ chemical reduction (ISCR).
	Chemical/Physical	Air Sparging	Eliminate	Previous use at the site was effective. NADC plumes are in lithology with hydraulic conductivity too low for air sparging.
		Large Diameter Augur Mixing	Eliminate	High-cost technology typically implemented in CVOC source areas, not plumes.
		In-Situ Chemical Oxidation (ISCO)	Eliminate	Although CVOC mass would be destroyed, effectiveness may be limited by background oxidant demand and need for multiple injections.
		ISCR	Retain	ISCR along with natural attenuation can be readily implemented to achieve GCTLs. Typically combined with anaerobic enhanced bioremediation.
		Powdered Activated Carbon	Eliminate	Although mass is removed, long-term destruction is uncertain.
		Permeable Reactive Barrier (PRB)	Retain	ISCR PRBs will be evaluated/compared to an ISCR grid approach to achieve GCTLs. A single PRB to mitigate the need of the biosparge barrier will be evaluated.
	Thermal	Electrical Resistance Heating	Eliminate	Technology is better for CVOC source area and high concentrations, not NADC plumes.
Disposal	On-Site	Re-injection Wells	Eliminate	Not retained when groundwater extraction is not retained.

Remedial Alternatives Evaluation

Option	Description	Type
1	**Monitored Natural Attenuation by Long-Term Monitoring (LTM)** • Current remedy for cDCE and VC plumes • Operate biosparge barrier until CAO met	**Least Aggressive**
2	**In Situ Chemical Reduction (ISCR) – Permeable Reactive Barrier (PRB)** • Multiple ISCR PRBs that span NADC plumes (~35 to 47 ft bls) • Natural attenuation between PRBs to achieve GCTLs • Operate biosparge barrier until CAO met	**Aggressive**
3	**ISCR – Grid** • Grid approach in NADC plumes (~40 to 45 ft bls) • Operate biosparge barrier until CAO met	**Most Aggressive**

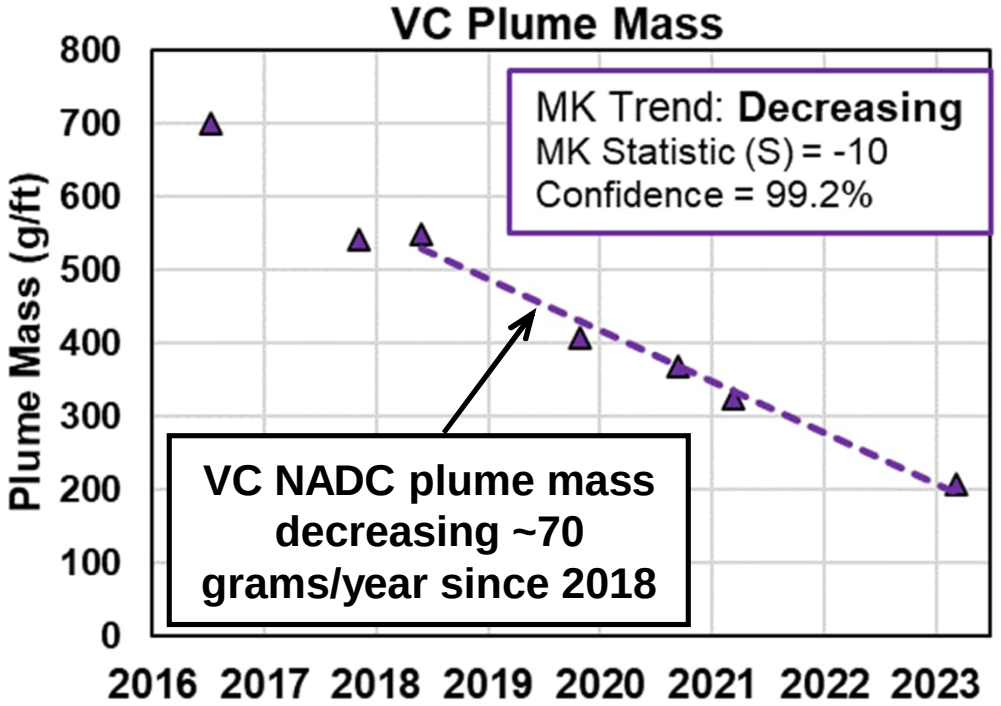
Option 1 – Monitored Natural Attenuation

Natural Attenuation Strategy

- Current site strategy since air sparging stopped in April 2018
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

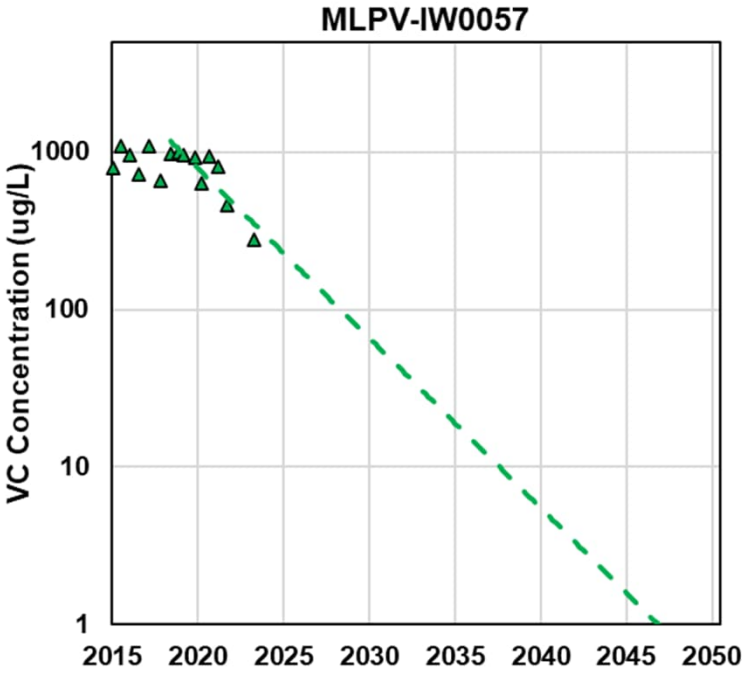
- Review and optimize current monitoring program to support evaluation of LTM
- Review plume metrics and behavior every 1 to 2 years to confirm reduction in dissolved VC plume mass and extent
- Time to achieve CAOs is uncertain

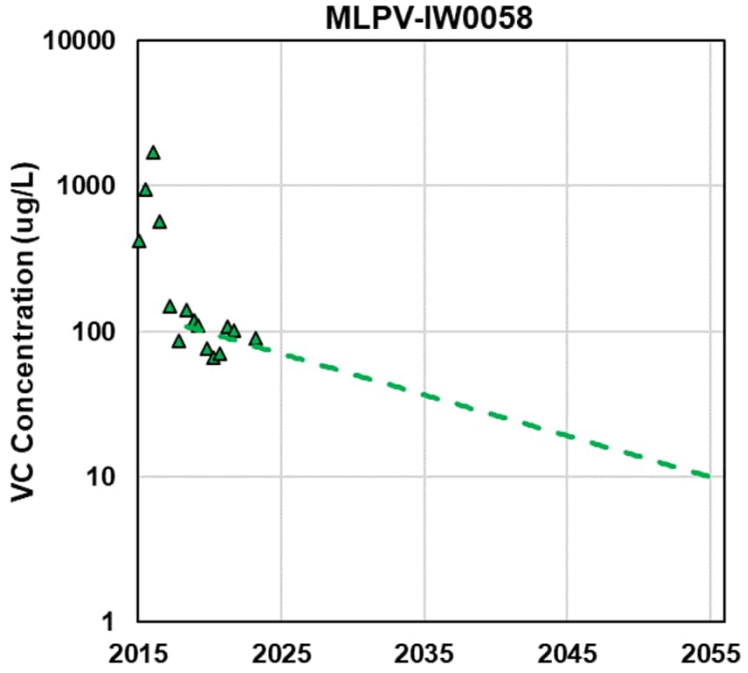


Option 1 – Monitored Natural Attenuation

Implementation

- Time to achieve CAOs at boundary with biosparge barrier is greatest near centerline of VC plume (IW0057 and IW0058)
  - IW0057: VC > NADC, ~20 years to GCTL at current exponential decay trend
  - IW0058: VC < NADC, >30 years to GCTL at current exponential decay trend





Option 2 – ISCR PRBs

ISCR PRB Strategy

- Treat cDCE and VC mass flux in primary migration pathway from 40 to 45 ft bls to decrease mass flux to biosparge barrier
- Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC
- Install PRB in VC NADC plume to decrease mass flux of VC upgradient of biosparge barrier
- Install PRBs in more permeable sand and key into clayey sand (~35 to 47 ft bls)
- cDCE and VC mass to naturally attenuate upgradient of PRBs
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

- Conceptual design for ISCR product, injection spacing, and costs are from recent design of the ISCR remedy in the IMWP for Hot Spot 3
  - ISCR product: Provect-IR (zero-valent-iron, time-released organic carbon, O_2 scavenger, and other)
  - Dosing rate is 0.6% of soil mass (injection rate of 424 pounds per foot of injection interval)
  - Estimated radius of distribution is 15 feet (injection point spacing is 20 feet)
  - No bioaugmentation

Response to Comments

- HGL Comment #4: Slide #45 (new slide #47) – The second bullet refers to cDCE NADC plume. However, the 2021 data described on prior slides did not show cDCE concentrations greater than NADC.
- Tetra Tech Comment #2: Slide #45 (new slide #47) – Second bullet under ISCR PRB Strategy does not agree with site characterization slides (no cDCE NADC plume shown on site characterization slides).
- *Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."*

- Tetra Tech Comment #1: Slides #45 and #47 (new slides #47 and #51) – Bioaugmentation was retained as a technology on Slide 41 (new slide #43). However, there is no mention of this technology being combined with ISCR in Options 2 and 3 or costs associated with it in the attachments. Was bioaugmentation eliminated after further evaluation?
- *Response: Bioaugmentation with a microbial consortia including Dhc was not eliminated but is not included in the conceptual designs for Options 2 and 3. Similar to the ISCR design at Hot Spot 3, bioaugmentation is not included because Dhc is likely present and the primary degradation pathway is expected to be abiotic. However, bioaugmentation can be added, if needed, during the remedial design phase with limited effect on remedy costs. A note was added to the slides to indicate that bioaugmentation is not included.*

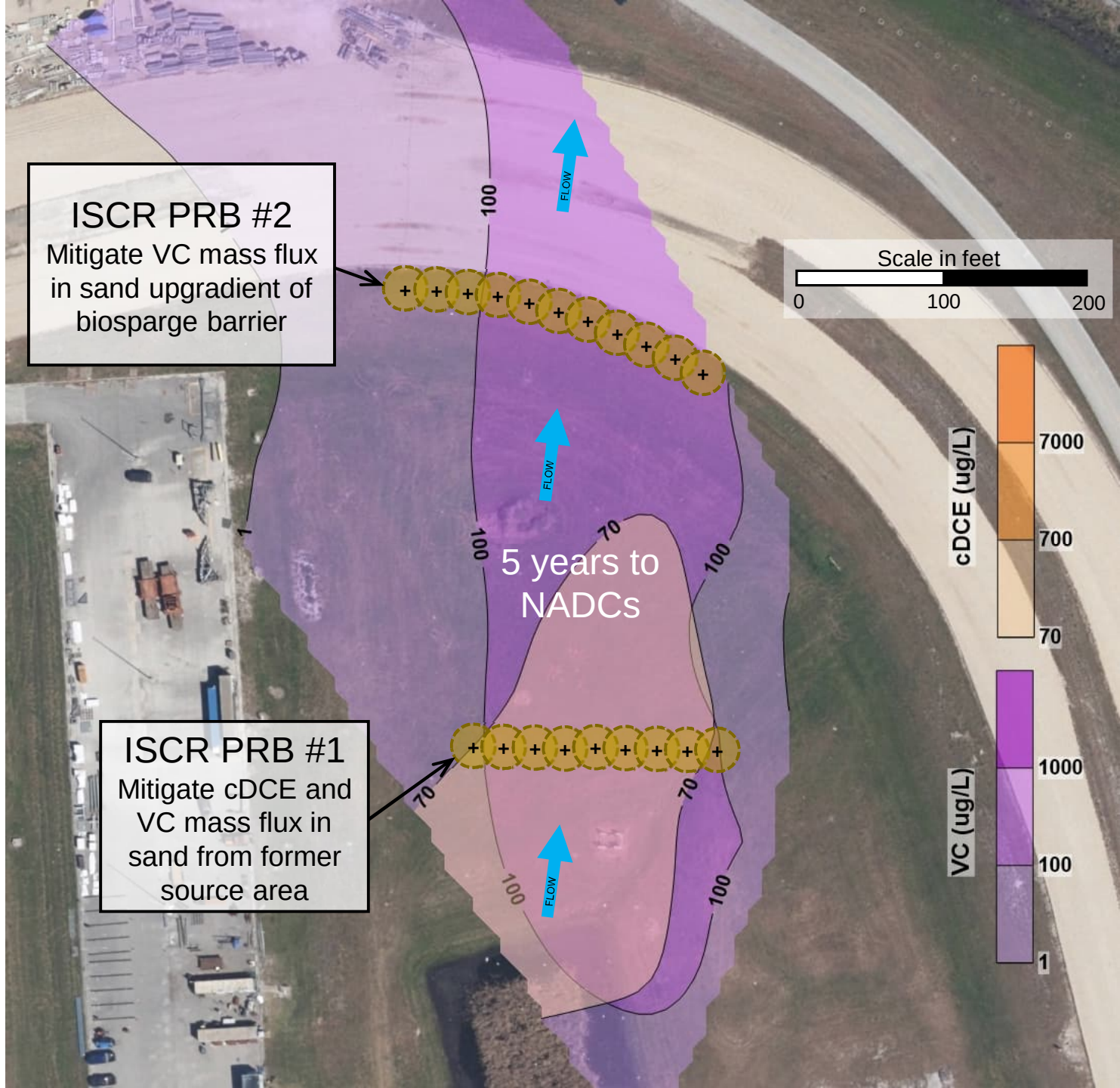
Option 2 – ISCR PRBs

Conceptual Design

- 20 injection points
- 12-foot injection interval (35 to 47 ft bls)
- ~102,000 lbs of Provect-IR
- Direct-push injection in 4-foot intervals
- Treatment lifespan is 5 to 10 years

Time to Achieve CAOs

- 5 years to reach GCTLs at biosparge barrier (~250 feet downgradient of PRB)
  - Depends on travel time between PRB #2 and biosparge barrier (data need),
  - Attenuation rate of CVOCs, and
  - Rate of matrix back-diffusion from clayey sand to sand
- 5 years to reach NADCs in former HS2 area plus 10 years of LTM to achieve GCTLs



Response to Comments

- HGL Comment #5: Slide #46 (new slide #49) – this option assumes 15 years of active treatment by the PRBs. Will the PRBs need to be replenished with amendment during that timeframe?
- Tetra Tech Comment #4: Slide #46 (new slide #49) – Please specify the expected lifespan of the PRBs on this slide. Costing for Option 2 appears to be one injection event to install PRBs. Are the PRBs expected to last through the estimated treatment timeframe (~15 years)?
- *Response: The expected treatment lifespan of the ISCR PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on the slide, the time to achieve the CAO of GCTLs upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.*
- HGL Comment #6: Options 1 and 3: What is the estimated distance between PRB#2 or the downgradient edge of the treatment grid and the current bio barrier?
- *Response: The biosparge barrier injection wells are approximately 250 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3. This distance was added to new slides #49 and #52. Note that the monitoring well network upgradient of the biosparge barrier is approximately 150 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3.*

Option 3 – ISCR Grid

ISCR Grid Strategy

- Treat cDCE and VC mass in primary migration pathway from 40 to 45 ft bls to decrease mass flux to biosparge barrier
- Treats matrix diffusion of cDCE and VC from clayey sand to sand while mass in clayey sand naturally attenuates
- Treatment area is extents of VC NADC plume
- Target treatment interval is permeable sands (~40 to 45 ft bls)
- Requires operation of biosparge barrier until GCTLs are met upgradient of the barrier (downgradient edge of former HS2 area VC plume)

Implementation

- Conceptual design for ISCR product, injection spacing, and costs are from recent design of the ISCR remedy in the IMWP for Host Spot 3
  - ISCR product: Provect-IR (zero-valent-iron, time-released organic carbon, O_2 scavenger, and other)
  - Dosing rate is 0.6% of soil mass (injection rate of 424 pounds per foot of injection interval)
  - Estimated radius of distribution is 15 feet (injection point spacing is 25 feet for grid)
  - No bioaugmentation

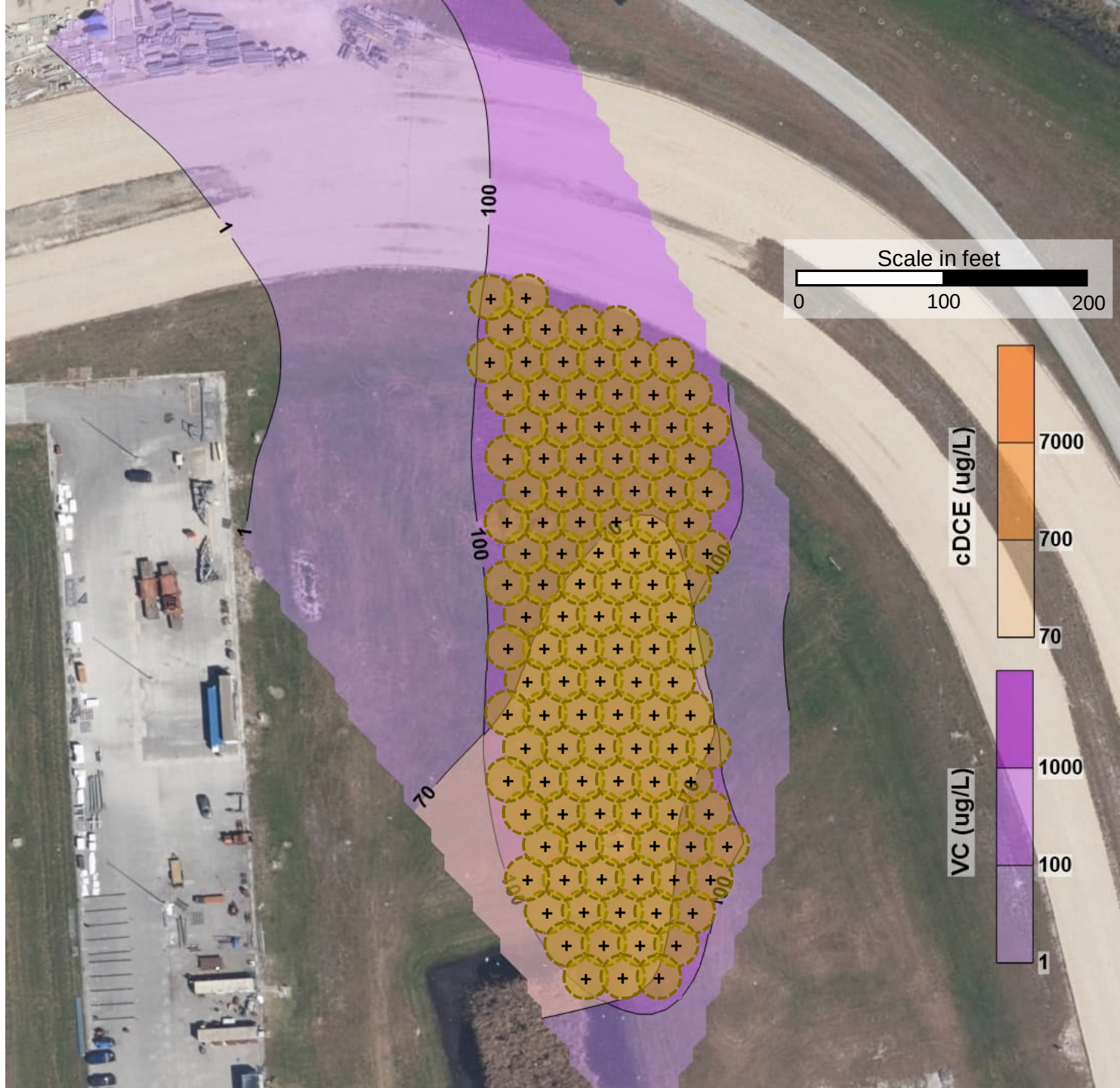
Option 3 – ISCR Grid

Conceptual Design

- 118 injection points
- 5-foot injection interval (40 to 45 ft bls)
- ~250,000 lbs of Provect-IR
- Direct-push injection in 5-foot interval
- Treatment lifespan is 5 to 10 years

Time to Achieve CAOs

- 5 years at biosparge barrier (~250 feet downgradient of grid)
  - Depends on travel time between ISCR grid and biosparge barrier (data need),
  - Attenuation rate of CVOCs, and
  - Rate of matrix back-diffusion from clayey sand to sand
- 2 years to reach NADCs in former HS2 area plus 5 years of LTM to achieve GCTLs



Response to Comments

- Tetra Tech Comment #5: Slides #47 and #48 (new slides #51 and #52) – Third bullet under ISCR Grid Strategy is misleading (“NADC plumes”). Figure on slide 48 (slide 52) shows treatment area extent is the VC NADC plume with overlap of the cDCE GCTL plume.
- *Response: The third bullet was revised on slide #51 to read “VC NADC plume.” The text in the 1st sub-bullet on slide #52 was revised from “PRB #2” to “ISCR grid.”*

Cost Evaluation

Option 1 – LTM

- 20 to 30 years to achieve CAOs (GW monitoring and biosparge system operation)
- Total Cost: **$7.5M to $13.4M** (AS well abandonment, long-term annual costs)

Option 2 – ISCR PRB

- Capital Cost: $535K (design and install PRBs)
- Total Recurring Cost: $2.3M (15 years of GW monitoring, 5 years of biosparge system operation)
- Total: **$2.8M**

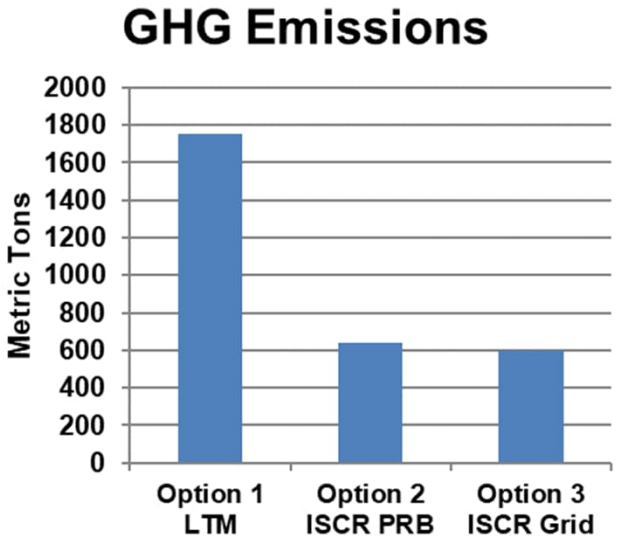
Option 3 – ISCR Grid

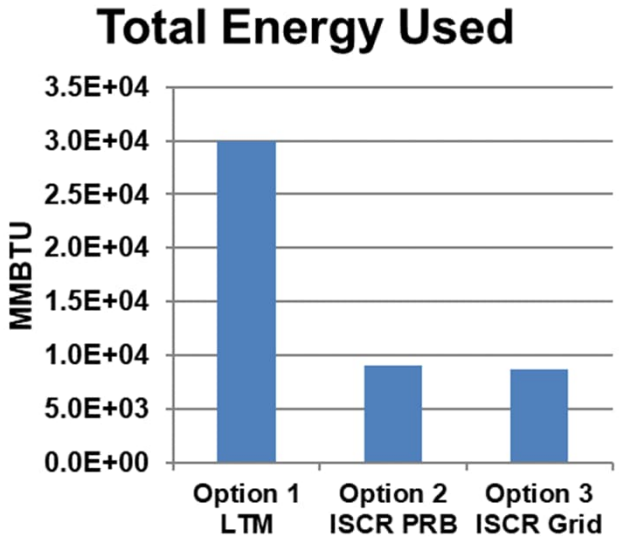
- Capital Cost: $1.1M (design and install grid)
- Total Recurring Cost: $1.6M (7 years of GW monitoring, 5 years of biosparge system operation)
- Total Cost: **$2.7M**

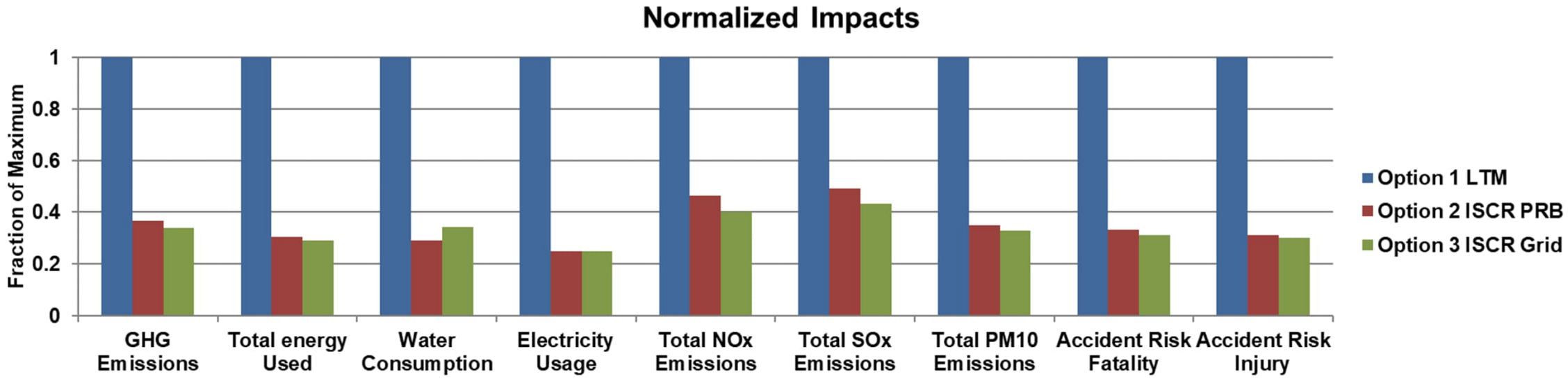
Costs are very sensitive to estimate of time to achieve CAOs.

Sustainability Evaluation

- Evaluation performed with SiteWise™ Version 3.2
- Primary driver in differences between LTM (Option 1) and ISCR (Options 2 & 3) is the difference in time of biosparge system operation (20 years for Option 1 and 5 years for Options 2 & 3)







GHG = greenhouse gas, **MMBTU** = one million British thermal units, **NOx** = Nitrous Oxides, **SOx** = Sulfur Oxides, **PM10** = Particulate matter smaller than 10 micrometers

Comparison of Alternatives

Option	Advantages	Disadvantages	Limitations	Expectations	Cost	Sustainability
1 – LTM	• Current strategy • No capital cost • Plumes are attenuating	• Time to achieve CAOs is uncertain and primarily driven by matrix diffusion, which is difficult to model • Does not actively reduce mass flux to shorten time to achieve CAOs	• Annual costs are high and the time to achieve CAOs is likely long (20 to 30 years)	• 20 to 30 years to achieve CAOs • Time to achieve CAOs could be shorter or longer	$7.5 to $13.4M	• Greatest GHG emissions, total energy use, water impacts, and electricity use
2 – ISCR PRB	• Actively treats and reduces lateral mass flux towards biosparge barrier • PRB design/location can be optimized to shorten time to operate biosparge barrier • Achieves CAOs faster than LTM only	• Does not actively mitigate vertical mass flux from clayey sand; thus, time to achieve CAOs in former HS2 area is uncertain • Time to achieve GCTLs at biosparge barrier uncertain	• May cause changes in groundwater flow • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Strategically located PRB can achieve GCTLs at biosparge barrier in <5 years • Time to achieve CAOs in former HS2 area is likely less than LTM	$2.8M	• Lower GHG emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar
3 – ISCR Grid	• Actively treats and reduces lateral mass flux towards biosparge barrier • Actively treats and reduces vertical mass flux from clayey sand • Achieves CAOs faster than other options	• Highest capital cost • Temporary disruption to property use	• Subsurface utilities may limit treatment area • Treatment life expectancy needs to exceed time for vertical mass flux to attenuate	• Time to achieve GCTLs at biosparge barrier <5 years (like PRB) • Rapid treatment and CAOs in former HS2 area (2 years) • LTM outside current NADC plume (~5 years)	$2.7M	• Lower GHG emissions, total energy use, water impacts, and electricity use • Options 2 &3 are similar

Data Needs

Primary evaluation factors that determined advantages of options

- Timeframe of annual recurring costs for groundwater monitoring and operation of the biosparge system
- Additional data collection can support various methods to model time to achieve the CAOs
  - Matrix diffusion rate of cDCE and VC from clayey sand (below 45 ft bls) to sand (above 45 ft bls)
  - Attenuation rate of cDCE and VC in clayey sand
  - Model fate and transport of VC that includes matrix diffusion
    - REMChlor-MD (plume centerline) may reduce uncertainty in timeframe but may provide a range of times instead of a discrete result
    - Spatial heterogeneity in lithology and matrix diffusion may be to complex for plume centerline models (i.e. REMChlor-MD)

Recommendation and Proposed Path Forward

Option 2 – ISCR PRB is the recommended remedial alternative based on

- PRB locations and designs can be optimized to treat spatial and vertical variability in mass flux
- Significantly decreases operation time from ~20 years to 5 years for the biosparge system and associated costs
- Less interruption to current property use
- No maintenance of active equipment (groundwater monitoring only)
- Expected to have better implementability than ISCR Grid (Option 3) because of potential underground utilities/obstruction within the former HS2 NADC footprint

Path Forward

- Develop scope of work to collect data that supports modeling fate and transport with matrix diffusion
- Develop model to evaluate ISCR PRB alternative and effect of matrix diffusion on time to achieve CAOs
- Continue to monitor and evaluate natural attenuation in the sand (above 45 ft bls)

Test Consensus

1. Option 2 ISCR PRB is the recommended remedial alternative to achieve CAOs
2. Model the fate and transport of VC at the site
   - to develop optimal design for the ISCR remedy to manage matrix diffusion
   - to support cost evaluation and confirm shorter remediation timeframe for ISCR alternatives

Response to Comments

- Tetra Tech Comment #6: Slide #54 (new slide #59) – The consensus statements appear conflicting as currently written. Statement 1 recommends the selection of Option 2. However, statement 2 states the fate and transport model will support selection and optimal design of an ISCR remedy, which suggests the best ISCR remedy option is not yet determined. It is understood that Option 2 is more desirable for several reasons as stated on slide #53 (new slide #58). Will the selected alternative be reevaluated following the fate and transport modeling and prior to IM Work Plan preparation? If not, consider revising the first sub-bullet of Statement 2.
- *Response: The first sub-bullet of Statement 2 was revised to state that the modeling will be performed "to develop optimal design for the ISCR remedy to manage matrix diffusion." This revision is made to clarify that the modeling effort will be used to optimize the design of Option 2.*

Attachments

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Common Cost Elements for Remedial Alternative Options

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Biosparge Area Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 63,000	$ 315,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 73,000	$ 365,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 85,000	$ 425,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 99,000	$ 495,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 114,000	$ 570,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 133,000	$ 665,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,835,000	
Former Hot Spot 2 Groundwater Monitoring & Reporting						
	Average Annual Cost Years 1-5	5	YEAR	$ 65,000	$ 325,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 75,000	$ 375,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 87,000	$ 435,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 101,000	$ 505,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 118,000	$ 590,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 136,000	$ 680,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 2,910,000	
Biosparge System Operation & Maintenance						
	Average Annual Cost Years 1-5	5	YEAR	$ 169,000	$ 845,000	Current SOW and 3% annual increase
	Average Annual Cost Years 6-10	5	YEAR	$ 196,000	$ 980,000	Current SOW and 3% annual increase
	Average Annual Cost Years 11-15	5	YEAR	$ 227,000	$ 1,135,000	Current SOW and 3% annual increase
	Average Annual Cost Years 16-20	5	YEAR	$ 264,000	$ 1,320,000	Current SOW and 3% annual increase
	Average Annual Cost Years 21-25	5	YEAR	$ 306,000	$ 1,530,000	Current SOW and 3% annual increase
	Average Annual Cost Years 26-30	5	YEAR	$ 355,000	$ 1,775,000	Current SOW and 3% annual increase
				30 Year Subtotal	$ 7,585,000	

Remedial Alternative Option #1 - Monitored Natural Attenuation by Long-term Monitoring (LTM)

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Low-End of Cost Range (20 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,640,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 20				$ 4,280,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 20				$ 1,600,000	See above average annual common cost elements
				Subtotal	$ 7,547,000	
High-End of Cost Range (30 Years)						
Air Sparge Well Abandonment	Year 1 AS well abandonment	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Former HS2 Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,910,000	See above average annual common cost elements
Biosparge System O&M	Years 1 through 30				$ 7,585,000	See above average annual common cost elements
Biosparge Area Groundwater Monitoring & Reporting	Years 1 through 30				$ 2,835,000	See above average annual common cost elements
				Subtotal	$ 13,357,000	

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Remedial Alternative Option #2 - In Situ Chemical Reduction Permeable Reactive Barrier

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	102,000	LB	$ 2.40	$ 244,800	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 8,000	$ 8,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 20 injection points	15	DAY	$ 4,150	$ 62,250	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	16	DAY	$ 650	$ 10,400	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	16	DAY	$ 250	$ 4,000	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	17	DAY	$ 2,000	$ 34,000	Engineering Estimate
				Subtotal	$ 394,950	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	120	HOUR	$ 150	$ 18,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 81,000	
				Total Capital Cost	$ 534,800	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 5 years to achieve NADCs plus 10 years to achieve GCTLs				$ 1,135,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 2,305,000	
				Option #2 Total	$ 2,839,800	

Estimated Costs for Remedial Alternatives Evaluation
Mobile Launcher Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB): Former Hot Spot 2

Remedial Alternative Option #3 - In Situ Chemical Reduction Grid

Item	Description	Quantity	Unit	Unit Cost	Total Cost	Estimate Basis
Capital Costs						
Site Preparation						
Site Preparation and Mobilization	Miscellaneous site preparation	1	EACH	$ 4,500	$ 4,500	Engineering Estimate
GPR Survey	Ground penetrating radar (GPR) survey of site	1	EACH	$ 1,500	$ 1,500	Engineering Estimate
Air Sparge Well Abandonment	AS well abandonment to eliminate preferential pathways	1	EACH	$ 27,000	$ 27,000	Estimate from EarthTech Quote (2023)
Injection Point Locations and GPR Survey Oversight	Mark injection point locations and oversight of GPR survey to clear/revise injection point locations	1	EACH	$ 1,600	$ 1,600	Engineering Estimate
				Subtotal	$ 34,600	
ISCR Injection						
Provect-IR60® ISCR Amendment	Purchase IR60 amendment	250,000	LB	$ 2.40	$ 600,000	Provectus email 10/2022
Shipping - ISCR Amendment	Shipping for IR60 amendment	1	EACH	$ 60,000	$ 60,000	Engineering Estimate
Mobilization/Demobilization	Mob/demob of ISCR injection equipment plus setup and breakdown	1	EACH	$ 20,000	$ 20,000	Estimate from Cascade quote (9/2022), TX site
Injection Services	Inject IR60 118 injection points	40	DAY	$ 4,150	$ 166,000	Estimate from Cascade quote (9/2022), TX site
Per Diem	Per diem for injection services contractor	40	DAY	$ 650	$ 26,000	Estimate from Cascade quote (9/2022), TX site
Fork Lift Rental	Fork lift for unloading super sacks and staging for mixing	41	DAY	$ 250	$ 10,250	Estimate from Cascade quote (9/2022), TX site
Reporting and HASP - Injection Contractor		1	EACH	$ 1,500	$ 1,500	Estimate from Cascade quote (9/2022), TX site
Remediation Management/Oversight	Oversight and management of ISCR injection implementation	42	DAY	$ 2,000	$ 84,000	Engineering Estimate
				Subtotal	$ 967,750	
Post ISCR Injection						
Monitoring Well Installation - DPT	Installation, development, and surveying of perfromance monitoring wells	5	EACH	$ 3,500	$ 17,500	Engineering Estimate, Enviornmental Drilling Services Estimate (10/2022)
Initial Groundwater Sampling	Collection and analysis of groundwater samples from new monitoring wells	1	EACH	$ 6,750	$ 6,750	Engineering Estimate
				Subtotal	$ 24,250	
Engineering Design, Management, and Reporting Costs						
Project Engineering/Management Support	Project coordination, health and safety, meetings, telephone conferences, progress reports, administrative support, permits	200	HOUR	$ 150	$ 30,000	Engineering Estimate
Implementation Work Plan	Implementation Work Plan per NASA Engineering Evaluation process	1	EACH	$ 30,000	$ 30,000	Engineering Estimate
Construction Completion Report	Summary of project implementation	1	EACH	$ 18,000	$ 18,000	Engineering Estimate
Advance Data Package (ADP)	ADP preparation and presentation of CCR	1	EACH	$ 15,000	$ 15,000	Engineering Estimate
				Subtotal	$ 93,000	
				Total Capital Cost	$ 1,119,600	
Post-Implementation Costs						
Former HS2 Groundwater Monitoring & Reporting	Assume 2 years to achieve NADCs plus 5 years to achieve GCTLs				$ 475,000	
Biosparge System O&M	Assume 5 years to achieve GCTLs				$ 845,000	
Biosparge Area Groundwater Monitoring & Reporting	Assume 5 years to achieve GCTLs				$ 325,000	
				Subtotal	$ 1,645,000	
				Option #2 Total	$ 2,764,600	

Remedial Technology Screening for Hot Spot 2
Mobile Launch Platform Rehabilitation Sites and the Vehicle Assembly Building Area (MLP/VAB) – SWMU 056
NASA Kennedy Space Center

General Response Action	Remedial Technology	Process Option	Technology Description	Effectiveness (Achieve/Maintain GCTLs and Reliability) Poor, Moderate, or Good	Implementability (Technical and Administrative) Poor, Moderate, or Good	Relative Cost Low, Moderate, or High	Screening Comments Retained or Not Retained
No Action	No Further Action	No Further Action	No actions	**Poor**. Relies on natural attenuation to achieve groundwater cleanup target levels (GCTLs).	**Poor**. Action is required for administrative approval.	**None**.	**Not Retained**. Not protective and does not provide for monitoring of effectiveness.
Limited Actions	Institutional Controls (ICs)	Groundwater Use Restrictions	Groundwater exposure pathway controlled with administrative measures.	**Moderate**. Relies on administrative measures to limit exposure to contaminated groundwater. ICs expected to be effective short-term but must be maintained to provide long-term effectiveness.	**Good**. Land Use Control Implementation Plan (LUCIP) is already in place prohibiting groundwater use including limitations on groundwater development and reuse for the area.	**Low**.	**Retained**. LUCIP required until area achieves cleanup and closure.
	Monitored Natural Attenuation	Long-term Groundwater Monitoring /Analysis to Monitor Naturally Occurring Processes	Contaminants in groundwater attenuate over time through natural physical, chemical, and biological processes.	**Moderate**. Although concentrations of cDCE and VC are greater than NADCs, the VC plume is generally decreasing. The time to achieve GCTLs is uncertain and will require continued operation of the biosparge barrier.	**Good**. Current groundwater monitoring program is evaluating natural attenuation.	**Low**. Long attenuation timeframe will require extended monitoring and reporting duration.	**Retained**. Natural attenuation is occurring. The time to achieve GCTLs is uncertain. Natural attenuation can be combined with other technologies to achieve GCTLs.
Containment	Hydraulic Containment	Groundwater Extraction and Treatment	Extract groundwater near downgradient edge of plume to mitigate groundwater and mass flux to biosparge barrier. Requires ex situ treatment of groundwater.	**Poor**. Could effectively mitigate mass flux of plume and eliminate need for biosparge barrier over time. However, long timeframe needed for natural attenuation to achieve natural attenuation default criteria (NADCs) / GCTLs in area.	**Moderate**. Required extraction rates and number of wells is uncertain to capture/contain chlorinated volatile organic compounds (CVOCs) plume in soil matrix between 45 and 50 ft bls.	**High**. Capital costs for extraction wells, treatment system, and injection wells/trench. Long-term operation and maintenance (O&M) costs.	**Not Retained**. Biosparge barrier is currently containing plume with less capital and long-term costs.
	Physical	Impermeable Barrier	Construct hydraulic barrier from groundwater table to about 45 ft bls near edge of plume to mitigate groundwater and mass flux to biosparge barrier.	**Poor**. Although a barrier could effectively mitigate groundwater and mass flux in sand, matrix diffusion to sand would continue. Long timeframe needed for natural attenuation to achieve NADCs/GCTLs in low permeability layer.	**Poor**. Barrier could be installed via in situ soil stabilization using LDAs or one-pass trenching technology. Length of barrier may be large and cause changes to groundwater flow directions and potentially cause different plume migration.	**High**. Capital costs for barrier installation.	**Not Retained**. Biosparge barrier is currently containing plume with less costs.
		Air Sparging Barrier	Inject air to promote partitioning of CVOCs to air along a treatment transect to mitigate downgradient mass flux.	**Moderate**. Air sparge transect could stop mass flux and shorten operation time for biosparge barrier. Air sparge transect would have to operate for long time until NADCs/GCTLs are achieved upgradient.	**Moderate**. Lots of experience with air sparge wells in the area to 45 ft bls.	**Moderate**. Capital costs for air sparge wells and system. Long-term O&M costs.	**Not Retained.** Biosparge barrier is currently containing plume using similar technology.
Removal	Physical Removal	Groundwater Extraction and Treatment	Extract groundwater plume with series of wells along centerline of NADC plume. Requires ex situ treatment of groundwater.	**Moderate**. Could effectively shrink NADC plume primarily located in sand (above 45 ft bls), but timeframe may be long. Matrix diffusion and discharge from clayey sand below 45 ft bls could increase remediation timeframe.	**Moderate**. Required extraction rates and number of wells is uncertain to shrink CVOCs plume.	**High**. Capital costs for extraction wells, treatment system, and injection wells/trench. Long-term O&M costs.	**Not Retained**. High costs and uncertainty with implementability.

General Response Action	Remedial Technology	Process Option	Technology Description	Effectiveness (Achieve/Maintain GCTLs and Reliability) Poor, Moderate, or Good	Implementability (Technical and Administrative) Poor, Moderate, or Good	Relative Cost Low, Moderate, or High	Screening Comments Retained or Not Retained
		Soil Vapor Extraction (SVE)	Not applicable as standalone technology but could be combined with air sparging to capture CVOCs removed from low permeability unit.	**Poor**. Not effective as standalone technology. **Good** if combined with air sparging to limit CVOCs discharge to atmosphere.	**Poor**. Groundwater elevation is typically within 5 feet of ground surface which limits vacuum, reduces well spacing, and increases water recovery. Not likely needed because CVOCs discharge is expected to be less than limits for emissions of hazardous air pollutants.	**Moderate**. Capital and O&M costs until criteria are met.	**Not Retained**. Not expected to be needed in combination with air sparging.
		Traditional Excavation	Excavate clayey sand from 45 to 50 ft bls where groundwater NADCs are exceeded. Dewatering would be required. Typically a source removal technology.	**Good**. Removes CVOCs mass and source of CVOCs mass.	**Poor**. Not feasible to excavate soil at this depth using traditional methods. Dewatering 40 feet of groundwater is not practical in sand.	**High**. Dewatering and soil disposal costs would be very high.	**Not Retained**. Not feasible for dissolved plumes and costs are high.
		Large diameter auger (LDA) Excavation	Targeted excavation of soil down to 50 ft bls. Dewatering not needed. Typically a source removal technology.	**Good**. Removes CVOCs mass and source of CVOCs mass.	**Poor**. Would need to excavate and manage large volume of sand column above 45 ft bls, which is clean to reach targeted soil interval of 45 to 50 ft bls.	**High**. Soil excavation and disposal costs would be very high.	**Not Retained**. Not feasible for dissolved plumes and costs are high.
Ex-situ Treatment	Physical Treatment	Air Stripping	Treat extracted groundwater by transferring CVOCs to air in tray strippers.	**Good**. Common and well understood performance for ex situ treatment of groundwater.	**Good**. Mobile or package system are readily available and implementable for several potential treatment rates.	**Moderate**. Capital and O&M costs would be added to groundwater extraction system costs.	**Not Retained.** Not needed since groundwater extraction was not retained.
		Adsorption	Treat extracted groundwater by CVOCs adsorption to activated carbon.	**Good**. Common and well understood performance for ex situ treatment of groundwater.	**Good**. Mobile or package system are readily available and implementable for several potential treatment rates.	**Moderate**. Capital and O&M costs would be added to groundwater extraction system costs.	**Not Retained.** Not needed since groundwater extraction was not retained.
In-Situ Treatment	Biological	Anaerobic Enhanced Bioremediation	Typically includes injection of an electron donor to enhance reductive dechlorination (ERD) of CVOCs.	**Moderate**. Proven performance at this and other KSC sites. However, effectiveness is typically limited by the length of electron donor supply after injection.	**Good**. Readily implementable in an area to treat CVOCs from 40 to 50 ft bls. Treatment area needs to be sufficient to limit diffusion and downgradient migration to biosparge barrier.	**Moderate**. Costs are primarily capital for the electron donor and one injection event via direct-push technology.	**Not Retained.** ERD only will not be retained because of electron donor longevity, but will be part of an ISCR alternative.
		Aerobic Enhanced Bioremediation	Inject air or oxygen to increase the concentration of dissolved oxygen and promote the aerobic biooxidation of contaminant.	**Good**. Proven performance at the existing biosparge barrier for VC. May be less effective for cDCE. Not effective for TCE.	**Moderate**. Lots of experience with air sparge wells in the area. Would only be able to implement in sand above 45 ft bls and rely on matrix diffusion to treat clayey sand below 45 ft bls.	**Moderate**. Capital costs for biosparge wells and system. Long-term O&M costs.	**Not Retained.** Air sparging for mass removal is expected to be more effective for similar cost.
		Bioaugmentation	Microbial consortia that target anaerobic degradation of CVOCs can be included in an ERD remedy.	**Good**. Proven performance and included in most ERD remedies at KSC.	**Good**. Readily implementable by injecting along with electron donor for ERD.	**Low**. Low add-on cost to ERD remedy.	**Retained.** ERD only is not retained, but bioaugmentation will be evaluated with ISCR.

Remedial Technology Screening for Hot Spot 2
Mobile Launch Platform Rehabilitation Sites and the Vehicle Assembly Building Area (MLP/VAB) – SWMU 056
NASA Kennedy Space Center

General Response Action	Remedial Technology	Process Option	Technology Description	Effectiveness (Achieve/Maintain GCTLs and Reliability) Poor, Moderate, or Good	Implementability (Technical and Administrative) Poor, Moderate, or Good	Relative Cost Low, Moderate, or High	Screening Comments Retained or Not Retained
	Chemical/Physical	Air Sparging (AS)	Inject air into the plume to promote partitioning of CVOCs to air and transfer to atmosphere. Previously implemented to about 45 ft bls within former Hot Spot 2 (HS2) plume.	**Good**. Proven performance at the site in sandy lithology to 45 ft bls. Effectiveness in clayey sand below 45 ft bls is uncertain and would depend on ability to inject and distribute air.	**Moderate**. Implemented previously in the former HS2 plume. Geotechnical testing of clayey sand below 45 ft bls indicates hydraulic conductivity is several orders of magnitude less than practical limits for air sparging.	**Moderate**. Capital costs for air sparge wells and system. Long-term O&M costs.	**Not Retained.** Previous use at the site was effective in sand above 45 ft bls. Hydraulic conductivity of clayey sand (source of VC) is too low for air sparging.
		Large Diameter Augur (LDA) Mixing	In situ soil mixing combined with different technologies to remove or treat CVOCs. Technologies include in situ soil stabilization, steam enhanced extraction, and ISCR.	**Good**. Proven effectiveness at removing CVOCs mass or limiting mass flux of CVOCs to groundwater in CVOC source areas.	**Moderate**. Target treatment zone is deep (about 45 to 50 ft bls) and limited to narrow depth interval.	**High**. High cost to operate LDA equipment. High costs for complimentary technologies (steam, stabilization, and ISCR)	**Not Retained.** High-cost technology typically implemented in CVOC source areas, not plumes.
		In Situ Chemical Oxidation (ISCO)	Inject chemical oxidants in plume to oxidize CVOCs.	**Moderate**. Typical oxidants are expected to permanently remove CVOCs. Natural or background oxidant demand may limit effectiveness.	**Moderate**. Readily implementable via direct-push methods to treat plume area. Ability to treat plume with one injection is unlikely because of background oxidant demand.	**Moderate**. Costs are primarily capital for oxidant injection event via direct-push technology.	**Not Retained.** Although CVOC mass would be destroyed, effectiveness may be limited by background oxidant demand and need for multiple injections.
		In Situ Chemical Reduction (ISCR)	Typically includes injection of zero-valent iron for abiotic reduction of CVOCs and often includes electron donors to support ERD.	**Good**. Permanently degrades CVOCs, which dependent on ability to achieve very low redox conditions.	**Good**. Readily implementable in to treat CVOCs from 40 to 45 ft bls. Treatment area needs to be sufficient to limit diffusion and downgradient migration to biosparge barrier.	**Moderate.** Typically requires one injection since product provides treatment up to 5 years. Capital cost for product and injection.	**Retained.** ISCR is evaluated for targeted treatment of NADC plumes. ISCR along with natural attenuation can be readily implemented to achieve GCTLs. Typically combined with anaerobic enhanced bioremediation.
		Powdered Activated Carbon (PAC)	Powdered activated carbon is injected into the groundwater to adsorb CVOCs and remove mass from groundwater.	**Good**. Effectively decreases concentrations of CVOCs in groundwater.	**Moderate**. Typically implemented as a permeable reactive barrier to intercept dissolved CVOC in a plume. May require additional treatment with an electron donor to regenerate sorption capacity.	**High**. Capital costs can be high for product and direct-push installation in barriers.	**Not Retained.** Although mass is removed, long-term destruction is uncertain.
		Permeable Reactive Barrier (PRB)	A permeable treatment barrier is installed to intercept the plume to destroy CVOCs via ISCR.	**Moderate**. Mass flux is mitigated via removal of CVOCs from groundwater flow. Relies on groundwater flow through barrier for treatment.	**Moderate**. Multiple barriers may be required to achieve GCTLs in reasonable time. Could also be implemented to remove the need for the biosparge barrier.	**Moderate**. Capital costs can be high for product and direct-push installation in multiple barriers.	**Retained.** ISCR PRBs will be evaluated/compared to an ISCR grid approach to achieve GCTLs. A single PRB to mitigate the need of the biosparge barrier will be evaluated.
	Thermal	Electrical Resistance Heating	Heat the subsurface using electrical resistive heating to enhance removal of CVOCs via volatilization.	**Moderate**. Can effectively remove CVOCs in combination with multiphase extraction. Less effective in sandy soil where groundwater flux may slow subsurface heating.	**Moderate to Poor**. Would require heating entire saturated zone to 50 ft bls to treat small depth interval of 45 to 50 ft bls.	**High**. Infrastructure and energy cost are high.	**Not Retained.** Technology is better for CVOC source area and high concentrations, not NADC plumes.

Remedial Technology Screening for Hot Spot 2
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General Response Action	Remedial Technology	Process Option	Technology Description	Effectiveness (Achieve/Maintain GCTLs and Reliability) Poor, Moderate, or Good	Implementability (Technical and Administrative) Poor, Moderate, or Good	Relative Cost Low, Moderate, or High	Screening Comments Retained or Not Retained
Disposal	On-Site	Re-Injection Wells	Used in combination with groundwater extraction and ex situ groundwater treatment to inject treated groundwater. Groundwater injection can enhance performance of groundwater extraction.	**Moderate**. Can be used to control groundwater flow, contain the plume and increase the pore volume flush rate for plume removal.	**Moderate**. Would require development of a groundwater flow model to design appropriate injection locations. Requires significant monitoring of treated groundwater to ensure meeting criteria for injection.	**Moderate**. Requires capital cost for injection wells or trenches. Requires O&M along with treatment system.	**Not Retained.** Not retained when groundwater extraction is not retained.

Remedial Alternatives	GHG Emissions	Total energy Used	Water Consumption	Electricity Usage	Onsite NO_x Emissions	Onsite SO_x Emissions	Onsite PM_{10} Emissions	Total NO_x Emissions	Total SO_x Emissions	Total PM_{10} Emissions	Accident Risk Fatality	Accident Risk Injury
	metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
Option 1 LTM	1759.01	2.99E+04	1.31E+06	2.56E+03	0.00E+00	0.00E+00	0.00E+00	2.07E+00	3.18E+00	1.48E+00	1.96E-03	2.91E-01
Option 2 ISCR PRB	643.69	9.09E+03	3.49E+05	6.41E+02	6.40E-04	4.00E-05	4.00E-05	9.57E-01	1.56E+00	5.18E-01	6.64E-04	9.16E-02
Option 3 ISCR Grid	600.26	8.70E+03	4.48E+05	6.41E+02	1.92E-03	1.20E-04	1.20E-04	8.27E-01	1.38E+00	4.88E-01	6.05E-04	8.61E-02

Additional Sustainability Metrics

Remedial Alternatives	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent Electricity from Renewable Sources	Final Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	$
Option 1 LTM	0.00	0.00E+00	0.00E+00	7.55E+06	2.33E+00	1.7%	7.55E+06
Option 2 ISCR PRB	0.00	0.00E+00	0.00E+00	3.24E+06	7.33E-01	1.7%	3.24E+06
Option 3 ISCR Grid	0.00	0.00E+00	0.00E+00	3.16E+06	7.08E-01	1.7%	3.14E+06

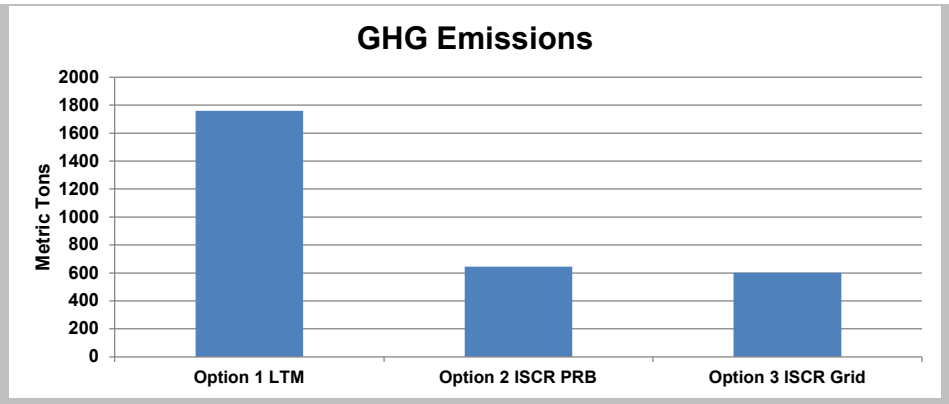
Relative Impact

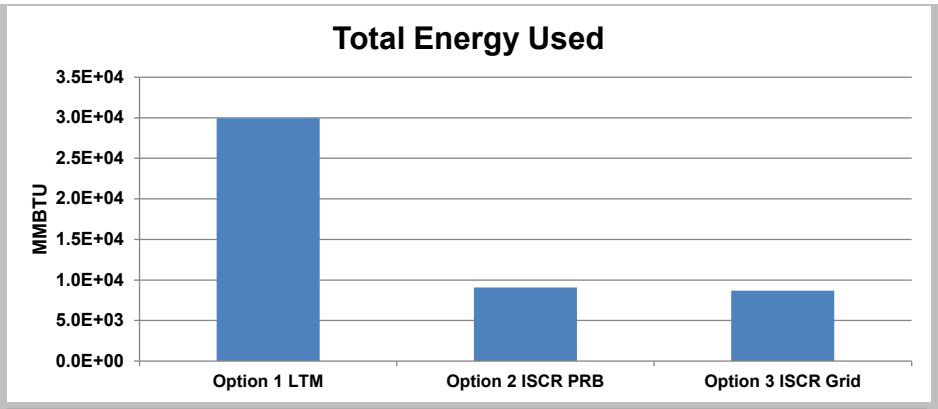
Remedial Alternatives	GHG Emissions	Energy Usage	Water Usage	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx emissions	Total SOx Emissions	Total PM10 Emissions	*Accident Risk Fatality	*Accident Risk Injury	Community Impacts	Resources Lost
Option 1 LTM	High	High	High	High	Low	Low	Low	High	High	High	Low	Low	user select	user select
Option 2 ISCR PRB	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	user select	user select
Option 3 ISCR Grid	Medium	Low	Medium	Low	High	High	High	Medium	Medium	Medium	Low	Low	user select	user select

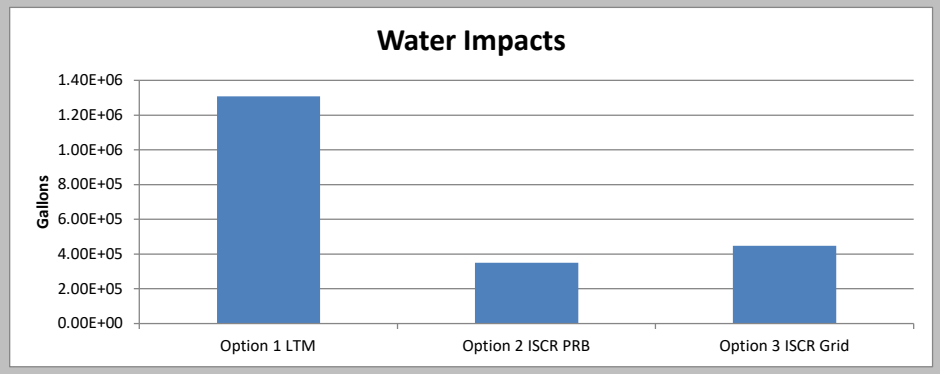
Relative Impact (User Override)

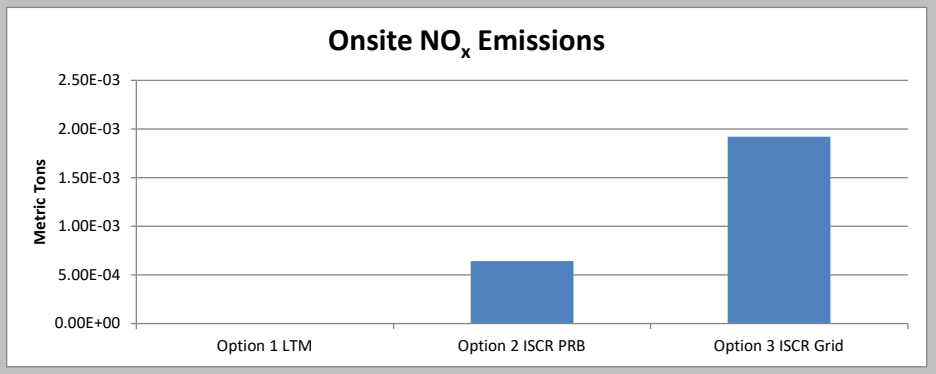
Remedial Alternatives	GHG Emissions	Energy Usage	Water Usage	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	*Accident Risk Fatality	*Accident Risk Injury	Community Impacts	Resources Lost
Option 1 LTM	High	High	High	High	Low	Low	Low	High	High	High	Low	Low	user select	user select
Option 2 ISCR PRB	Medium	Medium	Low	Low	Medium	Medium	Medium	Medium	Medium	Medium	Low	Low	user select	user select
Option 3 ISCR Grid	Medium	Low	Medium	Low	High	High	High	Medium	Medium	Medium	Low	Low	user select	user select

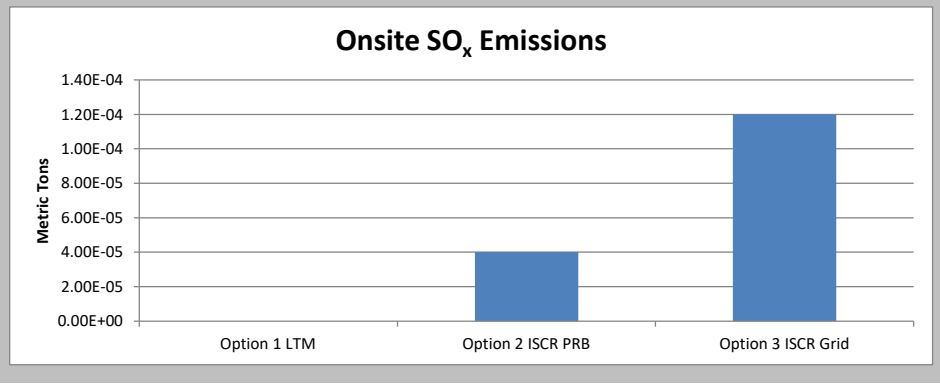
*Accident Risk is an estimate of how many accidents may occur. This risk is not the same as Cancer Risk, which is the probablity (for a single person) of getting cancer. Accident risk is not comparable to Cancer Risk due to inherent fundamental differences.

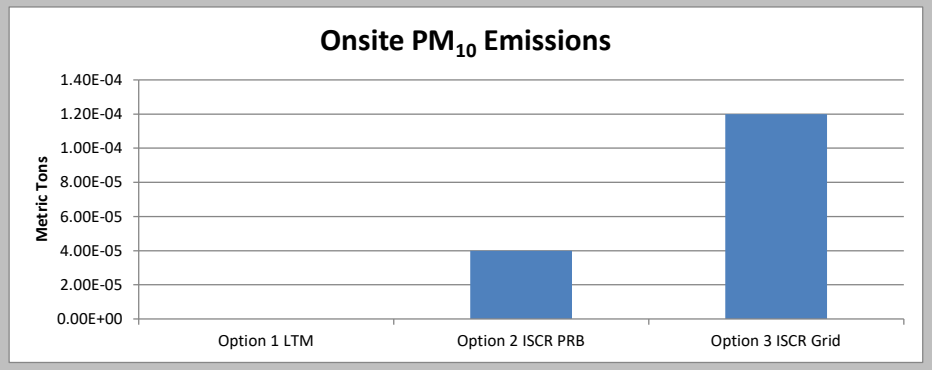

GHG Emissions
Metric Tons
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

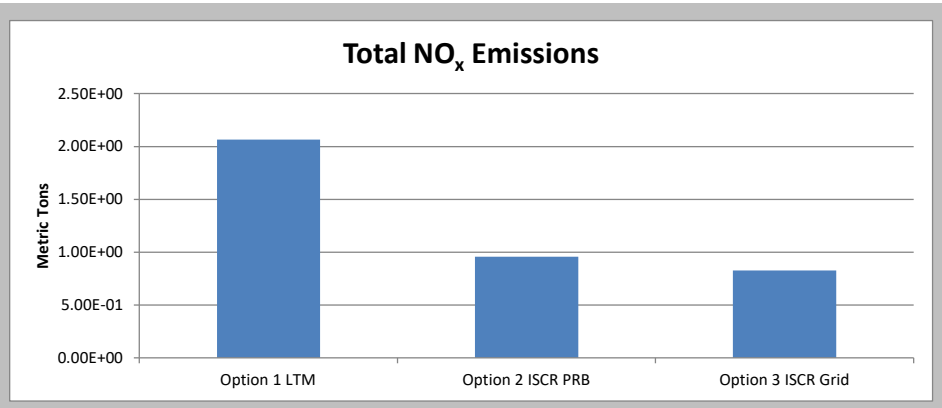

Total Energy Used
MMBTU
3.5E+04
3.0E+04
2.5E+04
2.0E+04
1.5E+04
1.0E+04
5.0E+03
0.0E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

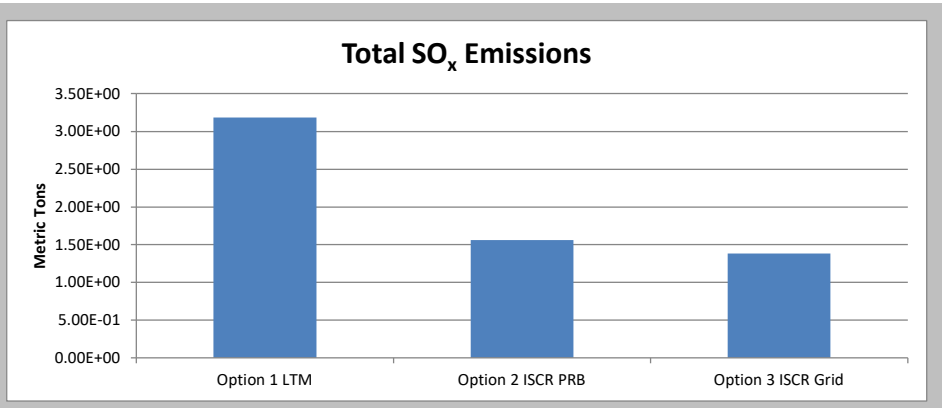

Water Impacts
Gallons
1.40E+06
1.20E+06
1.00E+06
8.00E+05
6.00E+05
4.00E+05
2.00E+05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

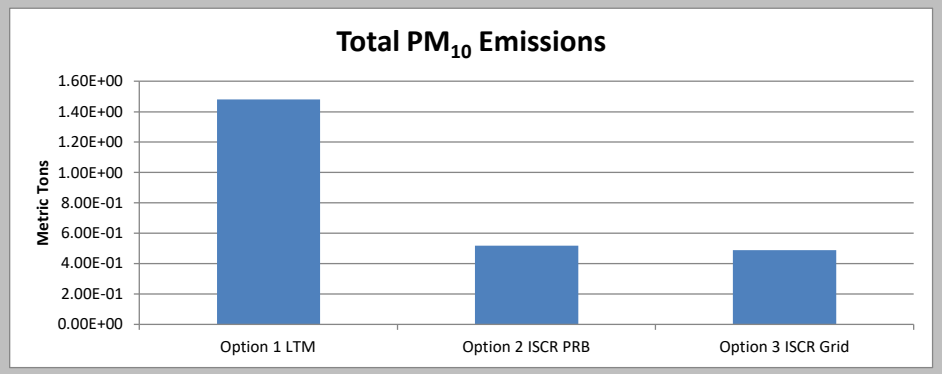

Onsite NOx Emissions
Metric Tons
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

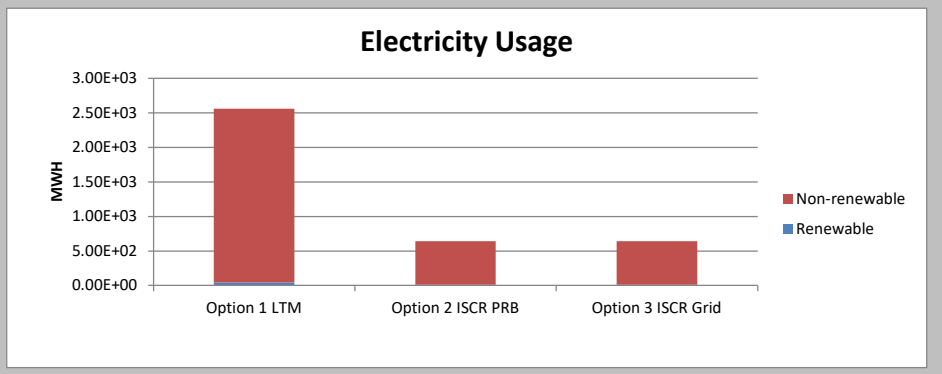

Onsite SOx Emissions
Metric Tons
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

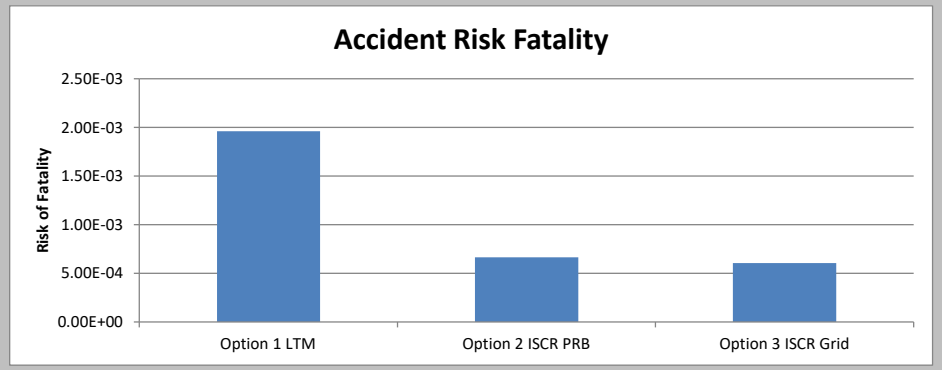

Onsite PM10 Emissions
Metric Tons
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

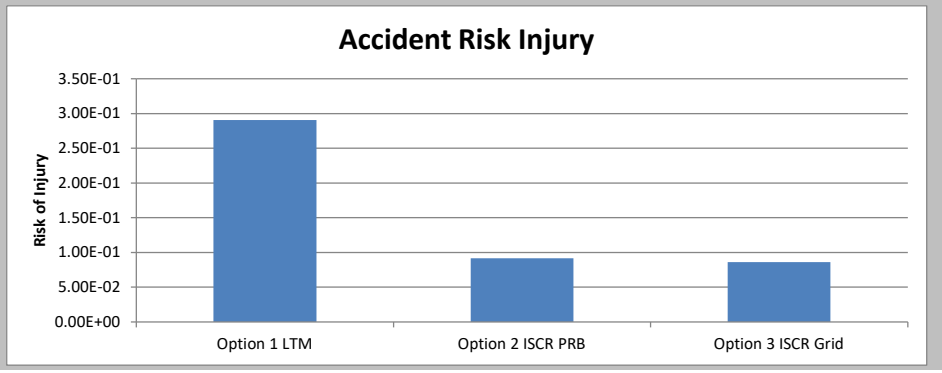

Total NOx Emissions
Metric Tons
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Total SOx Emissions
Metric Tons
3.50E+00
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

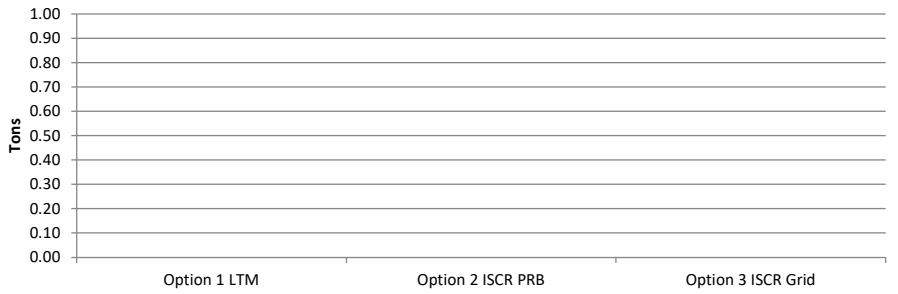

Total PM10 Emissions
Metric Tons
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Electricity Usage
MWH
3.00E+03
2.50E+03
2.00E+03
1.50E+03
1.00E+03
5.00E+02
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid
Non-renewable
Renewable

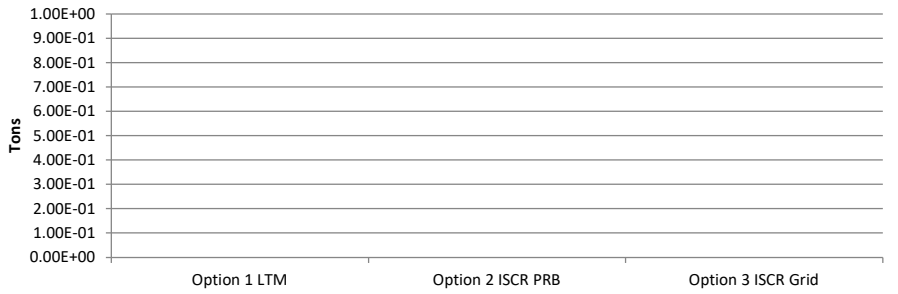

Accident Risk Fatality
Risk of Fatality
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid


Accident Risk Injury
Risk of Injury
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

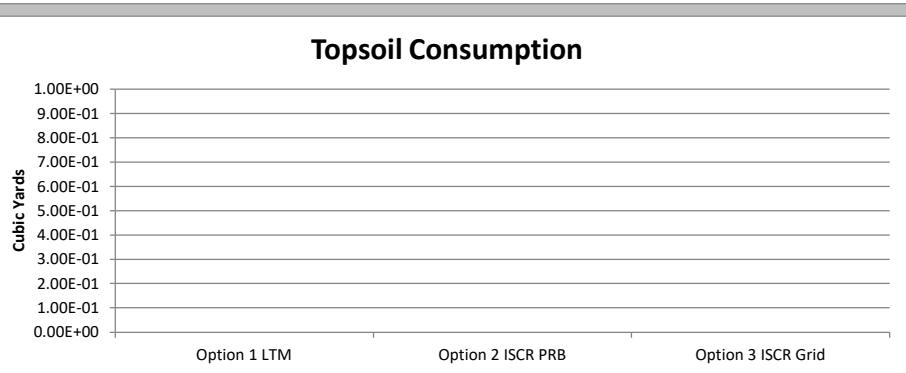
Non-Hazardous Waste Landfill Space



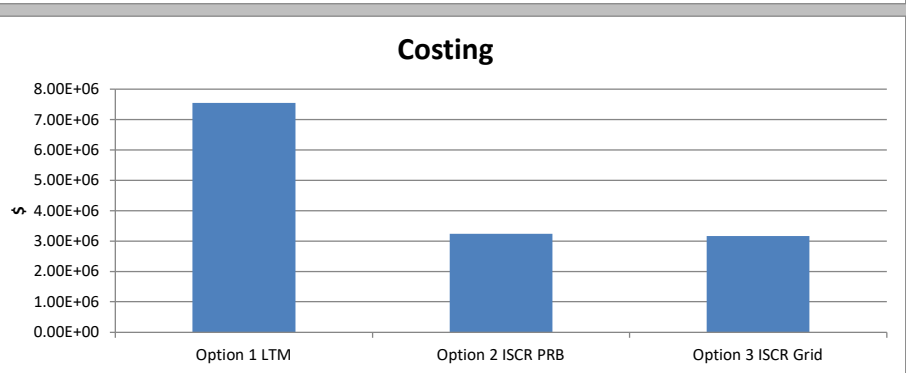
Hazardous Waste Landfill Space



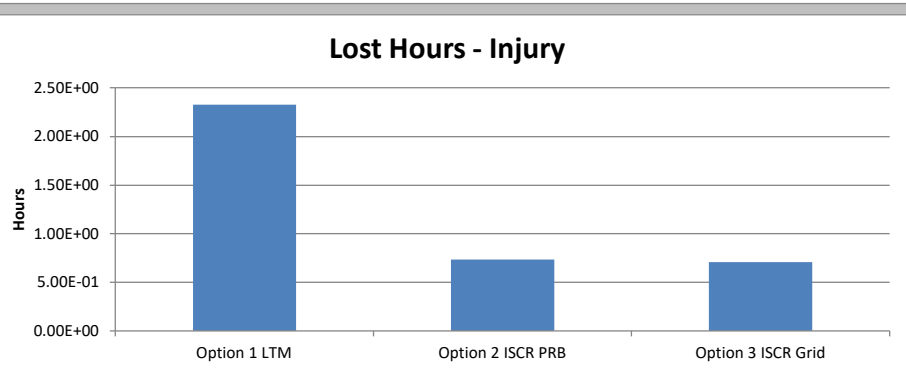
Topsoil Consumption



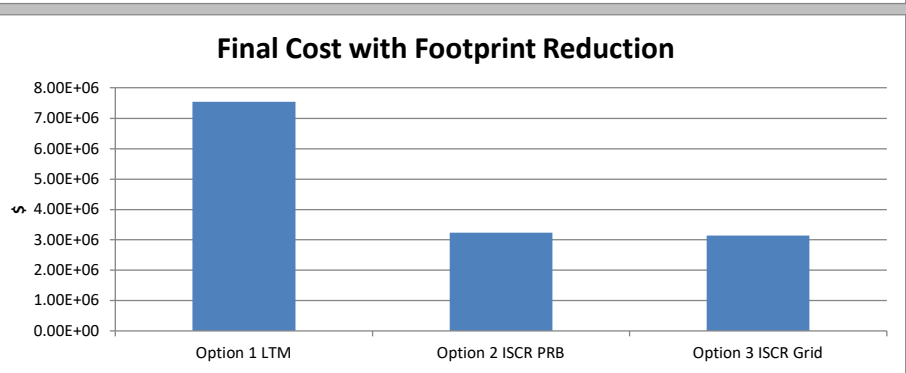
Costing

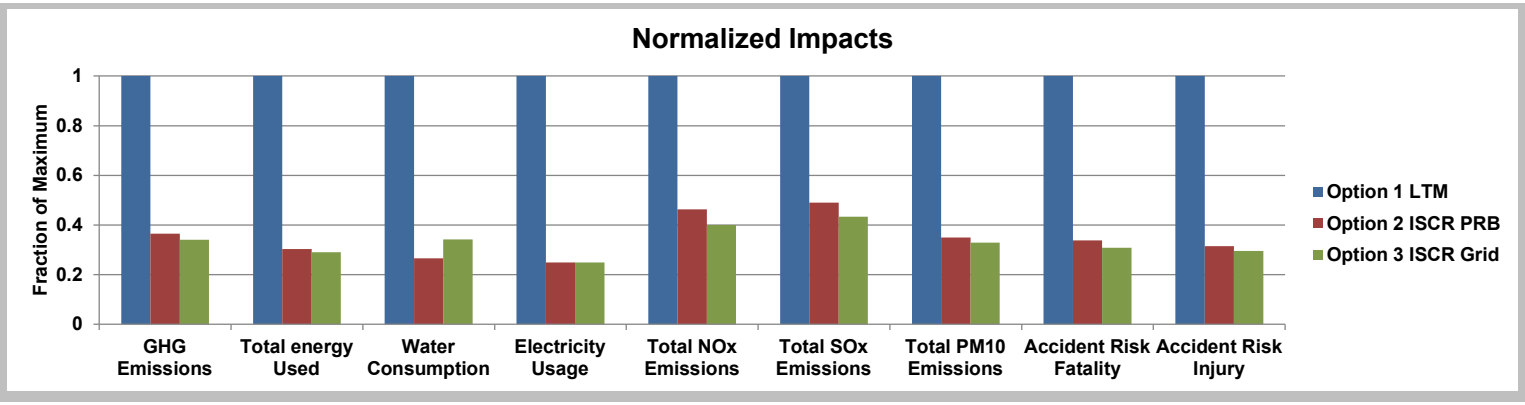


Lost Hours - Injury



Final Cost with Footprint Reduction

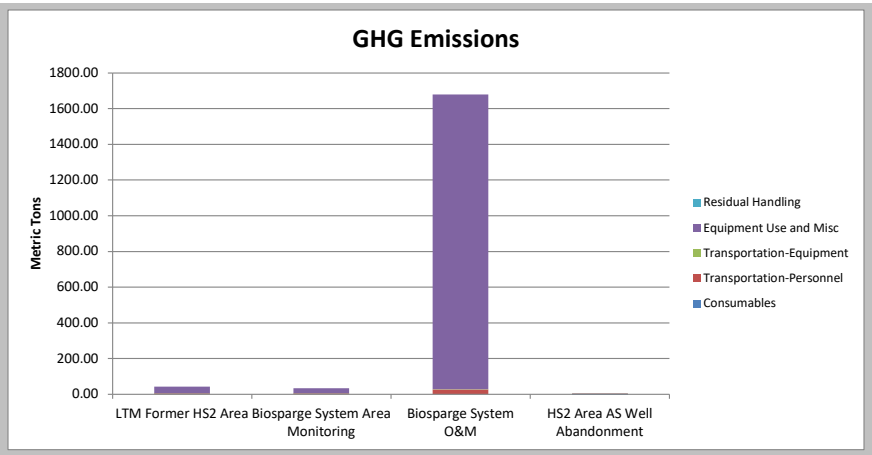


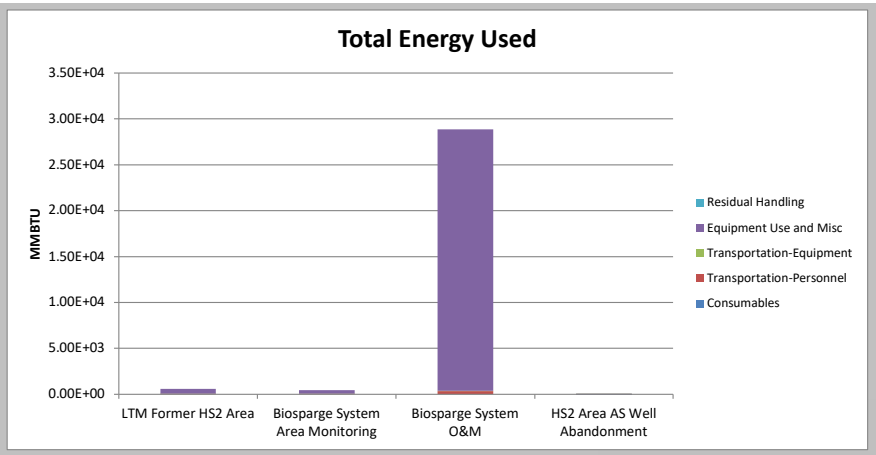

Normalized Impacts
Fraction of Maximum
1
0.8
0.6
0.4
0.2
0
GHG Emissions
Total energy Used
Water Consumption
Electricity Usage
Total NOx Emissions
Total SOx Emissions
Total PM10 Emissions
Accident Risk Fatality
Accident Risk Injury
Option 1 LTM
Option 2 ISCR PRB
Option 3 ISCR Grid

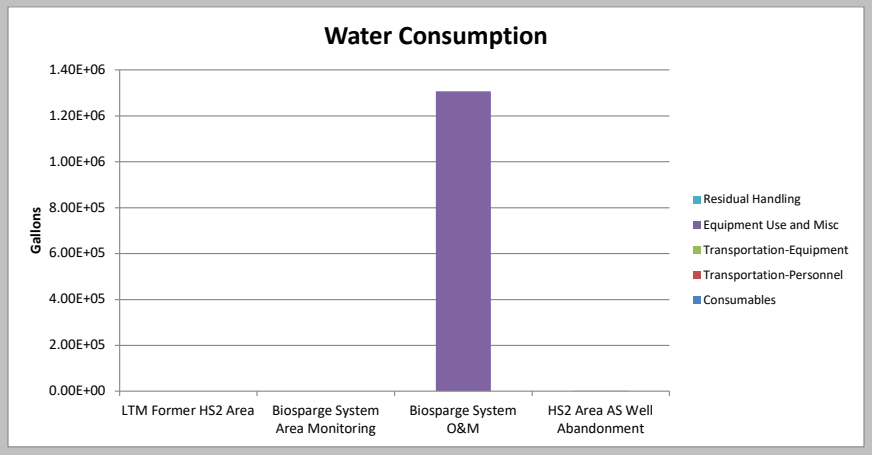
Sustainable Remediation - Environmental Footprint Summary
Option 1 LTM 2

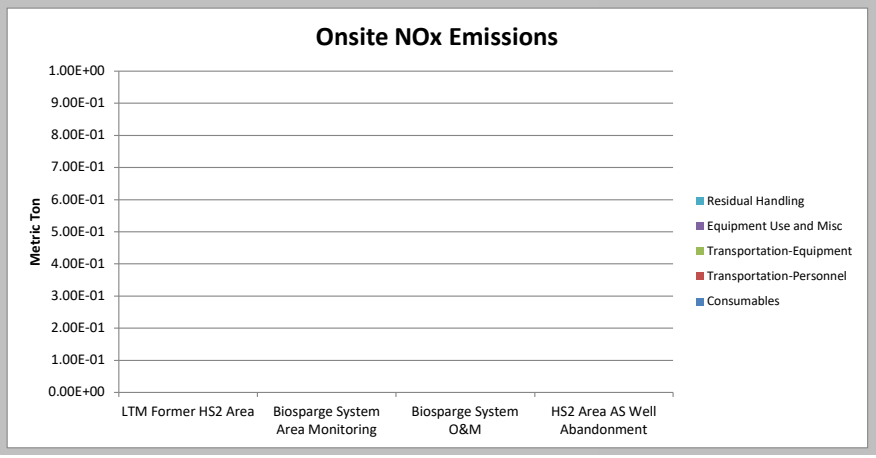
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	5.42	6.8E+01	NA	NA	NA	NA	NA	2.3E-03	7.1E-05	3.2E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.49	6.4E+00	NA	NA	NA	NA	NA	1.5E-04	2.7E-06	1.4E-05	7.8E-05	6.3E-03
	Equipment Use and Misc	36.29	5.2E+02	1.5E-01	3.0E-04	0.0E+00	0.0E+00	0.0E+00	1.7E-01	1.3E-01	1.5E-02	5.8E-06	7.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	42.20	5.94E+02	1.51E-01	2.96E-04	0.00E+00	0.00E+00	0.00E+00	1.77E-01	1.31E-01	1.49E-02	2.37E-04	2.57E-02
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	5.42	6.8E+01	NA	NA	NA	NA	NA	2.3E-03	7.1E-05	3.2E-04	1.5E-04	1.2E-02
	Transportation-Equipment	0.49	6.4E+00	NA	NA	NA	NA	NA	1.5E-04	2.7E-06	1.4E-05	7.8E-05	6.3E-03
	Equipment Use and Misc	27.22	3.9E+02	1.5E-01	3.0E-04	0.0E+00	0.0E+00	0.0E+00	1.3E-01	9.8E-02	1.1E-02	5.4E-06	6.6E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	33.13	4.64E+02	1.51E-01	2.96E-04	0.00E+00	0.00E+00	0.00E+00	1.33E-01	9.80E-02	1.12E-02	2.37E-04	2.52E-02
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	26.44	3.3E+02	NA	NA	NA	NA	NA	1.1E-02	3.5E-04	1.6E-03	7.5E-04	6.0E-02
	Transportation-Equipment	2.35	3.1E+01	NA	NA	NA	NA	NA	7.4E-04	1.3E-05	6.6E-05	3.7E-04	3.0E-02
	Equipment Use and Misc	1,651.07	2.8E+04	1.3E+06	2.6E+03	0.0E+00	0.0E+00	0.0E+00	1.7E+00	2.9E+00	1.5E+00	3.4E-04	1.5E-01
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	1,679.86	2.89E+04	1.31E+06	2.56E+03	0.00E+00	0.00E+00	0.00E+00	1.75E+00	2.95E+00	1.45E+00	1.47E-03	2.38E-01
HS2 Area AS Well Abandonment	Consumables	1.60	8.4E+00	NA	NA	NA	NA	NA	3.2E-03	6.4E-03	1.3E-03	NA	NA
	Transportation-Personnel	1.41	1.8E+01	NA	NA	NA	NA	NA	4.4E-04	7.8E-06	3.9E-05	1.6E-05	1.3E-03
	Transportation-Equipment	0.82	1.1E+01	NA	NA	NA	NA	NA	2.6E-04	9.8E-06	2.2E-05	5.9E-06	4.7E-04
	Equipment Use and Misc	0.00	9.2E-03	1.0E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.4E-06	2.7E-06	7.3E-06	5.4E-07	6.6E-04
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	3.83	3.79E+01	1.00E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.91E-03	6.41E-03	1.35E-03	2.20E-05	2.39E-03
Total		**1.8E+03**	**3.0E+04**	**1.3E+06**	**2.6E+03**	**0.0E+00**	**0.0E+00**	**0.0E+00**	**2.1E+00**	**3.2E+00**	**1.5E+00**	**2.0E-03**	**2.9E-01**

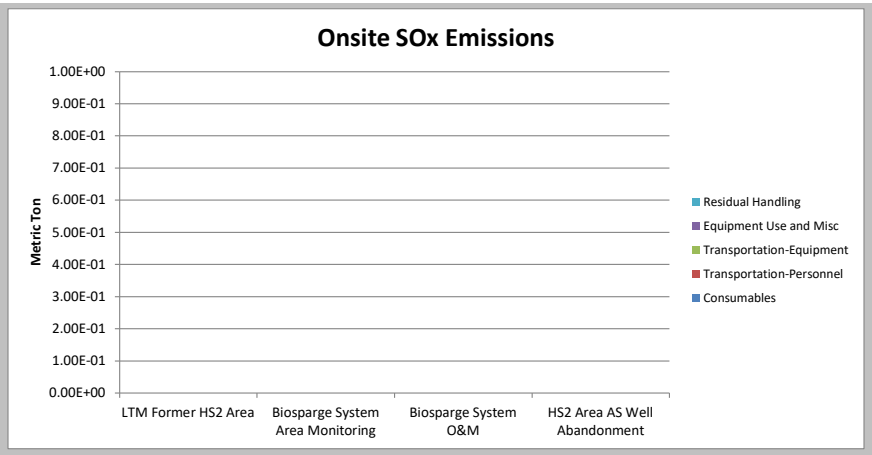
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	1,640,000	2.1E-01	2.3%	$7,547,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	1,600,000	2.0E-01	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	4,280,000	1.9E+00	2.3%	
HS2 Area AS Well Abandonment	0.0E+00	0.0E+00	0.0E+00	27,000	1.9E-02	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$7,547,000**	**2.3E+00**	**1.7%**	

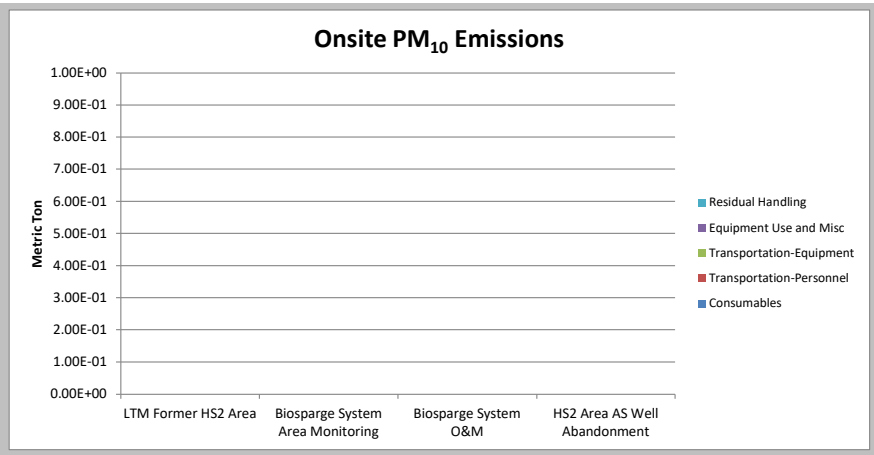

GHG Emissions
Metric Tons
1800.00
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

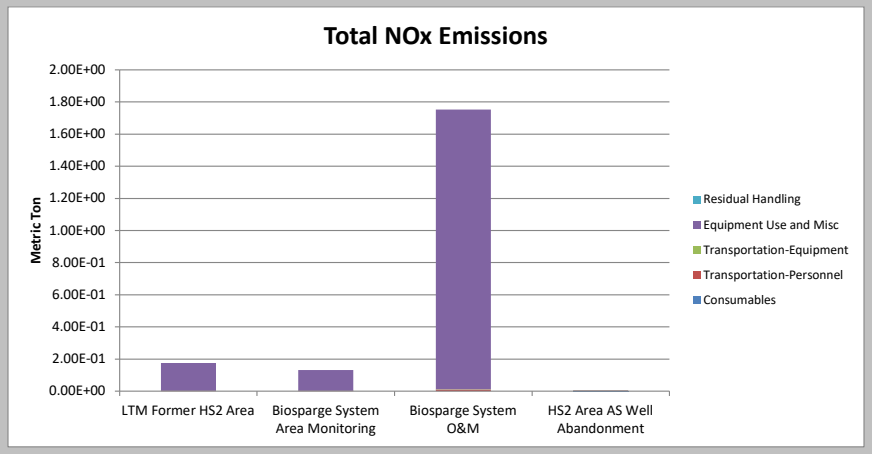

Total Energy Used
MMBTU
3.50E+04
3.00E+04
2.50E+04
2.00E+04
1.50E+04
1.00E+04
5.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

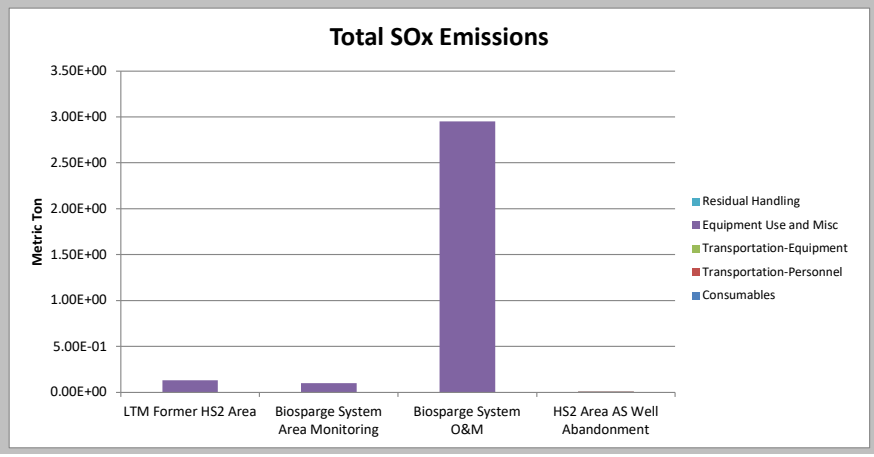

Water Consumption
Gallons
1.40E+06
1.20E+06
1.00E+06
8.00E+05
6.00E+05
4.00E+05
2.00E+05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

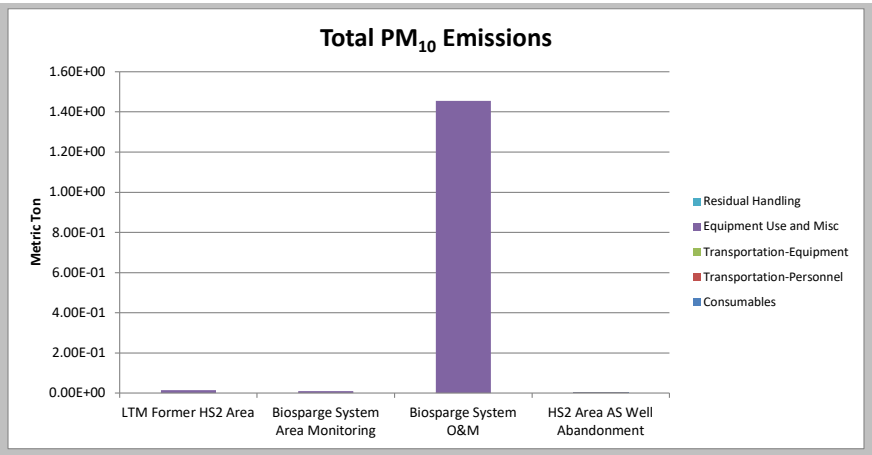

Onsite NOx Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

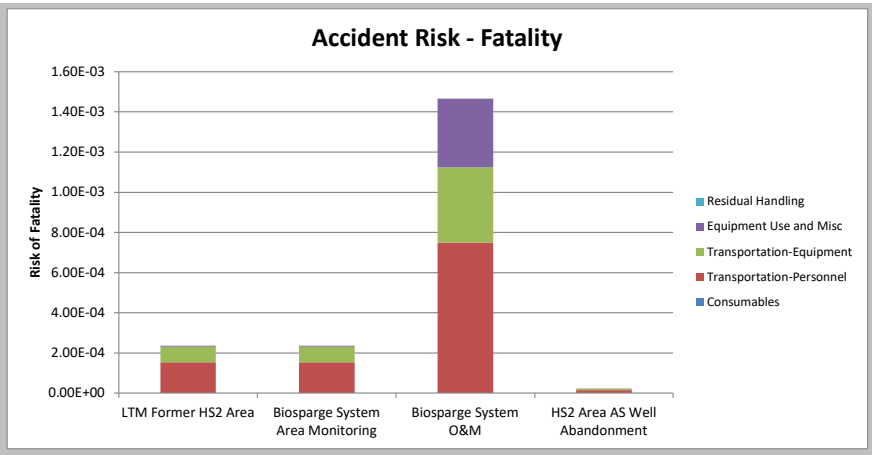

Onsite SOx Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

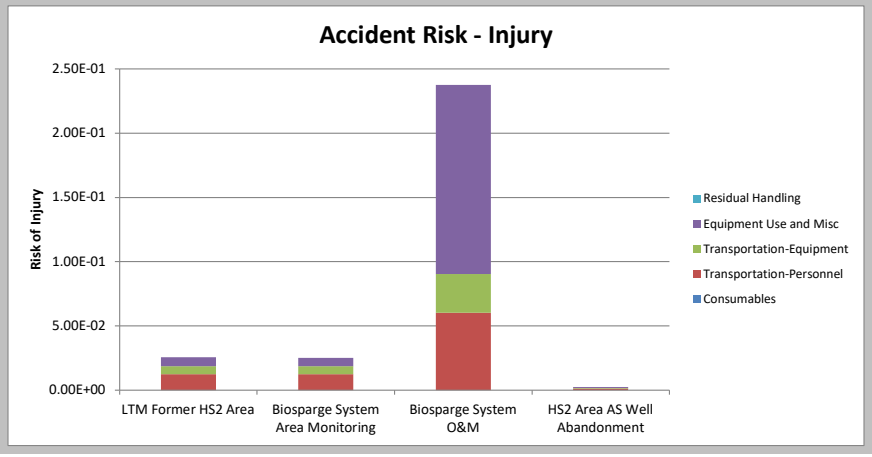

Onsite PM10 Emissions
Metric Ton
1.00E+00
9.00E-01
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

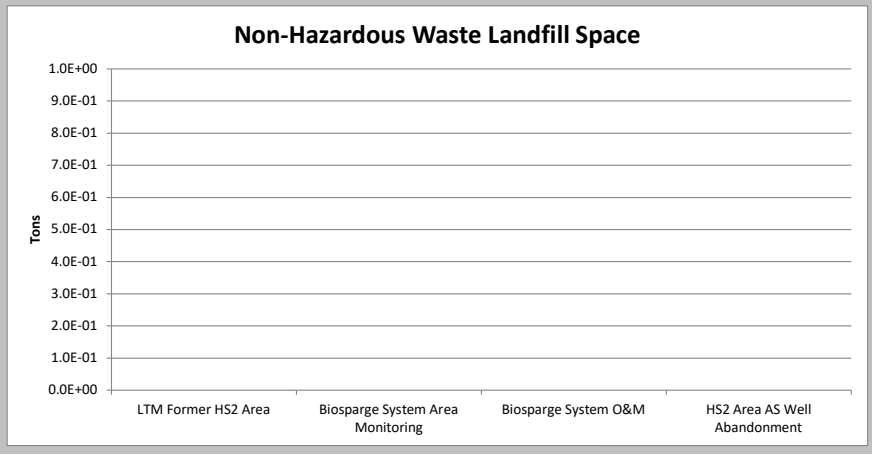

Total NOx Emissions
Metric Ton
2.00E+00
1.80E+00
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

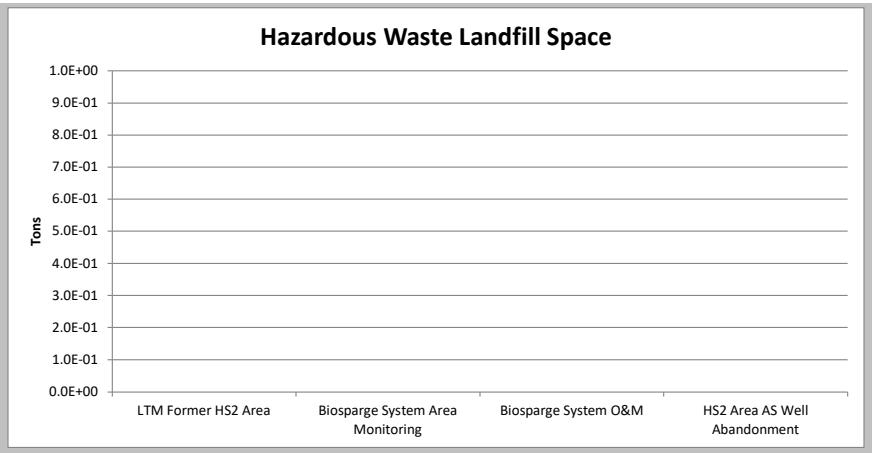

Total SOx Emissions
Metric Ton
3.50E+00
3.00E+00
2.50E+00
2.00E+00
1.50E+00
1.00E+00
5.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

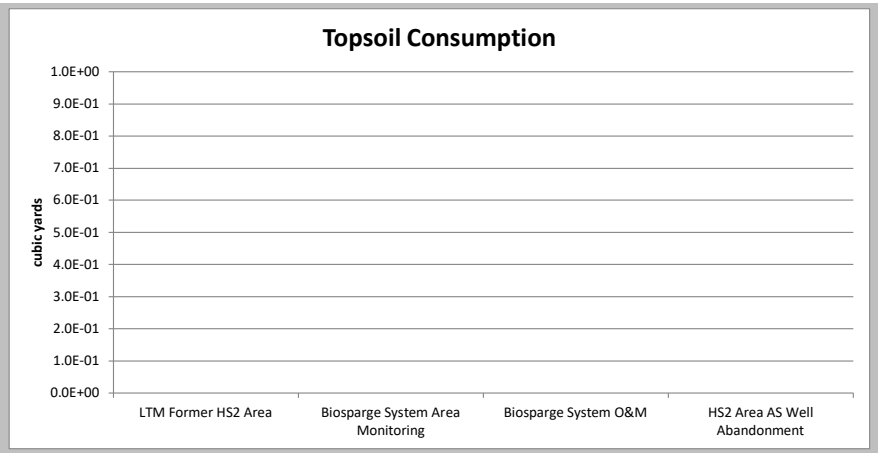

Total PM10 Emissions
Metric Ton
1.60E+00
1.40E+00
1.20E+00
1.00E+00
8.00E-01
6.00E-01
4.00E-01
2.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

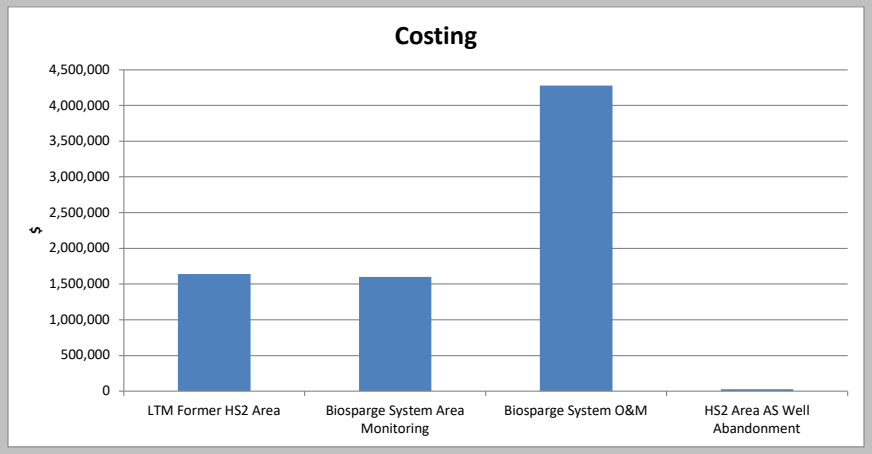

Accident Risk - Fatality
Risk of Fatality
1.60E-03
1.40E-03
1.20E-03
1.00E-03
8.00E-04
6.00E-04
4.00E-04
2.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

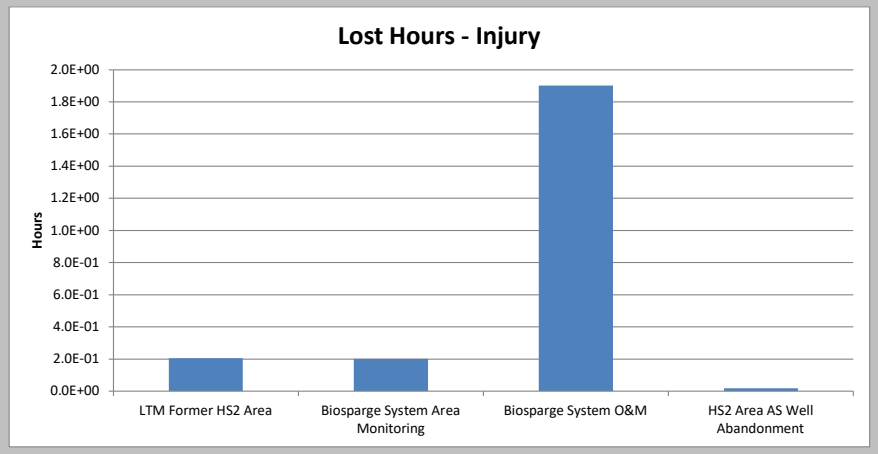

Accident Risk - Injury
Risk of Injury
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

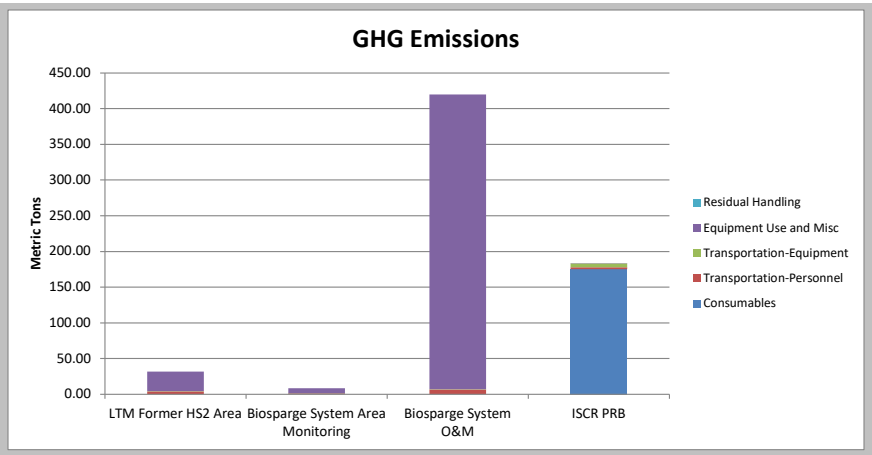

Costing
$
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

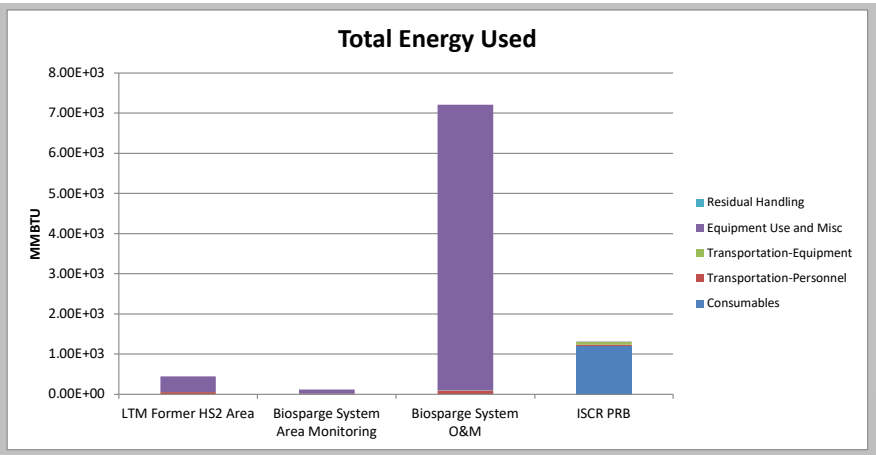

Lost Hours - Injury
Hours
2.0E+00
1.8E+00
1.6E+00
1.4E+00
1.2E+00
1.0E+00
8.0E-01
6.0E-01
4.0E-01
2.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
HS2 Area AS Well Abandonment

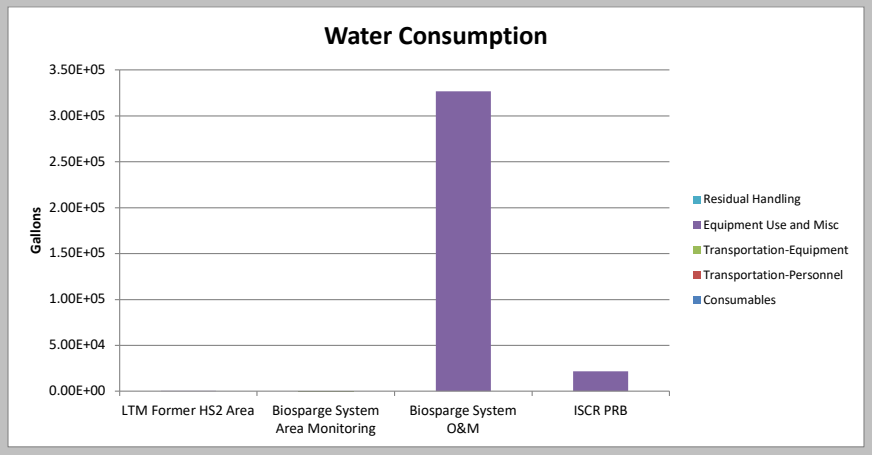
Sustainable Remediation - Environmental Footprint Summary
Option 2 ISCR PRB 2

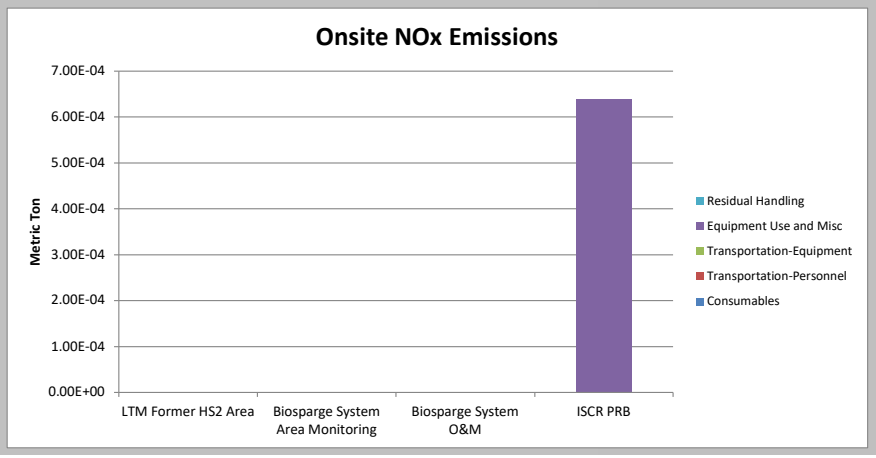
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	4.07	5.1E+01	NA	NA	NA	NA	NA	1.7E-03	5.3E-05	2.4E-04	1.2E-04	9.3E-03
	Transportation-Equipment	0.37	4.8E+00	NA	NA	NA	NA	NA	1.2E-04	2.0E-06	1.0E-05	5.9E-05	4.7E-03
	Equipment Use and Misc	27.22	3.9E+02	1.1E-01	2.2E-04	0.0E+00	0.0E+00	0.0E+00	1.3E-01	9.8E-02	1.1E-02	4.3E-06	5.3E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	31.65	4.45E+02	1.13E-01	2.22E-04	0.00E+00	0.00E+00	0.00E+00	1.32E-01	9.80E-02	1.11E-02	1.78E-04	1.93E-02
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	-	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.36	1.7E+01	1.5E+01	NA	NA	NA	NA	5.6E-04	1.8E-05	8.0E-05	3.8E-05	3.1E-03
	Transportation-Equipment	0.12	1.6E+00	1.4E+00	NA	NA	NA	NA	3.9E-05	6.8E-07	3.4E-06	2.0E-05	1.6E-03
	Equipment Use and Misc	6.80	9.7E+01	8.4E+01	7.4E-05	0.0E+00	0.0E+00	0.0E+00	3.3E-02	2.4E-02	2.7E-03	1.4E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	-	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	8.28	1.16E+02	1.00E+02	7.39E-05	0.00E+00	0.00E+00	0.00E+00	3.33E-02	2.45E-02	2.81E-03	5.92E-05	6.31E-03
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	6.61	8.3E+01	NA	NA	NA	NA	NA	2.7E-03	8.6E-05	3.9E-04	1.9E-04	1.5E-02
	Transportation-Equipment	0.59	7.7E+00	NA	NA	NA	NA	NA	1.8E-04	3.3E-06	1.6E-05	9.4E-05	7.5E-03
	Equipment Use and Misc	412.77	7.1E+03	3.3E+05	6.4E+02	0.0E+00	0.0E+00	0.0E+00	4.4E-01	7.4E-01	3.6E-01	8.6E-05	3.7E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	419.97	7.21E+03	3.27E+05	6.41E+02	0.00E+00	0.00E+00	0.00E+00	4.38E-01	7.37E-01	3.64E-01	3.66E-04	5.94E-02
ISCR PRB	Consumables	175.10	1.2E+03	NA	NA	NA	NA	NA	3.5E-01	7.0E-01	1.4E-01	NA	NA
	Transportation-Personnel	2.95	3.8E+01	NA	NA	NA	NA	NA	9.4E-04	1.7E-05	8.6E-05	3.3E-05	2.7E-03
	Transportation-Equipment	5.41	7.1E+01	NA	NA	NA	NA	NA	1.7E-03	3.0E-05	1.5E-04	2.5E-05	2.0E-03
	Equipment Use and Misc	0.34	4.0E+00	2.2E+04	0.0E+00	6.4E-04	4.0E-05	4.0E-05	9.2E-04	1.9E-04	2.3E-04	1.6E-06	2.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	183.79	1.31E+03	2.20E+04	0.00E+00	6.40E-04	4.00E-05	4.00E-05	3.54E-01	7.01E-01	1.41E-01	6.00E-05	6.68E-03
Total		**6.4E+02**	**9.1E+03**	**3.5E+05**	**6.4E+02**	**6.4E-04**	**4.0E-05**	**4.0E-05**	**9.6E-01**	**1.6E+00**	**5.2E-01**	**6.6E-04**	**9.2E-02**

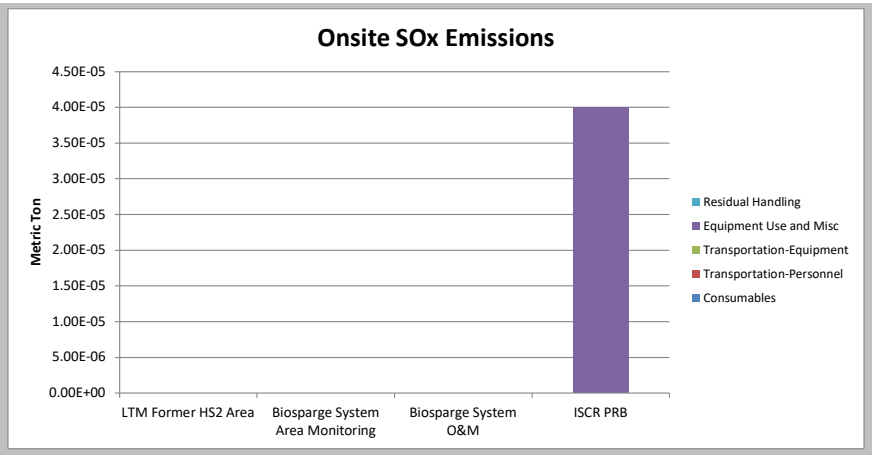
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	1,230,000	1.5E-01	2.3%	$3,235,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	400,000	5.0E-02	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	1,070,000	4.8E-01	2.3%	
ISCR PRB	0.0E+00	0.0E+00	0.0E+00	535,000	5.3E-02	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$3,235,000**	**7.3E-01**	**1.7%**	

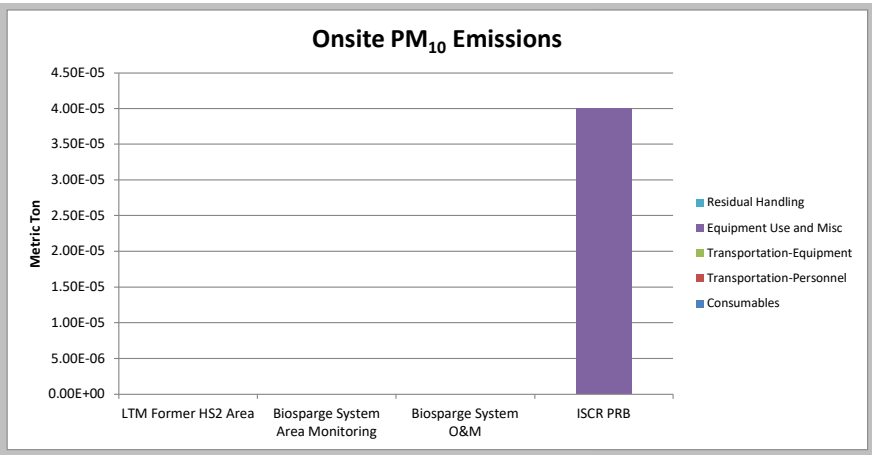

GHG Emissions
Metric Tons
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

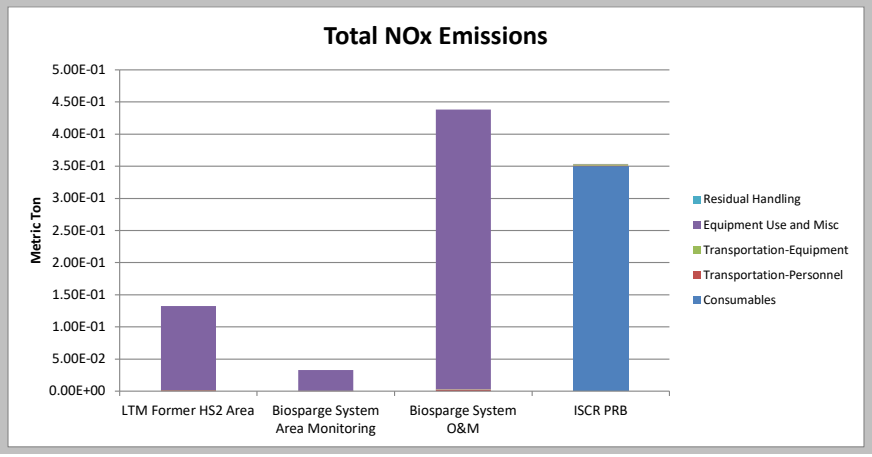

Total Energy Used
MMBTU
8.00E+03
7.00E+03
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

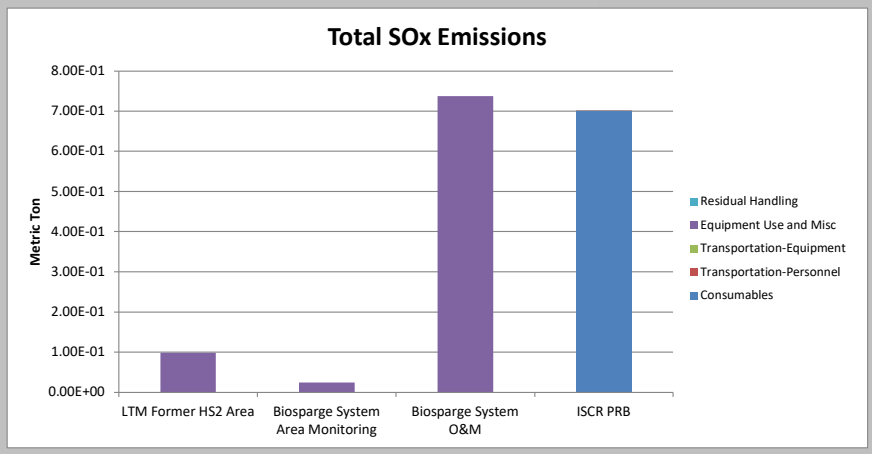

Water Consumption
Gallons
3.50E+05
3.00E+05
2.50E+05
2.00E+05
1.50E+05
1.00E+05
5.00E+04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

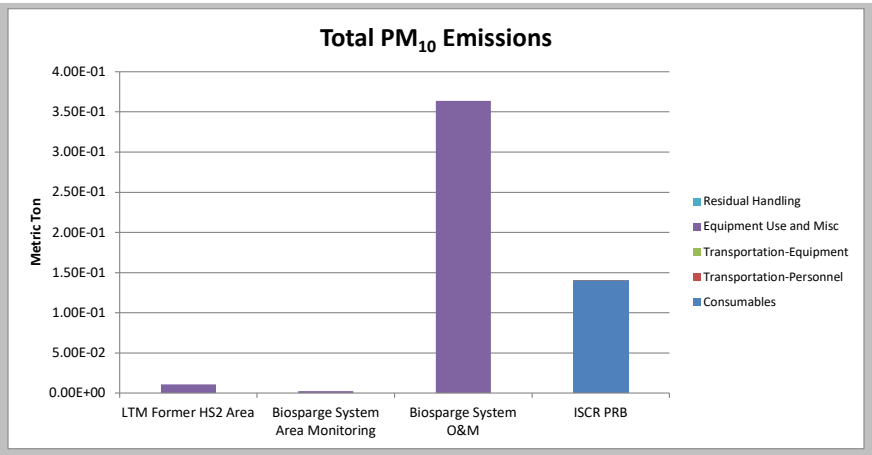

Onsite NOx Emissions
Metric Ton
7.00E-04
6.00E-04
5.00E-04
4.00E-04
3.00E-04
2.00E-04
1.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

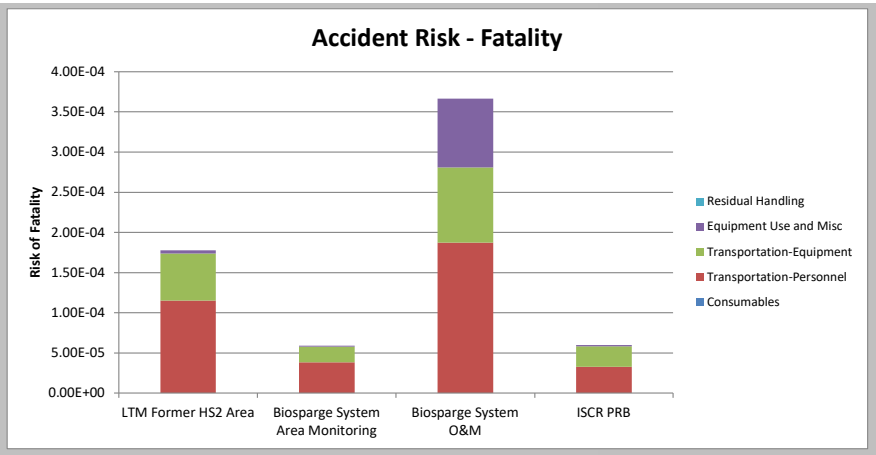

Onsite SOx Emissions
Metric Ton
4.50E-05
4.00E-05
3.50E-05
3.00E-05
2.50E-05
2.00E-05
1.50E-05
1.00E-05
5.00E-06
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

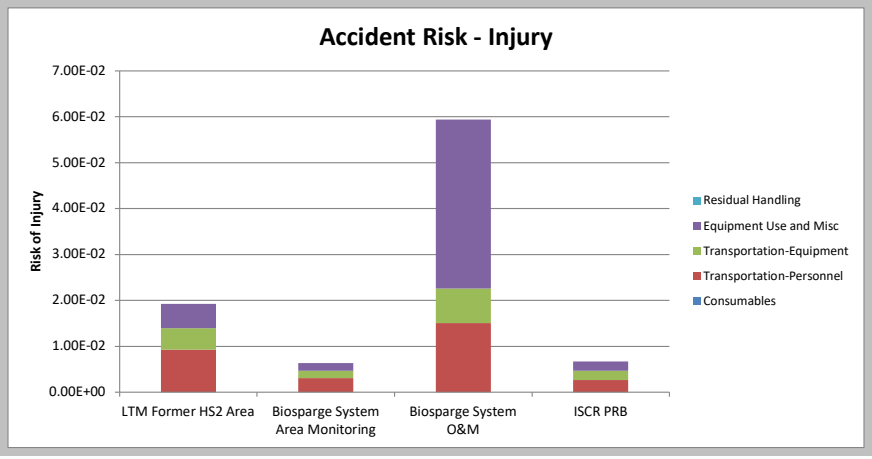

Onsite PM10 Emissions
Metric Ton
4.50E-05
4.00E-05
3.50E-05
3.00E-05
2.50E-05
2.00E-05
1.50E-05
1.00E-05
5.00E-06
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

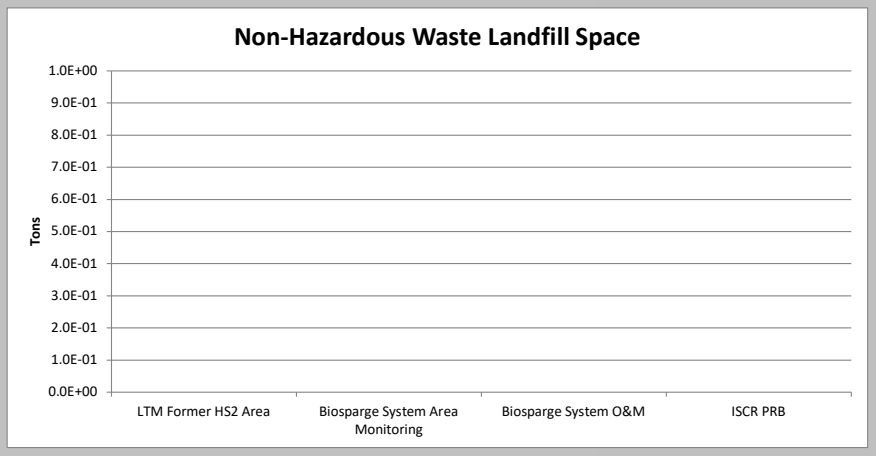

Total NOx Emissions
Metric Ton
5.00E-01
4.50E-01
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

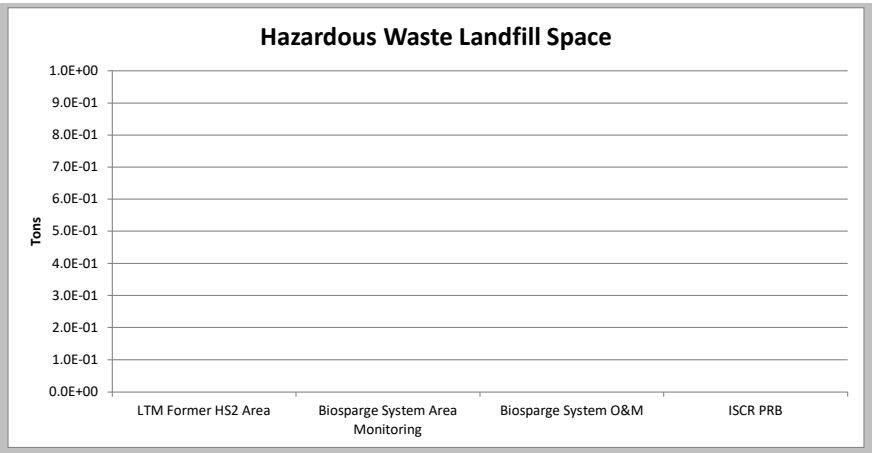

Total SOx Emissions
Metric Ton
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

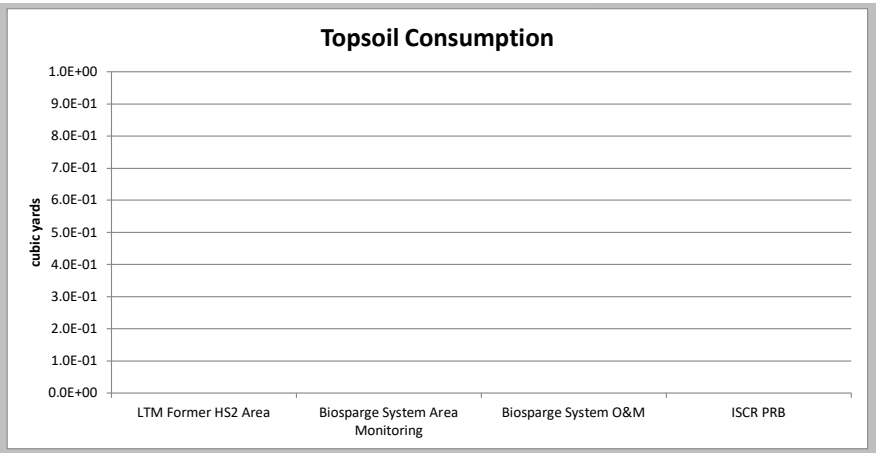

Total PM10 Emissions
Metric Ton
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

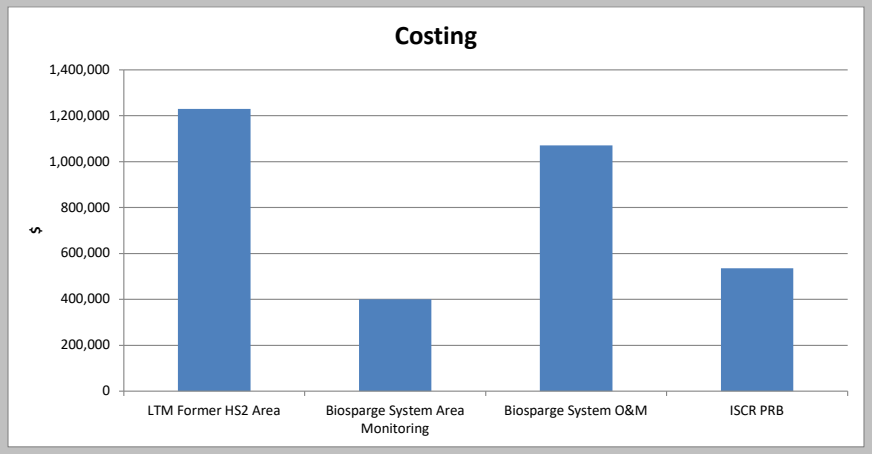

Accident Risk - Fatality
Risk of Fatality
4.00E-04
3.50E-04
3.00E-04
2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

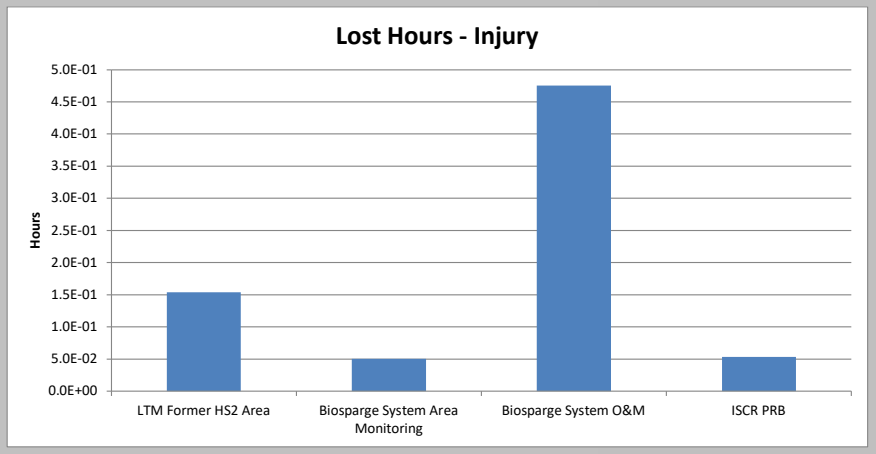

Accident Risk - Injury
Risk of Injury
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

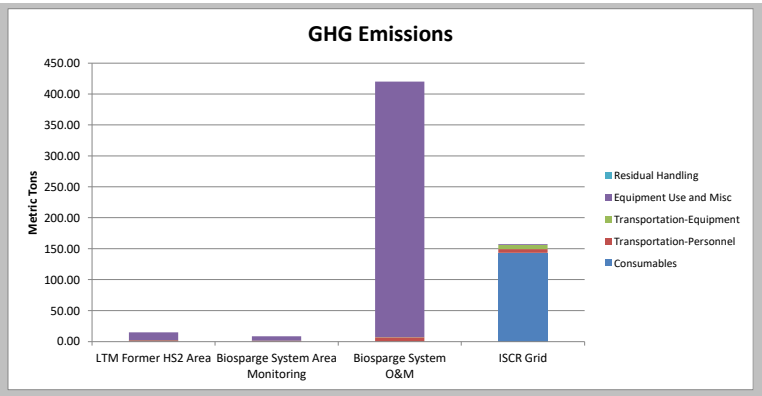

Costing
$
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

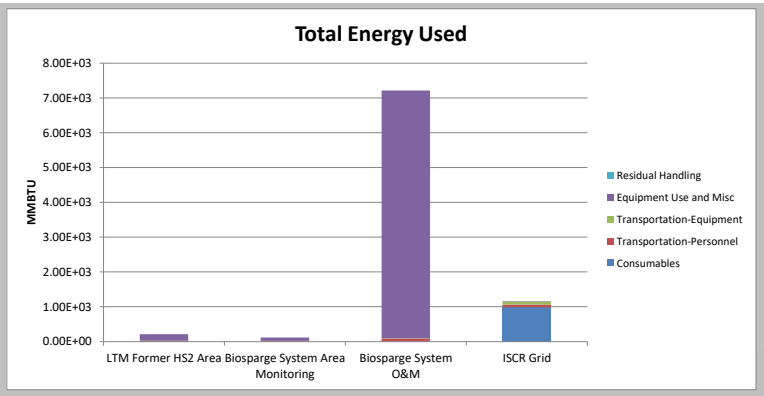

Lost Hours - Injury
Hours
5.0E-01
4.5E-01
4.0E-01
3.5E-01
3.0E-01
2.5E-01
2.0E-01
1.5E-01
1.0E-01
5.0E-02
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR PRB

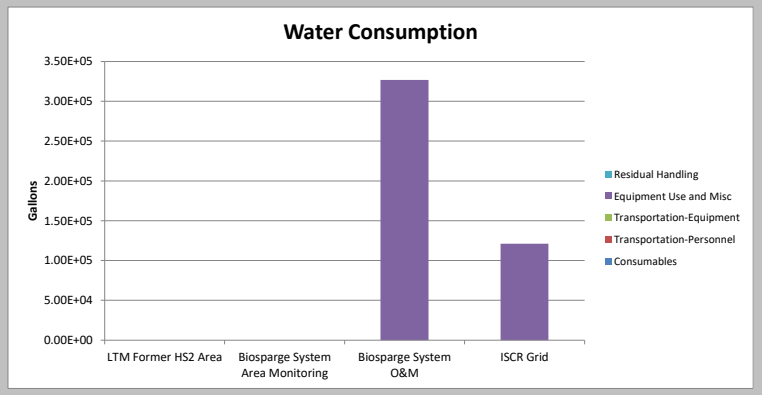
Sustainable Remediation - Environmental Footprint Summary
Option 3 ISCR Grid

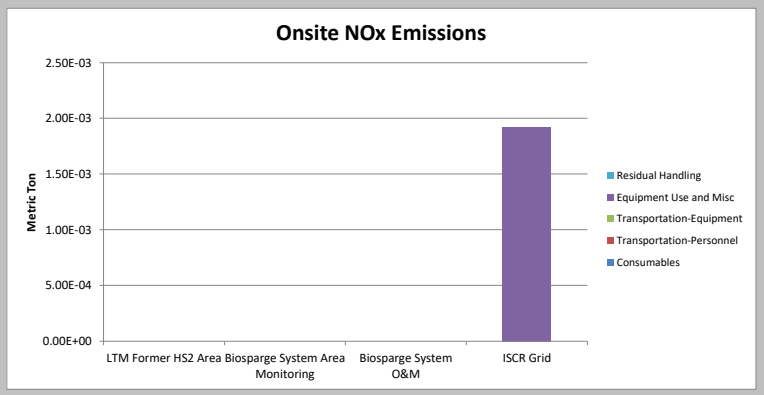
Phase	Activities	GHG Emissions	Total Energy Used	Water Consumption	Electricity Usage	Onsite NOx Emissions	Onsite SOx Emissions	Onsite PM10 Emissions	Total NOx Emissions	Total SOx Emissions	Total PM10 Emissions	Accident Risk Fatality	Accident Risk Injury
		metric ton	MMBTU	gallons	MWH	metric ton	metric ton	metric ton	metric ton	metric ton	metric ton		
LTM Former HS2 Area	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.90	2.4E+01	NA	NA	NA	NA	NA	7.9E-04	2.5E-05	1.1E-04	5.4E-05	4.3E-03
	Transportation-Equipment	0.17	2.2E+00	NA	NA	NA	NA	NA	5.4E-05	9.5E-07	4.8E-06	2.7E-05	2.2E-03
	Equipment Use and Misc	12.70	1.8E+02	5.3E-02	1.0E-04	0.0E+00	0.0E+00	0.0E+00	6.1E-02	4.6E-02	5.1E-03	2.0E-06	2.5E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	14.77	2.08E+02	5.27E-02	1.03E-04	0.00E+00	0.00E+00	0.00E+00	6.18E-02	4.57E-02	5.20E-03	8.30E-05	8.99E-03
Biosparge System Area Monitoring	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	1.36	1.7E+01	NA	NA	NA	NA	NA	5.6E-04	1.8E-05	8.0E-05	3.8E-05	3.1E-03
	Transportation-Equipment	0.12	1.6E+00	NA	NA	NA	NA	NA	3.9E-05	6.8E-07	3.4E-06	2.0E-05	1.6E-03
	Equipment Use and Misc	6.80	9.7E+01	3.8E-02	7.4E-05	0.0E+00	0.0E+00	0.0E+00	3.3E-02	2.4E-02	2.7E-03	1.4E-06	1.7E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	8.28	1.16E+02	3.77E-02	7.39E-05	0.00E+00	0.00E+00	0.00E+00	3.33E-02	2.45E-02	2.81E-03	5.92E-05	6.31E-03
Biosparge System O&M	Consumables	0.00	0.0E+00	NA	NA	NA	NA	NA	0.0E+00	0.0E+00	0.0E+00	NA	NA
	Transportation-Personnel	6.61	8.3E+01	NA	NA	NA	NA	NA	2.7E-03	8.6E-05	3.9E-04	1.9E-04	1.5E-02
	Transportation-Equipment	0.59	7.7E+00	NA	NA	NA	NA	NA	1.8E-04	3.3E-06	1.6E-05	9.4E-05	7.5E-03
	Equipment Use and Misc	412.77	7.1E+03	3.3E+05	6.4E+02	0.0E+00	0.0E+00	0.0E+00	4.4E-01	7.4E-01	3.6E-01	8.6E-05	3.7E-02
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	419.97	7.21E+03	3.27E+05	6.41E+02	0.00E+00	0.00E+00	0.00E+00	4.38E-01	7.37E-01	3.64E-01	3.66E-04	5.94E-02
ISCR Grid	Consumables	143.44	9.8E+02	NA	NA	NA	NA	NA	2.9E-01	5.7E-01	1.1E-01	NA	NA
	Transportation-Personnel	6.02	7.8E+01	NA	NA	NA	NA	NA	1.9E-03	3.6E-05	1.8E-04	5.2E-05	4.2E-03
	Transportation-Equipment	6.63	8.7E+01	NA	NA	NA	NA	NA	2.1E-03	3.7E-05	1.9E-04	4.1E-05	3.3E-03
	Equipment Use and Misc	1.15	1.3E+01	1.2E+05	0.0E+00	1.9E-03	1.2E-04	1.2E-04	3.0E-03	7.3E-04	1.1E-03	3.2E-06	4.0E-03
	Residual Handling	0.00	0.0E+00	NA	NA	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sub-Total	157.25	1.16E+03	1.21E+05	0.00E+00	1.92E-03	1.20E-04	1.20E-04	2.94E-01	5.75E-01	1.16E-01	9.64E-05	1.15E-02
Total		**6.0E+02**	**8.7E+03**	**4.5E+05**	**6.4E+02**	**1.9E-03**	**1.2E-04**	**1.2E-04**	**8.3E-01**	**1.4E+00**	**4.9E-01**	**6.1E-04**	**8.6E-02**

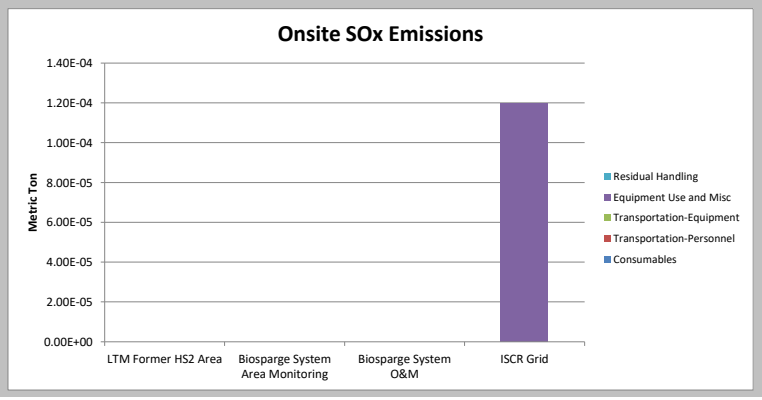
Remedial Alternative Phase	Non-Hazardous Waste Landfill Space	Hazardous Waste Landfill Space	Topsoil Consumption	Costing	Lost Hours - Injury	Percent electricity from renewable sources	Total Cost with Footprint Reduction
	tons	tons	cubic yards	$		%	
LTM Former HS2 Area	0.0E+00	0.0E+00	0.0E+00	574,000	7.2E-02	2.3%	$3,137,000
Biosparge System Area Monitoring	0.0E+00	0.0E+00	0.0E+00	400,000	5.0E-02	2.3%	
Biosparge System O&M	0.0E+00	0.0E+00	0.0E+00	1,070,000	4.8E-01	2.3%	
ISCR Grid	0.0E+00	0.0E+00	0.0E+00	1,120,000	1.1E-01	0.0%	
Total	**0.0E+00**	**0.0E+00**	**0.0E+00**	**$3,164,000**	**7.1E-01**	**1.7%**	

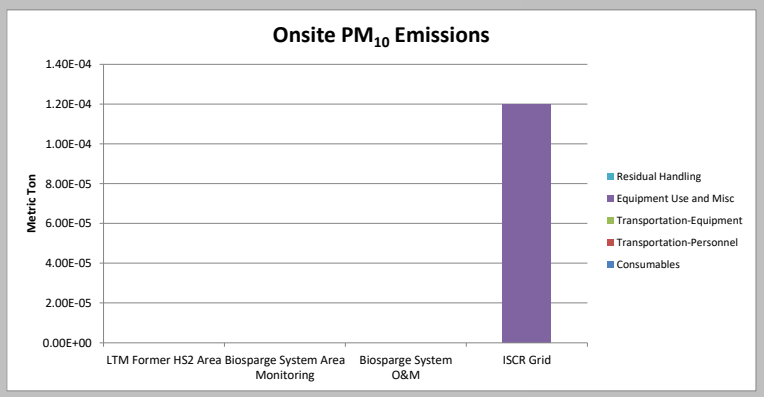

GHG Emissions
Metric Tons
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

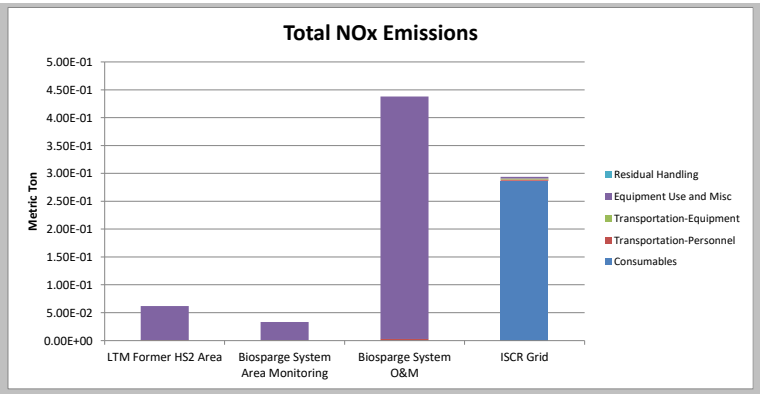

Total Energy Used
MMBTU
8.00E+03
7.00E+03
6.00E+03
5.00E+03
4.00E+03
3.00E+03
2.00E+03
1.00E+03
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

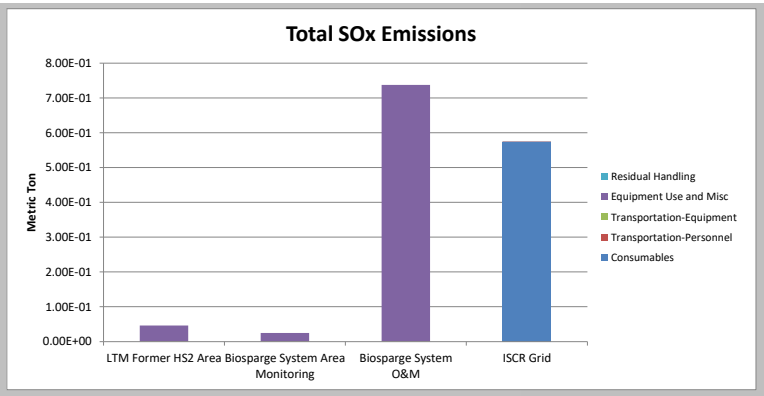

Water Consumption
Gallons
3.50E+05
3.00E+05
2.50E+05
2.00E+05
1.50E+05
1.00E+05
5.00E+04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

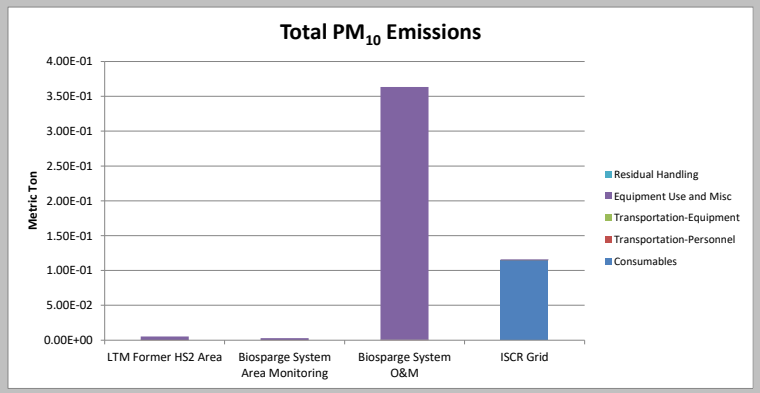

Onsite NOx Emissions
Metric Ton
2.50E-03
2.00E-03
1.50E-03
1.00E-03
5.00E-04
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

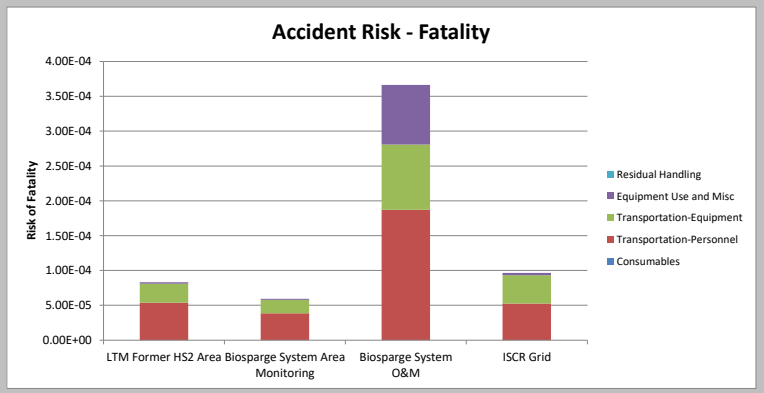

Onsite SOx Emissions
Metric Ton
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

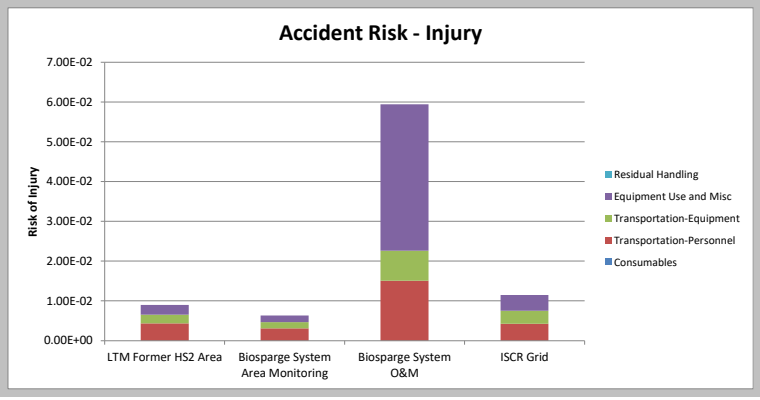

Onsite PM10 Emissions
Metric Ton
1.40E-04
1.20E-04
1.00E-04
8.00E-05
6.00E-05
4.00E-05
2.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

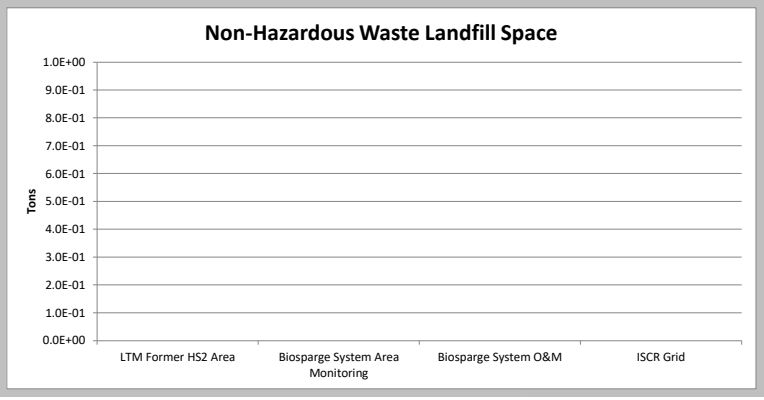

Total NOx Emissions
Metric Ton
5.00E-01
4.50E-01
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

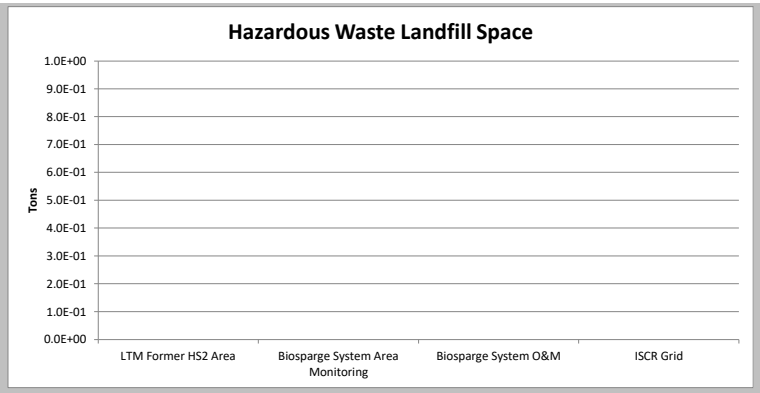

Total SOx Emissions
Metric Ton
8.00E-01
7.00E-01
6.00E-01
5.00E-01
4.00E-01
3.00E-01
2.00E-01
1.00E-01
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

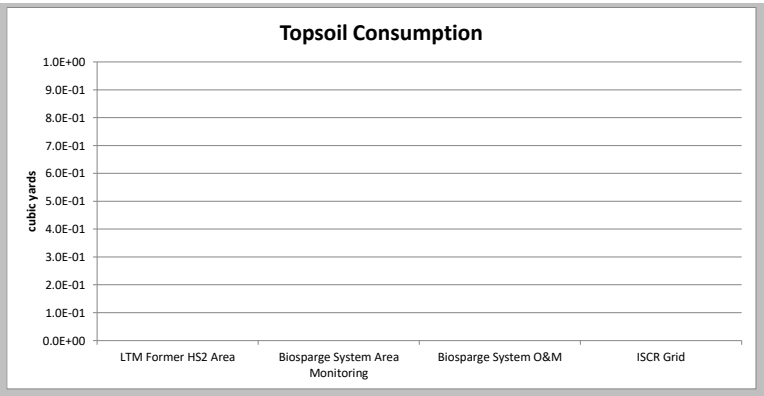

Total PM10 Emissions
Metric Ton
4.00E-01
3.50E-01
3.00E-01
2.50E-01
2.00E-01
1.50E-01
1.00E-01
5.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

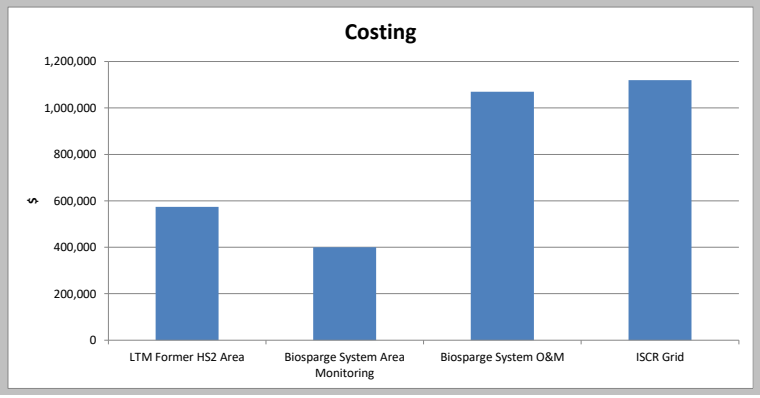

Accident Risk - Fatality
Risk of Fatality
4.00E-04
3.50E-04
3.00E-04
2.50E-04
2.00E-04
1.50E-04
1.00E-04
5.00E-05
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables

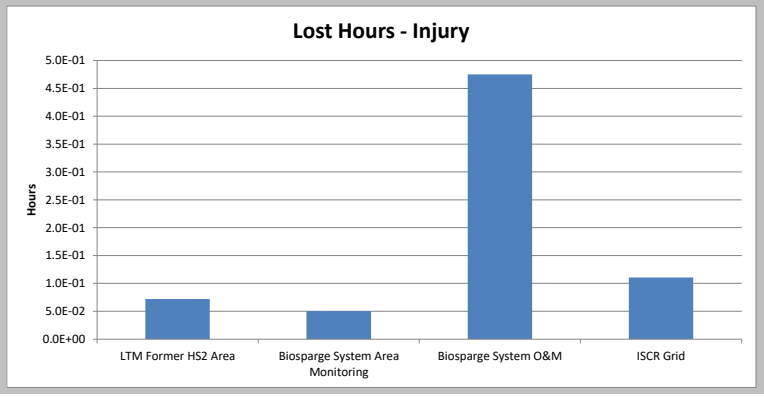

Accident Risk - Injury
Risk of Injury
7.00E-02
6.00E-02
5.00E-02
4.00E-02
3.00E-02
2.00E-02
1.00E-02
0.00E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid
Residual Handling
Equipment Use and Misc
Transportation-Equipment
Transportation-Personnel
Consumables


Non-Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Hazardous Waste Landfill Space
Tons
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Topsoil Consumption
cubic yards
1.0E+00
9.0E-01
8.0E-01
7.0E-01
6.0E-01
5.0E-01
4.0E-01
3.0E-01
2.0E-01
1.0E-01
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Costing
$
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid


Lost Hours - Injury
Hours
5.0E-01
4.5E-01
4.0E-01
3.5E-01
3.0E-01
2.5E-01
2.0E-01
1.5E-01
1.0E-01
5.0E-02
0.0E+00
LTM Former HS2 Area
Biosparge System Area Monitoring
Biosparge System O&M
ISCR Grid

AECOM
150 North Orange Avenue
Orlando, FL 32801
aecom.com

Project name:
MLP/VAB

Project ref:
MLP/VAB Former HS2 RAE ADP

To:
Ryan O'Meara
Kennedy Space Center, Florida

From:
Randy Sillan, PhD, PE
Linnea King Clark

Date:
September 26, 2023

Memo

Subject: Response to Comments on Former Hot Spot 2 Remedial Alternatives Evaluation; Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building Area (MLP/VAB), SWMU 056

AECOM's responses to comments provided by HydroGeoLogic and Tetra Tech from their review of the MLP/VAB, SWMU 056, Former Hot Spot 2 Remedial Alternatives Evaluation are provided here.

Responses to HydroGeoLogic Comments

1. Comment: Slide 2 – Please note that the second goal, obtain team consensus on the treatment area, does not appear to align with the second consensus statement in the cover letter. The second consensus statement in the cover letter is to conduct fate and transport modeling to support the remedial design.

   Response: The goals were revised to be consistent with the consensus statements.

2. Comment: Slide 10 (new slide 11) – It would be helpful to specify the depths associated with the deep groundwater referenced on this slide. How many data points were used in the Mann-Kendall analysis?

   Response: The first bullet was revised to state 5 sampling events were included in the Mann-Kendall trend analysis. At the time of the analysis, 5 groundwater sampling events were available for the analysis since shutdown of the air sparge system in April 2018. The second sub bullet was revised to show that deep groundwater refers to groundwater from 40 to 50 ft bls at the time of the Mann-Kendall trend analysis.

3. Comment: Slide 24 (new slide 26) – There is a typo on sparge well, 1st bullet.

   Response: Corrected.

4. Comment: Slide 45 (new slide 47) – The second bullet refers to cis-1,2-dichloroethane (cDCE) Natural Attenuation Default Concentration (NADC) plume. However, the 2021 data described on prior slides did not show cDCE concentrations greater than NADC.

   Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."

5. Comment: Slide 46 (new slide 49) – This option assumes 15 years of active treatment by the permeable reactive barriers (PRBs). Will the PRBs need to be replenished with amendment during that timeframe?

6. *Response: The expected treatment lifespan of the in-situ chemical reduction (ISCR) PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on*

the slide, the time to achieve the corrective action objective (CAO) of Groundwater Cleanup Target Levels (GCTLs) upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.

7. Comment: Options 2 and 3 – What is the estimated distance between PRB#2 or the downgradient edge of the treatment grid and the current bio barrier?

   Response: The biosparge barrier injection wells are approximately 250 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3. This distance was added to new slides #49 and #52. Note that the monitoring well network upgradient of the biosparge barrier is approximately 150 feet downgradient of ISCR PRB #2 in Option 2 and the ISCR grid in Option 3.

8. Comment: Slide 49 (new slide 54) – Parenthesis in first bullet under Option 3 should read "design and install grid."

   Response: Corrected.

Responses to Tetra Tech Comments

1. Comment: Slides 45 and 47 (new slide 47 and 51) – Bioaugmentation was retained as a technology on slide 41. However, there is no mention of this technology being combined with ISCR in Options 2 and 3 or costs associated with it in the attachments. Was bioaugmentation eliminated after further evaluation?

   Response: Bioaugmentation with a microbial consortia including Dhc was not eliminated but is not included in the conceptual designs for Options 2 and 3. Similar to the ISCR design at Hot Spot 3, bioaugmentation is not included because Dhc is likely present and the primary degradation pathway is expected to be abiotic. However, bioaugmentation can be added, if needed, during the remedial design phase with limited effect on remedy costs. A note was added to the slides to indicate that bioaugmentation is not included.

2. Comment: Slide 45 (new slide 47) – Second bullet under ISCR PRB Strategy does not agree with site characterization slides (no cDCE NADC plume shown on site characterization slides).

   Response: The second bullet was revised to "Install PRB at edge of cDCE GCTL plume to decrease mass flux of cDCE and a source of VC."

3. Comment: Slide 45 (new slide 47) – There is a typo at the end of the first bullet under implementation; "Host Spot 3" should read "Hot Spot 3".

   Response: Corrected

4. Comment: Slide 46 (new slide 49) – Please specify the expected lifespan of the PRBs on this slide. Costing for Option 2 appears to be one injection event to install PRBs. Are the PRBs expected to last through the estimated treatment timeframe (~15 years)?

   Response: The expected treatment lifespan of the ISCR PRBs is between 5 and 10 years but may be longer depending on groundwater and mass flux through the PRBs. As stated on the slide, the time to achieve the CAO of GCTLs upgradient of the biosparge barrier is 5 years. The need for ISCR PRB treatment beyond 5 years is uncertain and will be evaluated with modeling to optimize the ISCR PRB design. The estimated treatment lifespan of the ISCR options was added to slides #49 and #52.

5. Comment: Slides 47 and 48 (new slides 51 and 52) – Third bullet under ISCR Grid Strategy is misleading ("NADC plumes"). Figure on slide 48 shows treatment area extent is the vinyl chloride (VC) NADC plume with overlap of the cDCE GCTL plume.

   Response: The third bullet was revised on slide #51 to read "VC NADC plume." The text in the 1st sub-bullet on slide #52 was revised from "PRB #2" to "ISCR grid."

6. Comment: Slide 54 (new slide 59) – The consensus statements appear conflicting as currently written. Statement 1 recommends the selection of Option 2. However, statement 2 states the fate and transport model will support selection and optimal design of an ISCR remedy, which suggests the best ISCR remedy option is not yet determined. It is understood that Option 2 is more desirable for several reasons as stated on slide 53 (new slide 58). Will the selected alternative be reevaluated following the fate and transport modeling and prior to IM Work Plan preparation? If not, consider revising the first sub-bullet of Statement 2.

   Response: The first sub-bullet of Statement 2 was revised to state that the modeling will be performed "to develop optimal design for the ISCR remedy to manage matrix diffusion." This revision is made to clarify that the modeling effort will be used to optimize the design of Option 2.