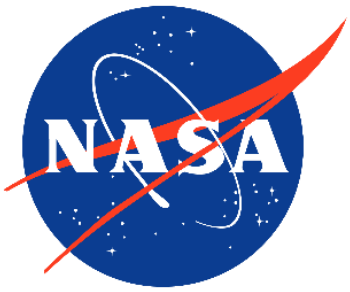
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Prepared for:



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

A-E Contract 80KSC019D0010
Task Order 80KSC019F0075

March 2025
Revision 0

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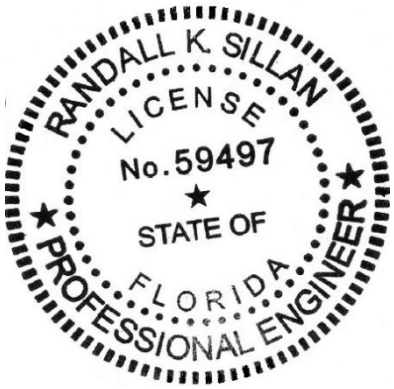
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In accordance with the provisions of Florida Statutes, Chapter 471, this Corrective Measures Implementation and Interim Measures Annual Status Report for the Kennedy Space Center Mobile Launch Platform Rehabilitation Sites / Vehicle Assembly Building 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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March 25, 2025

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

%	percent
10x	10 times
µg/L	micrograms per liter
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
FDEP	Florida Department of Environmental Protection
GCTL	Groundwater Cleanup Target Level
HCP	High Concentration Plume
IGM	interim groundwater monitoring
IM	Interim Measures
IMWP	Interim Measures Work Plan
ISCR	in situ chemical reduction
IWP	Implementation Work Plan
KSC	Kennedy Space Center
KSCRT	KSC Remediation Team
LCP	low concentration plume

LNAPL	light non-aqueous phase liquid
LTM	long-term monitoring
mg/L	milligrams per liter
mV	millivolts
MLP	Mobile Launch Platform
MW	monitoring well
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
PLC	Programmable Logic Controller
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
USEPA	U.S. Environmental Protection Agency
VAB	Vehicle Assembly Building
VABRA	Vehicle Assembly Building Reassessment Area
VC	vinyl chloride

EXECUTIVE SUMMARY

This report presents a summary of the Corrective Measures Implementation (CMI) and Interim Measures (IM) implementation activities that occurred from May 2023 through December 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 areas lie within SWMU 056 and are identified by historical site investigation activities where monitoring and remedial actions have been implemented.

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. A hot spot is defined as the area where chlorinated volatile organic compound (CVOC) impacts are greater than 10 times NADCs (10xNADC). 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 of reducing the CVOC concentration below NADCs. 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 Former Hot Spot 1; therefore, no additional activities have been reported for the Former Hot Spot 1 site. The LCP is defined as the area where CVOC impacts are greater than GCTLs and below NADCs.

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 corrective measure to treat groundwater immediately upgradient of the wetland where vinyl chloride concentrations were greater than 100 micrograms per liter (µg/L) (NASA 2019b). The biosparge barrier created a zone of elevated dissolved oxygen in the groundwater surrounding the biosparge barrier, enhancing the aerobic degradation of VC. 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 the compressor trailer was destroyed by an electrical fire. Groundwater performance monitoring and direct push technology (DPT) groundwater sampling performed in 2021 indicated the dissolved plume was migrating between biosparge barrier segments; therefore, a new compressor and trailer were installed in November 2021. Restart of the biosparge system took place in June 2022 and monthly 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 bridge the gap 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 High Concentration Plume (HCP) and LCP evaluation effort. The HCP is defined as the area where CVOC impacts are above NADCs and below 10xNADC. The analytical results from the newly installed monitoring wells indicated the HCP and LCP continued to migrate downgradient of the biosparge barrier. Monitoring well installation in this area for further evaluation is contingent on access surface conditions in the wetland area (Decision Item 2310-D10). In November 2023, an additional three monitoring wells were installed south of the biosparge barrier to further evaluate the HCP and LCP boundaries (Decision Items 2310-D10 and 2310-D11). Details of the monitoring well installations, semi-annual performance groundwater monitoring, biosparge OM&M activities, and LCP monitoring are provided in this report.

Former Hot Spot 2

Former Hot Spot 2, located downgradient of Former Hot Spot 1, was defined as the area with cis-1,2-dichloroethene concentrations greater than the Florida Department of Environmental Protection (DEP) Natural Attenuation Default Concentration (NADC) of 700 µg/L and TCE concentrations greater than the NADC of 300 µg/L. Air sparging was implemented at Hot Spot 2 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. Analytical results indicated increased concentrations below and outside the existing treatment area. Since concentrations within the treatment area remained below GCTLs, 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).

As groundwater monitoring continued, it was noticed that contaminant concentrations continued to increase, indicating 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. An RAE 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 remained above DEP 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. Analytical results from the newly installed wells indicated a collapse of the LCP footprint. In November 2023, one destroyed monitoring well was replaced within the Former Hot Spot 2 LCP (Decision Item 2310-D08).

Hot Spot 3

Hot Spot 3 is located adjacent to and underneath the western MLP structure, when present, and defined as the area where CVOC impacts are greater than 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 included 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. 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 was 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 2022a). 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), presented in February 2023. Team consensus was reached to develop an Implementation Work Plan for In-Situ Chemical Reduction design and approach (Decision 2302-D28).

Hot Spot 3 (Outstanding Florida Water)

The dissolved plume from Hot Spot 3 extends to an area near an Outstanding Florida Water (OFW) body, which is a protected body of water to preserve existing water quality. The leading edge of the dissolved plume (referred to as the Hot Spot 3 OFW area) is in interim groundwater monitoring (IGM) (NASA 2019b). Recommendations in the 2019 CMI and IM Annual Report, transitioned Hot Spot 3 OFW sampling frequency from semi-annually to annually beginning in 2020 based on groundwater contaminant concentrations being below DEP GCTLs. The September 2021 and December 2022 annual IGM activities at the Hot Spot 3 OFW area indicated that CVOC concentrations remained less than DEP GCTLs in monitoring wells sampled.

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 monitoring well VABRA-MW0010 to recover LNAPL and IGM was performed annually until the future of the MLP structure was determined (NASA 2019b). As of April 2017, monthly inspection of the passive skimmer indicated LNAPL was no longer present or detected with an in-well probe. May 2018 IGM data indicated contaminant concentrations from monitoring well VABRA-MW0010 were below DEP GCTLs; therefore, measurement of LNAPL was discontinued in September 2018. In a letter dated January 30, 2020, DEP 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 No Further Action 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 added to the 2020 LTM event to obtain data in areas with perceived data gaps. Sampling results from 2020 indicated elevated vinyl chloride concentrations in groundwater collected from select monitoring wells throughout the SWMU. The monitoring wells and periphery monitoring wells were resampled and results agreed with the data from previous groundwater sampling events. The LCP LTM monitoring well network was evaluated and details were provided in the 2021 CMI and IM Annual Report (NASA 2022a).

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. The 2022 biennial sampling event was delayed until 2023 due to site operations limiting access to perform monitoring well installations and sampling. Analytical data from the March 2023 biennial sampling event indicated a reduction of the overall LCP since the previous sampling event in 2020 (NASA 2024). An additional five monitoring wells were installed and added to the LCP network (Decision Items 2310-D08 through 2310-D11) and one existing monitoring well was added to the biennial sampling plan (Decision Item 2310-D12) to monitor plume behavior. Two remaining monitoring wells were installed within the VAB perimeter (east and southwest of the VAB) in 2023.

Sitewide Water Gauging

Sitewide water gauging events are alternated seasonally to capture hydrogeologic conditions during the dry (typically fall) and wet (typically spring and summer) 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. The sitewide water gauging event was performed in July 2023. In addition to sitewide water gauging, groundwater elevations were

collected from monitoring wells prior to sampling during the 2023 (October and November) IGM, performance groundwater monitoring, and LTM activities.

MLP/VAB Groundwater Monitoring Program

Sampling frequencies for the monitoring areas within the MLP/VAB groundwater monitoring program are either semi-annual, annual, or biennial based on historical trends. However, groundwater sampling is no longer performed at Hot Spot 4. 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
- 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 select CVOCs (Decision Items 2406-D14 and 2406-D15).
- **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. An RAE, performed in 2023 to address HCP migration towards the treatment barrier, is pending DEP approval at the time of this report's submission. Semi-annual IGM will continue (Decision Item 2406-D16), and the sampling plan will be evaluated one year after implementation of the selected technology from the RAE (Decision Item 2304-D17).
- **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 DEP review. Implementation of the IMWP is anticipated following DEP approval.
- **Hot Spot 3 (OFW)**: Performance monitoring will continue on an annual basis to monitor groundwater quality downgradient of the Hot Spot 3 treatment area (Decision Item 2406-D18).
- **Hot Spot 4**: DEP approved abandonment of the LNAPL skimmer monitoring wells VABRA-MW0007 through VABRA-MW0009. These monitoring wells 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 the addition of TCE to the analyte list and modified monitoring well network (Decision Items 2406-D19). The next event is

scheduled for 2025. The 2025 data will reflect four years of groundwater conditions from the newly installed monitoring wells (Decision Item 2310-D15) prior to re-evaluating the LTM monitoring well network or further modifying the sampling plan.

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 is designated Solid Waste Management Unit (SWMU) 056 under KSC's Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

AECOM Technical Services, Inc. (AECOM) prepared this report and completed the referenced site activities for NASA under Contract 80KSC019D0010, Task Order 80KSC019F0075. The Advanced Data Package (ADP), presented in preparation for this report, received KSC Remediation Team (KSCRT) approval at the June 2024 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 May through December 2023 relating to the high concentration plume (HCP) and low concentration plume (LCP). The HCP is defined as the area where chlorinated volatile organic compound (CVOC) impacts are above Florida Department of Environmental Protection [DEP] Natural Attenuation Default Concentration (NADC) and below 10 times greater than NADC (10xNADC). The LCP is defined as the area where CVOC impacts are greater than DEP Groundwater Cleanup Target Levels (GCTLs) and below NADCs. Activities included interim groundwater monitoring (IGM) in former treatment areas; performance groundwater monitoring; monitoring well installation and retrofitting to support evaluation of the low concentration plume (LCP) and overall sitewide monitoring well maintenance; surveying, 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, 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 LCP and ancillary plumes. A total of 4,922 direct push technology (DPT) groundwater 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 percent (%) 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 in situ aerobic bioremediation of vinyl chloride (VC) to mitigate the potential discharge of the associated high concentration VC plume (concentrations greater than the DEP NADC of 100 µg/L) to adjacent wetland areas (surface water).

LTM of the 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 MLP/VAB in the 2021 CMI and IM Annual Status Report (NASA 2022a).

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) of reducing CVOC concentrations to below NADCs was achieved, and documentation of the enhanced bioremediation activities and results were 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 implemented following KSCRT approval 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]).

A biosparge barrier was installed to mitigate groundwater contaminant migration from the Former Hot Spot 1 area and 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 was 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 re-start 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 monthly OM&M and semi-annual biosparge performance monitoring event completed in Fall 2023.

Following completion of active remediation in the Former Hot Spot 1 area, performance of the biosparge barrier is evaluated in relation to the upgradient HCP within the Former Hot Spot 2 area, rather than separately.

1.3.2 Former Hot Spot 2

Following achievement of the CAO within Former 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 DEP GCTLs, and VC was delineated to its NADC. The area of the primary plume swath with TCE concentrations greater than the NADC of 300 micrograms per liter (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 simultaneously using 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);
- Remedial Alternatives Evaluation (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 was restarted in June and July 2013, respectively, following troubleshooting activities. System

restart after the compressor replacement and results from the following 3 years of operation were 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 an air compressor failure. The compressor was unable to be successfully repaired by a certified manufacturer technician; therefore, a new compressor was installed and the system 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 shutdown 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 below land surface (bls) at MLPV-IW0030).

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

October 2019 IGM data indicated that the 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 beginning in 2020. Following the 2020 IGM event, plume analytics indicated a significant mass and concentration of cDCE and VC remained below the treatment interval and were 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 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, 25 DPT groundwater samples from 12 locations were collected at 4-foot intervals from 41 feet to 45 feet bls and 45 feet to 49 feet bls. One deeper sample was collected from 51 feet to 55 feet bls to confirm the vertical boundary of the high concentration plume (HCP; where CVOC concentrations are greater than NADCs). Evaluation of DPT data indicated VC remained the predominant contaminant within the Former Hot Spot 2 treatment area, with the highest concentrations located north of the treatment area. VC concentrations that exceeded the NADC indicated an HCP persisted in the deeper lower permeability layer. The HCP in the deeper interval was 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 an RAE, (Decision item 2203-D10). An RAE 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 remained above DEP GCTLs and NADCs. The RAE recommended in-situ chemical reduction (ISCR) using two permeable reactive barriers (Decision Item 2310-D23). Additionally, the 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). Details of the soil core activities, RAE, and semi-annual IGM activities were provided in the 2022 - April 2023 Annual CMI and IM Report (NASA 2024). This report summarizes the semi-annual IGM sampling event performed in Fall 2023.

1.3.3 Hot Spot 3 and Hot Spot 3 OFW Area

During VAB reassessment activities, an area with CVOC concentrations in groundwater 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 HCP, and an LCP (CVOC greater than DEP GCTL). The activities in this area followed the KSCRT multi-step EE process and details were 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 (IWP) (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 IWP Addendum for additional injection activities. Details of the Hot Spot 3

Bioremediation IM activities from October 2018 through April 2019 were 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 bls, aquifer conditions 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. Data from additional DPT groundwater sampling performed in March and April 2021 was provided in the 2021 CMI and IM Annual Status Report (NASA 2022a).

In October 2015, two monitoring wells (MW0011 and MW0012) were installed adjacent to the Outstanding Florida Water (OFW) downgradient of Hot Spot 3. An OFW is defined as a protected body of water to preserve existing water quality. The monitoring wells were installed to evaluate the extent of the upgradient dissolved CVOC plume from Hot Spot 3. 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 GCTL VC plume (concentrations greater than 1 µg/L) 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 were 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.

In March 2021, site access to Hot Spot 3 was reinstated and DPT groundwater performance monitoring was implemented to evaluate the extent of CVOC contaminant concentrations above NADCs and whether additional treatment was required to promote continued dissolved plume degradation. The April 2021 analytical data indicated CVOC concentrations exceeded their respective NADCs and an Interim Measures Work Plan (IMWP) was submitted to DEP in

January 2024. In June 2024, supplemental DPT groundwater sampling was performed to evaluate site conditions in preparation of the IMWP. The June 2024 analytical groundwater data was presented to DEP in the IMWP. DEP provided comments and the Response to Comments was submitted in September 2024. At the time of this report's submittal, the IMWP is pending DEP approval. This report summarizes the annual sampling event performed in October 2023 and confirmation sampling performed on November 16, 2023.

1.3.4 Hot Spot 4

During the VABRA 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 was 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 (COCs) identified within Hot Spot 4 included polycyclic aromatic hydrocarbons (PAHs), 1-methlynaphthalene, and naphthalene at concentrations greater than their respective DEP GCTLs. Details of the Hot Spot 4 delineation activities were presented in the Site Characterization EE ADP (NASA 2015c) and IGM was selected to monitor the stability of the LNAPL and groundwater COC 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. In May 2018, an oil/water interface probe was deployed in monitoring wells VABRA-MW0007 through VABRA-MW0009 and did not detect LNAPL greater than 0.01 feet thick. A sheen was observed in VABRA-MW0010; and therefore, a groundwater sample was collected to evaluate the presence of petroleum related compounds.

The analytical results indicated that concentrations for each of the analyzed VOCs (PAHs, benzene, toluene, ethylbenzene, xylene, methyl tert-butyl ether, and total recoverable petroleum hydrocarbon) were either not detected or detected below their respective GCTLs. Details of the associated activities were provided in the 2018 CMI and IM Annual Report (NASA 2019b), with the recommendation the skimmer be removed and monitoring wells be abandoned. No Further Action (NFA) for Hot Spot 4 was requested. Per a DEP letter dated January 30, 2020, NFA will be approved once the entire SWMU achieves NFA requirements. DEP approval was granted for the removal of the LNAPL skimmer 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 is planned prior to the request for NFA.

1.3.5 Long-Term Groundwater Monitoring Program

Prior to 2018, sampling results were documented in separate 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 LTM 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.

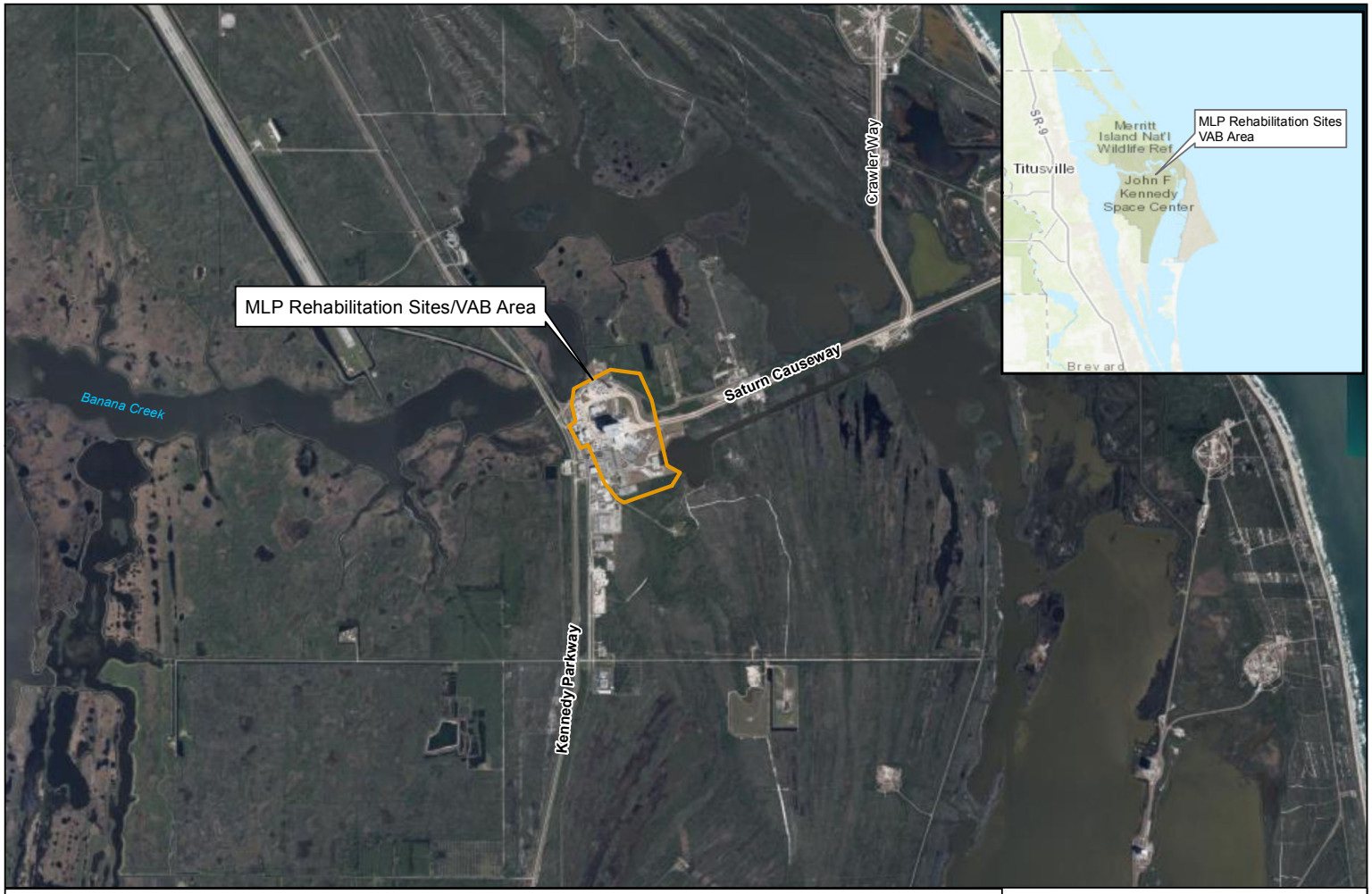
Sampling frequency for LTM remains biennial and the sampling program is now referenced as LCP LTM. In 2021, an evaluation of the LCP LTM network concluded that additional monitoring wells were needed to observe the LCP characteristics. Monitoring well installation activities and March 2023 LTM sampling was summarized in the 2022 - April 2023 Annual CMI and IM Report and indicated a reduction in size of the LCP (NASA 2024). This report summarizes additional monitoring well installations and supplemental LTM sampling activities performed in November 2023.

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 May through December 2023 and presenting the results associated with:

- CMI activities related to the biosparge barrier area, including OM&M and performance groundwater monitoring;
- IGM activities within the Former Hot Spot 2;
- Performance monitoring within the Hot Spot 3 OFW areas; and
- LCP LTM monitoring well network modifications and sampling.

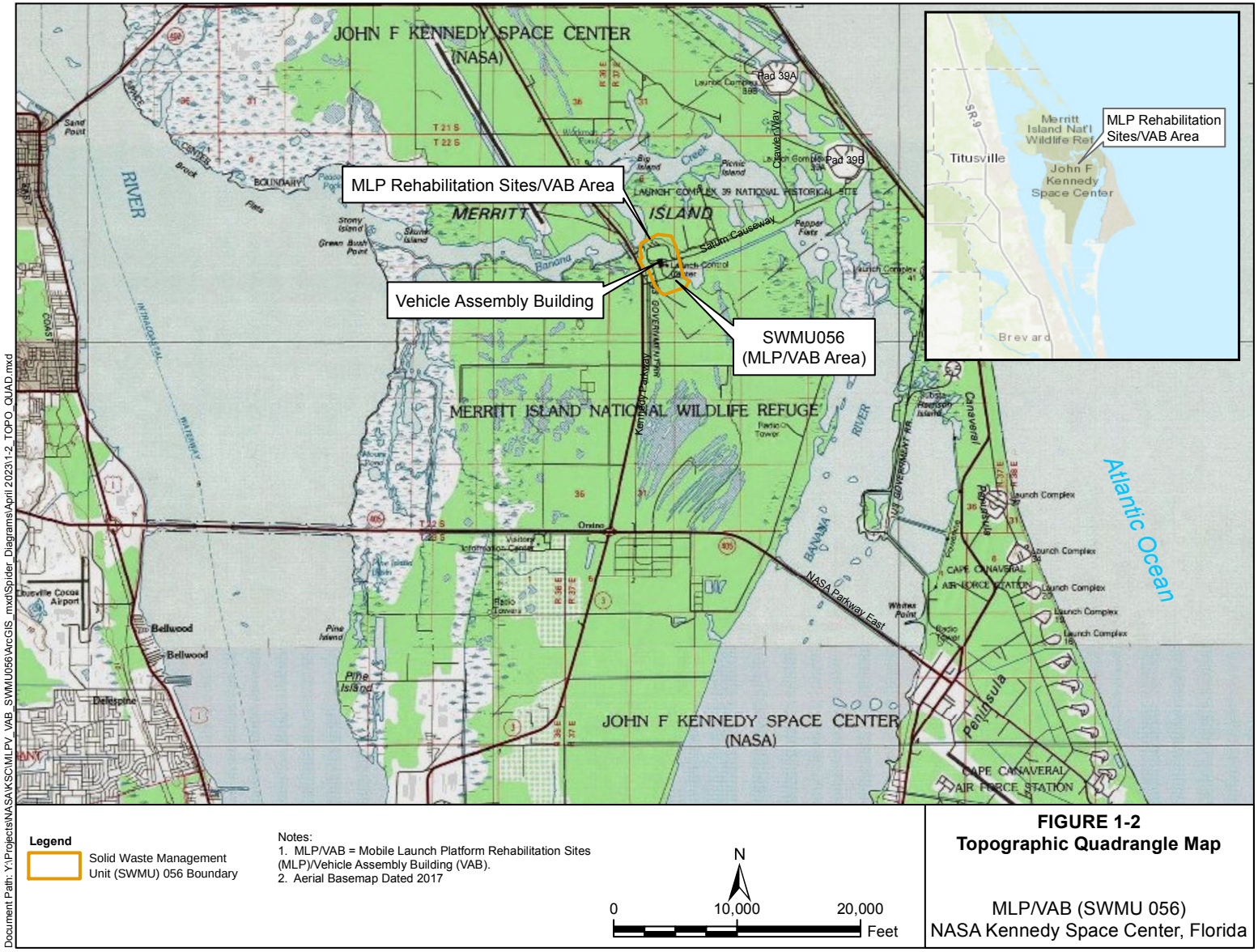
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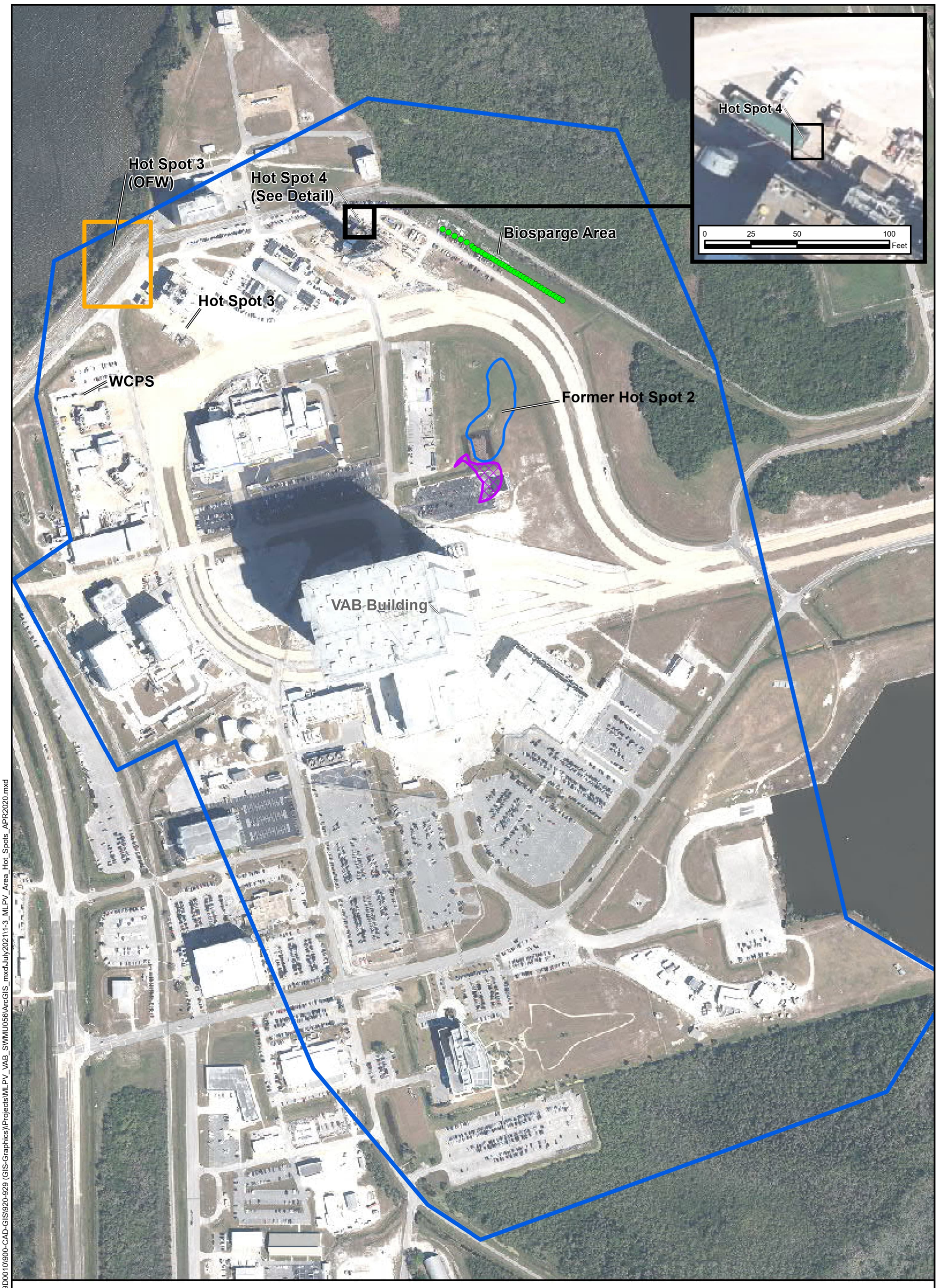


Notes:
1. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Area (VAB) (Solid Waste Management Unit 056)
2. Aerial Basemap Dated 2017

FIGURE 1-1
Site Location Map

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


JOHN F KENNEDY SPACE CENTER
(NASA)
MLP Rehabilitation Sites/VAB Area
Vehicle Assembly Building
SWMU056
(MLP/VAB Area)
MERRITT ISLAND
MERRITT ISLAND NATIONAL WILDLIFE REFUGE
Atlantic Ocean
Titusville
Merritt Island Nat'l Wildlife Ref
John F Kennedy Space Center
Brevard
Pad 39A
Pad 39B
Saturn Causeway
NASA Parkway East
CAPE CANAVERAL AIR FORCE STATION
Bellwood
Pine Island
Delespine
Document Path: Y:\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\April 2023\1-2_TOPO_QUAD.mxd
Legend
Solid Waste Management Unit (SWMU) 056 Boundary
Notes:
1. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP)/Vehicle Assembly Building (VAB).
2. Aerial Basemap Dated 2017
N
0
10,000
20,000
Feet
FIGURE 1-2
Topographic Quadrangle Map
MLP/VAB (SWMU 056)
NASA Kennedy Space Center, Florida



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Legend

- Biosparge Well Location
- SWMU 056 (MLP/VAB Boundary Area)
- OFW Investigation Area
- Former Hot Spot 1 LTM Area

Notes:
1. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLP) Vehicle Assembly Building (VAB).
2. LTM = Long-term Monitoring
3. OFW = Outstanding Florida Waters
4. Source of 2018 aerial: Florida Department of Transportation Aerial Photo Lookup System website.
5. SWMU = Solid Waste Management Unit
6. WCPS = West Crawler Park Site

N

0 400 800 Feet

FIGURE 1-3
Hot Spot Areas

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

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2 REMEDIAL ACTION FIELD ACTIVITIES

2.1 OVERVIEW

As reported in **Section 1**, three historical remedial action efforts were implemented at the MLP/VAB site (air sparge system, bioremediation, and passive LNAPL skimmer), and are complete or no longer active. Bioremediation within Former Hot Spot 1 (the former source area) was implemented through the CMD and is complete (NASA 2008, 2009). Air sparging was implemented in the Former Hot Spot 2 area in 2012 and operated until April 2018 (NASA 2019b). 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 2022a). 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 screened 48 to 50 feet bls were installed between the two existing sparge walls. Details of the system installation and biosparge expansion were provided in the 2022 - April 2023 Annual CMI and IM Report (NASA 2024).

2.2 BIOSPARGE SYSTEM OPERATION, MAINTENANCE & MONITORING

The following sections summarize biosparge activities completed from May 2023 through December 2023. During the July 2023 and December 2023 OM&M visits for the Former Hot Spot 1 and Former Hot Spot 2 biosparge system, it was noted that the biosparge area was saturated and wellheads submerged due to rain events. Therefore, limited parameters were collected due to restricted access to the monitoring wells. Additionally, monitoring well MLPV-ASMW0001 was buried under staged construction gravel beginning in July 2023, so parameters were not recorded for that monitoring well from July 2023 through December 2023. Field notes for the reporting period are provided in **Appendix B**. The OM&M logs for the reporting period are provided in **Appendix C**. The current biosparge system layout is presented in **Figure 2-1**. A piping and instrumentation diagram (P&ID) for the sparge system provided by the manufacturer is provided as **Appendix D**.

2.2.1 Telemetric Monitoring

Programmable Logic Controller (PLC) communications were received daily via email to confirm the sparge system was operating properly. The results of the telemetric monitoring recorded by week are provided in **Table 2-1**. During this reporting period, (May 2023 through December 2023), the biosparge system was operational 219 out of 244 days (approximately 90%), with zero shutdowns caused by mechanical part failure. The dates and reasons for loss of operation are summarized below:

- June 16, September 22, October 20, October 23, November 20, and December 20, 2023: The sparge system was shut down briefly to perform general maintenance on the system, including oil changes, belt tightening/replacement, select flow meter and filter replacements. System was operational upon departure for each event;
- June 26 and October 5, 2023: The sparge system was shut down to investigate a high temperature alarm and loss of telemetry. PLC interface was tightened with screws and telemetry was restored;
- July 11 through 13, 2023: The sparge system was shut down in preparation for and during the sitewide groundwater gauging event;
- October 9 through 12, 2023 and October 19 through 20, 2023: the sparge system was shut down in preparation of and during the fall 2023 groundwater sampling event;
- November 10 through 17, 2023: the sparge system was shut down in preparation for and during the monitoring well installation and sampling activities.

2.2.2 Operational Data

A summary of the sparge system operational readings is provided in **Table 2-2**. Sparge well locations are adjacent to a swale and can be inaccessible due to water and dense vegetation. During this reporting period, vegetation clearing occurred monthly as part of general site maintenance when the area was accessible.

A summary of the sparge system operational parameters is presented for the eight monthly OM&M events from May through December 2023 for operational Legs 1, 2, and 5. Manifolds for Leg 3 and Leg 4 are not associated with treatment wells and therefore not utilized. The biosparge system Legs 1, 2, and 5 were scheduled to operate for 8-hour intervals each per day, alternating continuously. The operational parameter summary is provided below:

- Leg 1:
  - Air flow rates ranged from 15.0 to 32.8 standard cubic feet per minute (scfm) with an average of 25.5 scfm.
  - Pressures ranged from 20.0 to 22.0 pounds per square inch (psi) with an average of 21.0 psi.

- Leg 2:
  - Air flow rates ranged from 16.0 to 26.8 scfm, with an average of 23.3 scfm.
  - Pressures ranged from 19.5 to 25.0 psi, with an average of 21.9 psi.
- Leg 5:
  - Air flow rates ranged from 18.4 to 25.9 scfm, with an average of 22.5 scfm.
  - Pressures ranged from 22.5 psi to 26.0 psi, with an average of 24.1 psi.

Readings indicated there were no obstructions to sparge wells, prior repairs to Leg 5 transfer pipe in 2023 remained intact, and flows to the expansion wells continued to distribute air as designed.

2.2.3 Wellhead Pressures and Flow Rates

When accessible, wellhead readings for pressure and air flow rate were collected. The data are provided in **Table 2-3**, and a summarized below:

- Original biosparge barrier wells and 2023 expansion biosparge wells (Legs 1 and 2)
  - Air flow rates ranged from 0.00 to 34.90 acfm (average of 2.51 acfm)
  - Pressures ranged from 15.40 to 23.00 psi (average of 18.91 psi).
  - Elevated flow readings were recorded in July 2023 and attributed to water infiltrating the pitot tube used to measure the differential pressure. Excluding the anomalous readings, flows were more representative of design parameters.
  - In September 2023, low pressures ranging from 0.01 psi to 0.76 psi were recorded in the 2023 expansion biosparge wells. A flow rate of 0.00 acfm was limited to sparge wells ASW07, ASW09, and ASW10 and it was determined that flow meter head replacements were warranted for several of the sparge wells. The flow meters on sparge wells were replaced outside of this reporting period and detailed under a separate cover.
- Expansion biosparge barrier wells (Leg 5)
  - Air flow rates ranged from 2.40 to 4.20 acfm (average of 3.27 acfm)
  - Pressures ranged from 19.00 to 23.00 psi (average of 21.15 psi).

The air flow and pressure data recorded from biosparge wells in Legs 1, 2, and 5 were generally within the historical range and averages, and the system operated as designed.

2.2.4 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) and ASMW0004 through ASMW0006 (downgradient), and piezometers ASPZ0001R and ASPZ0002, when accessible. Parameters for ASMW0001 were only collected in May and June, due to the aforementioned

gravel. The DO measurements for the reporting period are presented in **Table 2-4** and summarized below.

The average DO concentration measured at the upgradient monitoring wells ASMW0001 through ASMW0003 was 5.31 milligrams per liter (mg/L). The average DO concentration measured at the downgradient monitoring wells ASMW0004 through ASMW0006 was 3.63 mg/L. The average DO concentration at piezometers ASPZ0001R and ASPZ0002 was 5.35 mg/L.

The measured DO concentrations indicate that an aerobic zone (concentrations greater than 1 mg/L) 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 was approximately 0.21 mg/L based on 2023 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 is meeting the objective of providing an aerobic groundwater environment for the treatment of VC.

2.3 LCP LTM Monitoring Well Installation and Replacement

Monitoring well installation and replacement activities took place to fulfill recommendations from the 2022 - April 2023 CMI and IM Annual Status Report (NASA 2024). Recommendations from the report were as follows:

- Install three new monitoring wells, screened 35 to 45 feet bls, southeast of the biosparge barrier and add them to the LCP LTM biennial groundwater monitoring plan.
- Depending on the analytical results from the three proposed monitoring wells, install a fourth monitoring well, screened 37 to 47 feet bls, within the wetland area to the east (downgradient) of these monitoring wells.
- Replace monitoring well MLPV-IW0053, screened 35 to 45 feet bls, (part of the original sampling plan but destroyed by construction activities).
- Replace monitoring well, MLPV-IW0001S, screened 2 to 12 feet bls, as general maintenance of the monitoring well network. This monitoring well is not currently assigned to a sampling plan.

The previous CMI and IM Annual status report, from 2021, also recommended the installation of two monitoring wells. However, due to access restrictions in 2022 within the VAB area, the monitoring wells could not be installed. Those two monitoring wells, MLPV-MW0111 (screened 45 to 55 feet bls) and MLPV-MW0112 (screened 47 to 57 feet bls) were installed during this reporting period along with the three monitoring wells recommended in the 2022 – April 2023 CMI and IM report.

Prior to monitoring well installations, proposed locations [as presented in the 2022 – April 2023 CMI and IM Update ADP (NASA 2023) approved by the KSCRT in October 2023 (Decision Items 2310-D08 through D11)] were staked using a mobile Global Positioning System unit and surveyed by KSC utility locators. In November 2023, Preferred Drilling Solutions, Inc. installed five new and two replacement monitoring wells using sonic drilling technology. The locations of MLPV-MW0111 through MLPV-MW115, MLPV-IW0053R, and MLPV-IW0001SR are shown in **Figure 2-2**. Monitoring well installations were conducted within the biosparge barrier (MLPV-IW0001SR), southwest and upgradient of the biosparge barrier (MLPV-MW0113), northeast and downgradient of the LCP (MLPV-MW0114 and MLPV-MW0115), within the Former Hot Spot 2 area (MLPV-IW0053R), and in surrounding areas of the VAB (MLPV-MW0111 and MLPV-MW0112).

Monitoring wells were constructed with 1-inch diameter schedule 40 polyvinyl chloride riser and 10 feet of 0.010-slot screen, prepacked with 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, 8-inch round bolt-down vaults, and 2-foot by 2-foot square, 4-inch-thick 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 LCP monitoring well network is shown in **Figure 2-3**.

Professional land surveys of the 37 previously installed LCP monitoring wells (NASA 2024) and the seven newly installed LCP monitoring wells were completed in May 2023 and December 2023, respectively, and are included in **Appendix E**. Field notes for the monitoring well installation activities are provided in **Appendix F**. Monitoring well construction logs are provided in **Appendix G**. A photolog of the newly installed monitoring wells is provided in **Appendix H**.

2.4 SITEWIDE MONITORING WELL RETROFITTING

In November 2023, as part of sitewide monitoring well maintenance efforts, 17 monitoring wells, identified in **Table 2-5**, were retrofitted. Some monitoring wells were damaged by local construction operations and the quality of other monitoring 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. Except for MLPV-IW0028D, MLPV-SAMW0005I, and MLPV-SAMW0005D, retrofitted monitoring wells are part of an existing sampling plan. Photos of retrofitting activities are provided in **Appendix H**.

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Table 2-1. Sparge System Telemetric Monitoring

Date/time system was checked		System Operational Yes/No	Identify Any Operational Abnormalities and Corrective Action Taken to Restore Operation
01/03/2023	7:00	Yes	System Flow - 127.8 scfm
01/10/2023	7:00	Yes	No system information attached in the email.
01/17/2023	7:00	Yes	No system information attached in the email.
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.
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
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
05/02/2023	7:00	Yes	System Flow - 147.3 scfm
05/09/2023	7:00	Yes	System Flow - 146.2 scfm
05/16/2023	7:00	Yes	System Flow - 157.5 scfm
05/23/2023	7:00	Yes	System Flow - 142.6 scfm
05/30/2023	7:00	Yes	System Flow - 5.8 scfm
06/06/2023	7:00	Yes	System Flow - 153.8 scfm
06/13/2023	7:00	Yes	System Flow - 145.8 scfm
06/20/2023	7:00	Yes	System Flow - 147.2 scfm
06/27/2023	7:00	Yes	System Flow - 142.8 scfm
07/04/2023	7:00	Yes	System Flow - 14.1 scfm
07/11/2023	7:00	Yes	System Flow - 148.4 scfm
07/18/2023	7:00	Yes	System Flow - 141.8 scfm
07/25/2023	7:00	Yes	System Flow - 143.9 scfm
08/01/2023	7:00	Yes	System Flow - 139.8 scfm
08/08/2023	7:00	Yes	System Flow - 135.2 scfm
08/15/2023	7:00	Yes	System Flow - 140.5 scfm
08/22/2023	7:00	Yes	System Flow - 146.6 scfm
08/29/2023	7:00	Yes	System Flow - 161.9 scfm
09/05/2023	7:00	Yes	System Flow - 187.5 scfm
09/12/2023	7:00	Yes	System Flow - 188.1 scfm
09/19/2023	7:00	Yes	System Flow - 171.7 scfm
09/26/2023	7:00	Yes	System Flow - 188.6 scfm
10/03/2023	7:00	Yes	System Flow - 173.8 scfm
10/10/2023	7:00	No	System Flow - 1.6 scfm
10/17/2023	7:00	Yes	System Flow - 183.8 scfm
10/24/2023	7:00	Yes	System Flow - 160.9scfm
10/31/2023	7:00	Yes	System Flow - 158.8 scfm
11/07/2023	6:00	Yes	System Flow - 159.3 scfm
11/14/2023	6:00	No	System Flow - 160.2 scfm
11/21/2023	6:00	Yes	System Flow - 146.6 scfm
11/28/2023	6:00	Yes	System Flow - 137.1 scfm
12/06/2023	6:00	Yes	System Flow - 143.9 scfm
12/13/2023	6:00	Yes	System Flow - 150.4 scfm
12/20/2023	6:00	Yes	System Flow - 135.6 scfm
12/27/2023	6:00	Yes	System Flow - 123.7 scfm

Notes:
O&M = operation and maintenance.
psi = pounds per square inch.
PLC = Program logic control
Beginning 6/21/23, total system flow captured which includes bleed for Zone 4 for compressor operation.

Table 2-2. Sparge System Operational Readings

O&M Date	Hour Meter[a]	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)
12/30/2008	9488.7	384.9	7.0	225	90	9	50.0	23.0	9	50.0	22.0	NI	NI	100	NI	NI	NI	NI
01/30/2009	9826.3	337.6	13.0	275	90	7	45.0	25.0	5	40.0	28.0	NI	NI	85	NI	NI	NI	NI
02/27/2009	10031.3	205.0	10.0	250	95	6	43.0	26.0	6	43.0	26.0	NI	NI	86	NI	NI	NI	NI
03/31/2009	10031.6	0.3	11.0	260	95	5	40.0	28.0	6	41.5	24.0	NI	NI	82	NI	NI	NI	NI
04/29/2009	10203.6	172.0	10.0	250	89	5	39.0	25.0	5	39.0	25.0	NI	NI	78	NI	NI	NI	NI
05/29/2009	10380.6	177.0	NR	150	110	5	39.0	27.0	4	42.0	28.0	NI	NI	81	NI	NI	NI	NI
06/29/2009	10609.9	229.3	5.0	225	90	5	39.0	22.0	5	39.0	25.0	NI	NI	78	NI	NI	NI	NI
08/12/2009	89.3	89.3	10.0	285	122	5	38.0	25.0	1	17.0	25.0	NI	NI	55	NI	NI	NI	NI
09/08/2009	236.3	147.0	10.0	240	90	5	38.0	25.0	5	38.0	25.0	NI	NI	76	NI	NI	NI	NI
09/30/2009	541.0	304.7	10.0	245	95	5	38.0	24.0	5	38.0	25.0	NI	NI	76	NI	NI	NI	NI
10/27/2009	722.5	181.5	9.0	249	95	5	38.0	24.0	5	38.0	25.0	NI	NI	76	NI	NI	NI	NI
11/23/2009	926.6	204.1	10.0	250	85	5	38.0	25.0	5	38.0	25.0	NI	NI	76	NI	NI	NI	NI
12/31/2009	1428.9	502.3	5.0	225	85	5	37.5	23.0	5	38.0	25.0	NI	NI	76	NI	NI	NI	NI
01/29/2010	1704.7	275.8	5.0	230	75	5	38.5	25.0	5	38.0	24.0	NI	NI	77	NI	NI	NI	NI
03/02/2010	2120.5	415.8	5.0	195	80	5	37.0	22.0	5	38.0	24.0	NI	NI	75	NI	NI	NI	NI
03/19/2010	2243.2	122.7	6.0	180	75	5	37.0	22.0	5	37.0	22.0	NI	NI	74	NI	NI	NI	NI
04/20/2010	2589.1	345.9	16.6	213	104	3.3	30.0	24.2	1.1	20.0	23.7	NI	NI	50	NI	NI	NI	NI
05/28/2010	3005.2	416.1	17.0	230	115	5	38.0	24.0	3.5	33.0	23.5	NI	NI	71	NI	NI	NI	NI
06/30/2010	3370.4	365.2	17.3	225	125	5	38.0	24.0	3.5	32.0	23.0	NI	NI	70	NI	NI	NI	NI
07/29/2010	3687.0	316.6	0.0	150	85	5	38.0	24.0	3.5	30.0	20.0	NI	NI	68	NI	NI	NI	NI
08/28/2010	4002.4	315.4	5.0	145	80	4.5	36.0	23.0	3	30.0	21.0	NI	NI	66	NI	NI	NI	NI
09/25/2010	4262.3	259.9	5.0	250	98	3.5	32.0	25.0	3	30.0	25.0	NI	NI	62	NI	NI	NI	NI
10/29/2010	4632.6	370.3	3.6	180	104	3.8	33.0	24.0	1.2	19.0	24.5	NI	NI	52	NI	NI	NI	NI
11/29/2010	4985.0	352.4	5.0	165	100	4	34.0	25.0	2.5	27.0	25.0	NI	NI	61	NI	NI	NI	NI
12/23/2010	5238.1	253.1	4.0	220	95	1.5	21.0	23.9	3	30.0	24.6	NI	NI	51	NI	NI	NI	NI
01/26/2011	5609.0	370.9	4.2	220	98	3.2	31.0	24.8	1.1	19.0	25.9	NI	NI	50	NI	NI	NI	NI
03/01/2011	5828.7	219.7	3.5	190	95	2.5	27.0	24.5	2	24.0	25.5	NI	NI	51	NI	NI	NI	NI
04/01/2011	6164.0	335.3	4.0	220	95	3.5	32.0	24.5	2	24.5	25.0	NI	NI	57	NI	NI	NI	NI
04/26/2011	6438.0	274.0	4.0	210	120	3	29.0	24.0	2	24.5	25.0	NI	NI	54	NI	NI	NI	NI
05/31/2011	6822.3	384.3	4.5	250	130	2.5	27.0	24.0	1	17.0	24.5	NI	NI	44	NI	NI	NI	NI
06/23/2011	7075.8	253.5	3.0	249	126	2.5	27.0	24.0	2	24.0	25.0	NI	NI	51	NI	NI	NI	NI
07/27/2011	7448.6	372.8	3.0	225	140	2.3	25.5	24.0	2	24.0	25.0	NI	NI	50	NI	NI	NI	NI
08/29/2011	7757.6	309.0	3.0	175	95	3	30.0	25.0	2.5	27.0	24.5	NI	NI	57	NI	NI	NI	NI
09/28/2011	7974.9	217.3	3.5	220	125	2.2	25.0	24.5	1	17.0	24.5	NI	NI	42	NI	NI	NI	NI
10/24/2011	8226.9	252.0	2.0	215	110	2.3	26.0	25.0	1.5	21.0	25.0	NI	NI	47	NI	NI	NI	NI
11/21/2011	8532.1	305.2	3.5	225	115	3	30.0	25.0	1	17.0	26.0	NI	NI	47	NI	NI	NI	NI
12/30/2011	9003.1	471.0	2.0	190	68	3	29.0	22.0	2	23.0	23.0	NI	NI	52	NI	NI	NI	NI
05/30/2012	9147.7	144.6	3.0	200	130	3	31.0	27.0	3	30.0	25.0	NI	NI	61	NI	NI	NI	NI
06/29/2012	9472.9	325.2	4.0	290	115	7	46.0	26.0	2	24.0	26.0	NI	NI	70	NI	NI	NI	NI
08/28/2012	9764.5	291.6	3.5	340	130	NI	31.0	27.5	NI	31.0	30.0	NI	NI	62	65.0	29.0	70.0	26.0
08/29/2012	9784.1	19.6	3.5	345	130	NI	33.0	28.5	NI	33.0	30.0	NI	NI	66	66.0	28.0	70.0	26.0
08/30/2012	9805.6	21.5	3.5	325	126	NI	37.0	29.5	NI	25.0	28.5	NI	NI	62	65.0	28.0	68.0	27.0
09/07/2012	9970.9	165.3	4.5	375	125	NI	NR	28.0	NI	25.0	28.0	NI	NI	NR	65.0	26.0	70.0	26.0
09/14/2012	10128.4	157.5	3.5	340	130	NI	38.0	29.0	NI	38.0	31.0	NI	NI	76	70.0	26.0	70.0	24.0
09/21/2012	10288.1	159.7	1.5	325	125	NI	35.0	28.0	NI	37.0	29.0	NI	NI	72	68.0	25.0	69.0	26.0

Table 2-2. Sparge System Operational Readings

O&M Date	Hour Meter[a]	Total Run Time (hrs/month)	Vacuum (PI-1) Biosparge / Air Sparge (inches H_2O)		Temperature after Compressor (TI-1) (^oF)	Temperature after Aftercooler (TI-2) (^oF)	Biosparge									Air Sparge			
							Leg 1			Leg 2			Leg 5			Leg 3		Leg 4	
							Differential (inches H_2O)	Flow Rate (FI-1) (scfm)	Pressure (PI-2) (psi)	Differential (inches H_2O)	Flow Rate (FI-2) (scfm)	Pressure (PI-3) (psi)	Flow Rate (FI-5) (scfm)	Pressure (PI-6) (psi)	Biosparge Total Flow (Zone 1, Zone 2, and Zone 5 [expansion]) (scfm)	Flow Rate (FI-3) (scfm)	Pressure (PI-4) (psi)	Flow Rate (FI-4) (scfm)	Pressure (PI-5) (psi)
06/12/2013	10370.8	82.7	3.5		200	95	NI	NR	NR	NI	NR	NR	NI	NI	NR	85.0	19.0	85.0	21.0
06/14/2013	10418.3	47.5	2.0		130	100	NI	30.0	27.0	NI	30.0	27.0	NI	NI	60	NR	NR	NR	NR
07/17/2013	11192.0	773.7	2.0	4.0	345	120	NI	43.0	27.0	NI	44.0	28.0	NI	NI	87	146.0	23.5	147.0	24.0
07/18/2013	11200.7	8.7	2.0	4.0	290	105	NI	46.0	27.0	NI	42.0	29.0	NI	NI	88	144.0	21.5	147.0	23.0
07/19/2013	11207.6	6.9	2.0	3.0	370	135	NI	39.0	26.5	NI	41.0	29.0	NI	NI	80	126.0	21.5	128.0	23.0
07/26/2013	11374.9	167.3	1.5	4.0	370	140	NI	39.0	26.5	NI	32.0	28.0	NI	NI	71	141.0	22.0	144.0	23.0
08/02/2013	11542.2	167.3	1.5	4.0	345	140	NI	38.0	24.0	NI	32.0	28.0	NI	NI	70	142.0	22.5	138.0	23.0
08/09/2013	11711.5	169.3	1.5	4.0	345	135	NI	39.0	26.0	NI	32.0	28.5	NI	NI	71	143.0	23.0	143.0	23.5
08/16/2013	11878.6	167.1	1.5	4.0	340	140	NI	31.0	25.0	NI	33.0	29.5	NI	NI	64	142.0	22.5	143.0	23.0
10/29/2013	12753.6	875.0	1.5	4.0	335	135	NI	36.0	25.5	NI	32.0	28.0	NI	NI	68	135.0	22.5	128.0	23.0
11/26/2013	13425.9	672.3	2.0	4.5	340	115	NI	32.0	25.5	NI	32.0	27.0	NI	NI	64	136.0	22.0	134.0	23.0
12/30/2013	14241.4	815.5	1.5	4.5	320	120	NI	36.0	25.5	NI	32.0	27.0	NI	NI	68	139.0	22.0	137.0	22.5
01/31/2014	14984.2	742.8	2.5	6.0	315	120	NI	33.0	25.5	NI	32.0	27.0	NI	NI	65	139.0	21.5	133.0	23.0
02/26/2014	15608.6	624.4	4.5	9.5	320	115	NI	32.0	25.5	NI	32.0	27.0	NI	NI	64	135.0	21.5	130.0	22.5
03/28/2014	16329.8	721.2	8.0	16.0	325	130	NI	33.0	25.5	NI	29.0	27.0	NI	NI	62	132.0	21.5	127.0	22.0
05/05/2014	17241.9	912.1	4.0	9.0	340	140	NI	31.0	25.5	NI	29.0	27.5	NI	NI	60	128.0	22.5	135.0	23.0
05/30/2014	17840.7	598.8	NR	NR	315	130	NI	33.0	25.5	NI	32.0	26.0	NI	NI	65	135.0	22.0	132.0	23.0
06/27/2014	18511.6	670.9	1.0	4.0	310	130	NI	38.0	25.5	NI	27.0	26.0	NI	NI	65	135.0	22.0	132.0	23.0
07/30/2014	19308.7	797.1	1.0	3.5	310	130	NI	36.0	25.0	NI	27.0	26.0	NI	NI	63	143.0	23.0	127.0	22.0
08/28/2014	19990.6	681.9	1.0	4.0	315	135	NI	31.0	25.5	NI	29.0	27.5	NI	NI	60	134.0	22.5	131.0	23.0
09/29/2014	20725.2	734.6	1.0	3.5	285	105	NI	31.0	26.5	NI	28.0	29.0	NI	NI	59	133.0	24.0	131.0	24.5
10/29/2014	21406.2	681.0	1.0	3.8	305	110	NI	32.0	25.0	NI	29.0	25.5	NI	NI	61	134.0	24.5	131.0	23.0
11/26/2014	21985.8	579.6	1.0	3.5	325	140	NI	31.0	26.5	NI	29.0	28.0	NI	NI	60	131.0	22.0	129.0	23.5
12/30/2014	22711.5	725.7	1.0	2.5	320	140	NI	32.0	27.0	NI	29.0	29.0	NI	NI	61	131.0	22.5	129.0	23.0
01/29/2015	23284.1	572.6	1.0	2.5	315	125	NI	33.0	25.0	NI	33.0	30.0	NI	NI	66	134.0	23.0	130.0	23.5
02/27/2015	23906.8	622.7	1.0	4.0	290	120	NI	32.0	26.5	NI	30.0	29.0	NI	NI	62	143.0	22.5	141.0	23.0
03/30/2015	24617.9	711.1	1.0	4.0	295	120	NI	32.0	26.0	NI	30.0	30.0	NI	NI	62	143.0	22.0	137.0	22.5
04/29/2015	25286.2	668.3	1.0	4.0	350	155	NI	30.0	25.0	NI	28.0	28.0	NI	NI	58	123.0	20.5	131.0	21.5
05/29/2015	25972.0	685.8	1.0	4.0	305	125	NI	28.0	25.5	NI	29.0	28.0	NI	NI	57	134.0	21.5	132.0	22.5
07/28/2015	26735.0	763.0	1.0	4.0	350	110	NI	25.0	29.0	NI	29.0	25.5	NI	NI	54	67.0	20.5	68.0	21.0
08/28/2015	27434.0	699.0	1.0	4.0	325	110	NI	32.0	27.0	NI	24.0	26.0	NI	NI	56	69.0	22.0	68.0	21.5
09/30/2015	28093.5	659.5	1.0	4.0	270	100	NI	29.0	25.5	NI	29.0	26.0	NI	NI	58	133.0	23.5	129.0	24.5
10/28/2015	28498.7	405.2	1.0	4.0	285	105	NI	19.0	24.5	NI	19.0	25.0	NI	NI	38	115.0	22.5	116.0	23.0
11/25/2015	29138.9	640.2	1.5	4.5	310	105	NI	19.0	24.5	NI	19.0	25.5	NI	NI	38	53.0	21.0	76.0	22.0
12/30/2015	29445.0	306.1	1.5	4.0	320	105	NI	19.0	24.5	NI	19.0	25.5	NI	NI	38	67.0	20.5	68.0	21.5
01/28/2016	30515.0	1070.0	1.5	4.5	310	100	NI	19.0	24.5	NI	21.0	25.5	**Leg 5 operational 2/24/16**		40	68.0	21.0	69.0	22.0
02/25/2016	31134.0	619.0	4.0	4.0	310	100	NI	22.0	25.0	NI	25.0	27.0	48.0	25.0	95	61.0	21.0	70.0	22.5
03/04/2016	31317.0	183.0	4.0	4.0	300	100	NI	29.0	25.0	NI	25.0	28.0	32.0	24.0	86	138.0	22.0	134.0	24.0
03/31/2016	31898.0	581.0	4.0	4.3	315	105	NI	24.0	25.0	NI	36.0	27.0	31.0	23.5	91	132.0	23.0	133.0	24.0
04/28/2016	32436.7	538.7	4.0	4.0	325	110	NI	23.0	24.0	NI	35.0	26.5	32.0	23.0	90	131.0	23.0	133.0	24.0
05/03/2017	32960.4	523.7	>20	>20	175	105	NI	28.0	23.0	NI	20.0	23.0	31.0	23.0	79	138.0	22.0	136.0	23.0
05/23/2017	33383.4	423.0	>20	>20	180	120	NI	15.0	21.0	NI	15.0	21.5	15.0	20.0	45	166.0	22.0	138.0	23.0
06/26/2017	34171.8	788.4	>20	>20	178	120	NI	19.0	22.0	NI	18.0	23.0	21.0	23.0	58	161.0	23.0	138.0	23.0
07/31/2017	34982.5	810.7	32.0	NR	175	113	NI	23.0	23.0	NI	20.0	23.0	23.0	23.0	66	NR	NR	NR	NR
08/31/2017	35623.9	641.4	28.0	24.0	175	110	NI	25.0	22.5	NI	15.0	23.0	30.0	22.0	70	170.0	23.0	162.0	23.0

Table 2-2. Sparge System Operational Readings

O&M Date	Hour Meter[a]	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)
09/26/2017	35780.4	156.5	28.0	25.0	180	110	NI	26.0	23.0	NI	23.0	23.5	34.0	23.0	83	162.0	23.0	143.0	25.0
10/24/2017	35901.0	120.6	28.0	28.0	160	100	NI	25.0	22.5	NI	16.0	23.0	31.0	22.0	72	171.0	23.0	144.0	25.0
11/27/2017	36529.3	628.3	100.0	95.0	175	110	NI	28.0	23.0	NI	19.0	23.0	31.0	23.0	78	173.0	24.5	147.0	23.0
12/20/2017	37057.8	528.5	44.5	20.0	174	105	NI	31.0	23.0	NI	31.0	24.0	19.0	23.0	81	168.0	22.0	140.0	23.5
01/30/2018	37946.1	888.3	23.0	24.5	145	70	NI	28.0	23.0	NI	20.0	24.5	29.0	23.0	77	177.0	23.5	164.0	25.0
02/27/2018	38360.8	414.7	21.5	23.5	170	106	NI	23.0	22.5	NI	19.0	24.0	28.0	22.5	70	157.0	22.5	148.0	23.5
03/27/2018	39031.0	670.2	23.5	26.0	165	100	NI	28.0	22.5	NI	19.0	24.0	31.0	22.5	78	157.0	23.5	156.0	23.0
04/24/2018	39710.5	679.5	20.0	24.0	155	100	NI	25.0	22.0	NI	19.0	23.0	31.0	22.0	75	156.0	23.0	155.0	22.5
05/22/2018	40046.1	335.6	23.0	NM	160	110	NI	23.0	22.0	NI	19.0	23.0	30.0	22.0	72	NM	NM	NM	NM
06/26/2018	40405.8	359.7	19.0	NM	140	105	NI	28.0	23.0	NI	19.0	24.0	34.0	22.5	81	NM	NM	NM	NM
07/23/2018	40601.4	195.6	20.5	NM	140	105	NI	19.0	22.0	NI	15.0	23.0	33.0	21.5	67	NM	NM	NM	NM
08/27/2018	41026.3	424.9	21.5	NM	150	105	NI	19.0	22.0	NI	19.0	24.5	27.0	21.5	65	NM	NM	NM	NM
09/25/2018	41315.9	289.6	19.5	NM	140	105	NI	15.0	21.0	NI	15.0	23.0	24.0	21.0	54	NM	NM	NM	NM
10/30/2018	41742.0	426.1	23.5	NM	180	115	NI	26.0	22.5	NI	27.0	25.0	30.0	21.5	83	NM	NM	NM	NM
11/20/2018	41863.4	121.4	17.5	NM	130	99	NI	18.0	22.0	NI	19.0	25.0	18.0	21.5	55	NM	NM	NM	NM
12/18/2018	42209.0	345.6	24.0	NM	170	105	NI	21.0	22.0	NI	27.0	25.0	18.0	21.5	66	NM	NM	NM	NM
01/31/2019	42253.9	44.9	25.0	NM	171	110	NI	19.0	23.0	NI	30.0	25.0	18.0	21.0	67	NM	NM	NM	NM
02/28/2019	42606.1	352.2	20.0	NM	169	110	NI	20.0	22.5	NI	27.0	26.0	21.0	21.5	68	NM	NM	NM	NM
03/27/2019	42791.0	184.9	22.5	NM	162	105	NI	23.0	22.0	NI	24.0	24.0	21.0	21.5	68	NM	NM	NM	NM
04/23/2019	43116.0	325.0	21.0	NM	162	100	NI	25.0	22.0	NI	22.0	24.0	24.0	21.0	71	NM	NM	NM	NM
05/29/2019	43548.6	432.6	20.0	NM	142	105	NI	23.0	22.0	NI	19.0	24.5	24.0	21.5	66	NM	NM	NM	NM
06/27/2019	43895.0	346.4	25.0	NM	178	106	NI	22.0	22.5	NI	21.0	24.5	24.0	22.0	67	NM	NM	NM	NM
07/31/2019	44305.3	410.3	25.0	NM	175	115	NI	21.0	22.5	NI	19.0	24.5	21.0	21.5	61	NM	NM	NM	NM
08/27/2019	44627.6	322.3	23.5	NM	175	110	NI	18.0	22.5	NI	17.0	24.5	21.0	21.5	56	NM	NM	NM	NM
09/24/2019	44877.1	249.5	25.0	NM	170	105	NI	17.0	22.0	NI	17.0	24.0	21.0	21.5	55	NM	NM	NM	NM
10/28/2019	45288.0	410.9	24.0	NM	175	110	NI	21.6	23.0	NI	17.0	23.0	17.0	23.0	56	NM	NM	NM	NM
11/04/2019	45288.5	0.5	25.0	NM	175	100	NR	19.5	23.0	NR	20.0	25.0	22.9	21.5	56	NM	NM	NM	NM
11/26/2019	45553.4	264.9	25.0	NM	160	70	NR	24.6	25.0	NR	20.0	23.0	23.5	21.5	68	NM	NM	NM	NM
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				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	Will not hold pressure.			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

Table 2-2. Sparge System Operational Readings

O&M Date	Hour Meter[a]	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)
01/16/2023	26794.0	839.0	NA	NA	NA	54.5	NR	13.0	25.0	NR	17.0	23.0	Will not hold pressure.			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	55.0	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	56.0	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	20.2	22.0	52.2	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	22.4	22.5	53.4	NM	NM	NM	NM
06/16/2023	30271.0	383.4	NA	NA	NA	110.0	NR	26.0	20.5	NR	26.2	22.0	21.6	23.0	73.8	NM	NM	NM	NM
07/18/2023	30912.0	641.0	NA	NA	NA	68.0	NR	24.9	22.0	NR	25.9	21.0	20.2	25.0	71.0	NM	NM	NM	NM
08/16/2023	31609.0	697.0	NA	NA	NA	110.0	NR	25.3	20.5	NR	19.1	19.5	18.4	23.0	62.8	NM	NM	NM	NM
09/22/2023	32495.0	886.0	NA	NA	NA	150.0	NR	32.8	21.5	NR	20.8	21.0	23.1	24.0	76.7	NM	NM	NM	NM
10/23/2023	33133.0	638.0	NA	NA	NA	90.0	NR	28.6	20.5	NR	26.2	22.0	25.2	24.0	80.0	NM	NM	NM	NM
11/20/2023	29098.4	-4034.6	NA	NA	NA	75.0	NR	26.5	22.0	NR	25.1	22.5	25.9	25.0	77.5	NM	NM	NM	NM
12/20/2023	34512.0	5413.6	NA	NA	NA	57.0	NR	24.8	21.0	NR	26.8	22.5	23.1	26.0	74.7	NM	NM	NM	NM

Days in Reporting Period*	Operating Hours in Period	Operating Days in Period	Downtime (Days)	Percent Runtime
244.00	5248.4	218.7	25.32	90%

*Reporting period of 05/01/2023 through 12/31/2023. 26 Days are added to runtime calculation accordingly.

Notes:

[a]hour meter from compressor collected at two different places on trailer and do not reflect actual hours. For actual hours, telemetry data was used.
hrs = hours.
inches H2O = inches of water.
^{o}F = degrees Fahrenheit.
psi = pounds per square inch.
scfm = standard cubic feet per minute.
NA = Not Applicable
NI = not installed.
NR = not recorded.
NM = that air sparge operational parameters were not collected because the air sparge system was turned off following the April 2018 O&M.
hrs/month = hours per month.
O&M = Operation and maintenance.
Flow Meter (FI-1) was broken on 7 September 2012, so a flow rate was not recorded.
Variable frequency drive installed (30 May 2013) and compressor programmed to operate at different capacities for biosparge and air sparge legs (12 July 2013).
Flow rates reported after 17 July 2013 are corrected because observed flow rates are based on standard temperature and pressure.
Flow rates reported for 28 July 2015 event are low due to a broken pressure relief valve.
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.
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.
System hour readings on 12/12/2020 had to be estimated based on daily telemetry data, due to equipment fire that destroyed the system

Table 2-3. Biosparge Barrier Well Head Pressure and Air Flow Measurements

	ASW01		ASW02		ASW03		ASW04		ASW05		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**		**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 (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	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	19.10	1.70	19.20	5.10	19.10	2.90	19.10	0.0	19.20	2.90
03/14/2023	19.00	3.40	19.00	3.80	19.00	4.00	19.10	2.10	19.10	2.40	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	3.20	20.00	4.20	20.00	4.80	20.00	5.00	20.00	3.20	20.00	2.40	20.50	1.20	20.50	3.20	20.00	1.20	20.50	2.10
05/16/2023	19.30	6.60	19.30	3.00	19.20	4.50	19.20	5.30	19.20	1.70	19.30	4.50	19.10	2.90	19.20	1.70	19.30	2.90	19.20	3.80
06/16/2023	19.40	2.10	19.40	2.10	19.50	1.70	19.40	2.40	19.40	3.80	19.40	2.90	19.50	1.70	19.50	3.80	19.60	3.40	19.40	3.20
07/18/2023	19.70	6.50	19.70	34.90	19.80	23.00	19.80	24.60	19.80	7.20	19.80	6.70	19.80	12.30	19.70	14.90	19.70	14.80	19.80	9.20
08/16/2023	23.00	6.80	20.30	6.60	20.10	4.00	20.30	5.10	20.20	1.70	20.30	1.20	20.20	0.00	20.20	7.80	20.30	2.70	20.30	0.00
09/22/2023	19.60	5.90	19.50	7.10	19.60	6.10	19.60	5.10	19.50	3.80	19.50	4.50	19.50	7.20	19.40	13.50	19.50	16.40	19.50	4.80
10/23/2023	19.50	10.00	19.60	3.40	19.50	5.60	19.30	5.70	19.60	3.60	19.50	2.90	19.40	7.90	19.40	2.70	19.30	0.00	19.30	3.60
11/20/2023	19.40	10.20	19.60	4.20	19.30	5.90	19.50	6.60	19.40	3.60	19.50	3.40	19.40	11.10	19.50	5.40	19.50	0.00	19.40	3.60
12/20/2023	19.80	8.60	19.70	4.50	19.80	3.00	19.70	5.70	19.80	3.20	19.70	3.00	19.70	8.60	19.60	5.90	19.60	0.00	19.80	3.20

Table 2-3. Biosparge Barrier Well Head Pressure and Air Flow Measurements

	ASW11		ASW12		ASW13		ASW14		ASW15		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**		**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 (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	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	21.50	1.70	21.90	3.50	21.70	2.80	21.50	3.00	21.80	5.40
03/14/2023	19.00	1.70	19.00	1.20	19.00	2.40	20.30	1.20	20.30	1.20	20.40	2.10	20.30	1.70	20.40	2.70	20.20	1.20	20.30	2.10
04/18/2023	20.50	1.70	20.00	1.20	20.00	2.10	22.00	2.10	22.00	2.10	22.00	1.70	22.00	2.20	22.00	2.20	22.00	2.20	22.00	1.20
05/16/2023	19.20	13.10	19.20	3.80	19.20	2.90	20.30	1.70	20.30	1.70	20.20	2.40	20.30	1.70	20.30	1.70	20.30	1.70	20.30	1.70
06/16/2023	19.40	2.40	19.50	1.20	19.70	2.40	20.20	2.70	20.40	2.40	20.50	2.10	20.00	1.20	20.60	2.10	20.60	1.20	20.70	3.00
07/18/2023	19.80	5.30	19.60	23.10	19.60	3.70	20.20	7.00	20.20	7.00	20.30	7.00	20.30	-	20.20	7.00	20.30	8.60	20.30	6.60
08/16/2023	20.20	1.20	20.40	1.20	20.40	1.70	21.10	1.70	21.30	2.10	21.10	1.70	21.10	1.20	21.20	1.20	21.10	8.30	21.30	1.70
09/22/2023	19.50	8.50	19.50	8.50	19.60	2.40	20.10	15.00	20.10	2.40	20.20	3.40	20.10	-	20.20	1.70	20.10	7.30	20.10	3.80
10/23/2023	19.60	3.80	19.50	2.10	19.50	4.30	20.90	3.50	21.00	3.50	20.90	3.00	21.00	3.00	20.80	3.00	20.90	3.20	20.80	2.10
11/20/2023	19.40	3.60	19.30	2.90	19.40	1.20	21.40	4.10	21.40	3.00	21.30	3.30	21.20	3.00	21.20	3.50	21.20	3.50	21.40	2.50
12/20/2023	19.70	3.80	19.60	8.60	19.70	3.40	21.20	2.80	21.20	3.00	21.20	2.80	21.30	2.80	21.10	3.00	21.20	3.50	21.10	3.00

Table 2-3. Biosparge Barrier Well Head Pressure and Air Flow Measurements

	ASW21		ASW22		ASW23		ASW24		ASW25		BSW26		BSW27		BSW28		BSW29		BSW30	
Screen Interval (ft BLS)	**48 to 50.5**		**48 to 50.5**		**47.5 to 50**		**47.5 to 50**		**47.5 to 50**		**46 to 48**		**46 to 48**		**46 to 48**		**46 to 48**		**46 to 48**	
Sample Date	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**	**Pressure (psi)**	**Flow Rate (acfm)**
01/16/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
02/14/2023	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	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	20.00	2.20	23.00	2.30	19.00	2.10	20.00	2.00	21.00	2.00
03/14/2023	20.30	1.20	20.10	2.10	20.10	2.10	20.20	1.70	19.80	1.20	20.00	2.00	23.00	3.00	19.00	2.60	19.50	2.40	21.00	2.50
04/18/2023	22.00	2.10	21.50	3.50	22.00	2.50	22.00	1.80	22.00	7.40	21.00	3.40	23.50	4.20	19.50	3.00	20.00	3.00	21.00	3.40
05/16/2023	20.30	1.70	20.30	2.40	20.30	1.70	20.30	1.70	20.20	5.40	20.00	3.10	23.00	4.10	20.00	3.10	20.00	2.40	21.00	3.10
06/16/2023	20.50	2.40	20.60	1.70	20.50	3.20	20.70	4.50	20.60	5.70	21.00	3.10	23.00	3.20	19.00	3.00	20.00	2.90	20.00	3.30
07/18/2023	20.20	7.00	20.30	1.70	20.40	1.70	20.50	6.80	20.40	-	21.00	3.10	23.00	3.60	20.00	3.00	20.00	3.00	21.00	-
08/16/2023	20.90	1.70	21.10	1.70	21.10	2.10	21.10	2.10	21.30	1.70	20.00	3.00	23.00	3.50	20.00	3.30	20.00	3.30	23.00	3.20
09/22/2023	20.20	1.20	20.20	3.00	20.20	10.90	20.30	4.50	20.00	10.60	20.00	3.70	23.00	4.20	20.00	3.80	20.00	3.70	21.00	3.40
10/23/2023	20.80	3.20	20.90	2.70	20.80	3.20	20.90	3.00	20.60	2.10	20.00	3.20	23.00	3.30	20.00	3.20	20.00	3.00	21.00	3.10
11/20/2023	21.00	3.50	21.00	2.80	20.80	3.70	20.80	3.70	20.60	3.20	21.00	3.40	23.00	3.20	20.00	2.90	20.00	3.10	21.00	3.30
12/20/2023	21.20	2.80	21.20	2.10	21.10	3.50	21.20	2.10	20.80	2.80	21.00	3.10	23.00	3.20	21.00	3.90	20.00	3.60	22.00	3.20

Table 2-3. Biosparge Barrier Well Head Pressure and Air Flow Measurements

	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 (acfm)	Pressure (psi)	Flow Rate (acfm)	Pressure (psi)	Flow Rate (acfm)	Pressure (psi)	Flow Rate (acfm)	Pressure (psi)	Flow Rate (acfm)	Pressure (psi)	Flow Rate (acfm)
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
05/16/2023	23.00	3.20	20.00	6.40	15.40	5.40	15.60	6.70	20.00	3.20	19.50	4.10
06/16/2023	22.00	3.30	21.70	2.50	21.20	2.70	21.10	2.40	19.30	3.60	19.80	2.10
07/18/2023	22.00	-	20.40	29.80	20.40	6.40	20.20	1.80	19.90	13.50	19.70	28.40
08/16/2023	22.00	3.10	21.40	3.00	21.20	3.70	21.20	2.70	20.10	5.40	20.30	2.40
09/22/2023	22.00	3.20	0.21	-	0.07	-	0.01	-	0.76	-	0.22	-
10/23/2023	22.00	3.10	20.80	6.00	20.80	5.80	20.70	6.40	19.50	4.10	19.60	4.10
11/20/2023	22.00	3.20	20.80	5.70	20.60	5.20	20.70	5.50	19.40	4.30	19.50	4.10
12/20/2023	22.00	3.20	20.80	5.10	20.70	5.50	20.70	6.40	19.80	2.40	19.80	6.20

Notes:
ASW and BSW indicate biosparge wells.
ft bls = feet below land surface.
psi = pounds per square inch.
acfm = standard cubic feet per minute. This is the volumetric air flow that is not at standard air conditions. ACFM takes into account the temperature and pressure of the gas flowing anywhere in a system. This is a calculated value.
NR = not recorded.
NI = not installed.
ASW15 and ASW23 measured on 6/14/13 had broken pitot tubes. Measurement not accurate.
The January 2019 flow rate data is not usable due to a faulty magnehelic gauge.
Gray highlighting indicates that the operational parameters were collected during the reporting period (May through December 2019).
Pressure data from 11/26/19 does not appear usable. Suspect bad field pressure gauge. Replaced pressure gauge for subsequent field readings.
Wellhead pressure data from 10/28/2020 does not appear usable. Suspect faulty digital manometer. Instrument will be evaluated for accuracy.

Table 2-4. Biosparge Barrier Dissolved Oxygen Measurements

	Upgradient			Downgradient			In Biosparge Wall	
Location	**ASMW01**	**ASMW02**	**ASMW03**	**ASMW04**	**ASMW05**	**ASMW06**	**ASPZ01R[b]**	**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)**
05/19/2007	0.99	1.23	1.21	0.77	2.64	1.29	8.51	8.30
06/28/2007	1.50	0.87	0.91	1.11	1.25	1.57	7.99	8.03
07/30/2007	1.00	0.90	0.90	1.00	1.10	1.10	5.49	6.02
08/28/2007	0.00	0.25	0.27	0.27	0.62	0.00	0.29	4.28
11/27/2007	0.90	1.00	1.04	3.75	5.42	4.98	4.51	3.93
12/31/2007	0.50	0.50	0.70	2.19	2.93	1.98	3.95	2.98
01/31/2008	1.09	1.00	1.25	2.40	2.99	1.78	2.31	2.11
02/29/2008	1.05	1.23	1.09	2.11	1.97	1.59	1.50	2.30
03/31/2008	1.95	1.89	2.05	2.04	1.59	1.60	2.00	3.10
04/28/2008	2.16	1.61	1.91	2.00	1.14	1.41	1.51	2.59
05/29/2008	2.06	1.25	1.39	2.25	1.00	1.12	1.50	2.95
06/27/2008	0.02	0.00	0.00	0.00	0.00	0.00	NR	NR
07/29/2008	2.09	1.57	1.50	2.39	1.15	2.87	1.39	3.01
08/27/2008	2.14	1.27	1.93	2.04	3.02	2.85	2.09	2.58
09/22/2008	0.00	0.00	0.00	0.80	0.90	0.51	0.00	0.91
10/23/2008	NR	NR	NR	NR	NR	NR	1.63	1.98
11/25/2008	0.86	0.00	0.00	0.52	0.67	0.12	0.86	2.35
12/18/2008	1.46	1.05	1.09	0.87	1.23	1.01	NR	NR
12/30/2008	1.79	1.12	1.98	2.08	0.73	1.05	1.02	1.98
01/30/2009	0.54	0.86	0.92	0.84	0.62	0.71	NR	0.92
02/27/2009	1.01	0.99	1.23	1.15	1.12	1.17	1.07	0.94
03/05/2009	0.93	1.02	0.82	0.63	1.15	1.05	0.73	6.28
03/31/2009	1.16	0.92	0.88	0.82	1.22	0.72	0.87	1.34
04/29/2009	0.90	0.80	0.59	0.47	0.95	0.47	1.75	3.74
05/29/2009	1.74	2.01	1.24	1.68	1.89	2.00	2.09	2.97
06/29/2009	0.98	0.68	0.43	0.69	0.31	0.25	2.35	1.75
08/12/2009	0.25	0.17	0.17	0.19	1.45	0.27	0.10	4.78
09/08/2009	1.61	1.14	1.00	1.65	1.70	1.21	1.50	1.82
09/30/2009	2.00	1.01	0.98	0.52	0.99	1.01	1.29	1.97
10/27/2009	2.00	1.43	1.85	1.81	0.56	1.00	1.35	1.89
11/23/2009	1.09	0.65	0.48	0.50	0.81	0.50	1.69	2.98
12/31/2009	1.09	1.10	0.98	0.69	1.07	1.02	1.25	2.00
01/29/2010	1.54	1.98	1.74	1.82	1.69	1.73	1.45	2.06
03/02/2010	1.98	1.73	1.79	2.22	1.20	2.30	2.12	2.39
03/19/2010	0.62	0.46	0.43	0.41	1.30	0.28	0.45	6.35
04/20/2010	0.28	0.30	0.23	0.26	0.71	0.20	0.16	6.12
05/28/2010	1.78	1.80	1.09	0.73	1.06	1.41	0.72	6.95
06/30/2010	0.23	0.08	0.19	0.26	0.61	0.33	0.29	6.62
07/29/2010	0.89	1.00	0.95	0.92	1.25	1.40	0.59	0.90
08/28/2010	0.90	0.89	0.93	0.98	1.01	1.02	0.48	0.79
09/25/2010	0.32	0.14	0.11	0.31	0.89	0.29	NR	NR
10/29/2010	1.14	0.53	0.53	0.45	0.52	0.39	0.46	7.27
11/29/2010	0.63	0.25	0.31	0.19	0.30	0.56	0.50	2.98
12/23/2010	0.34	0.48	0.77	0.40	1.55	0.29	0.38	7.13
01/26/2011	0.60	0.72	0.95	0.28	0.81	0.64	0.25	6.20
03/01/2011	1.03	0.98	0.37	0.53	0.93	0.31	0.96	7.68
03/15/2011	1.46	0.96	0.51	1.17	2.19	1.95	NR	NR
04/01/2011	1.73	1.39	1.29	0.58	0.81	0.79	1.10	6.75
04/26/2011	2.27	1.81	0.82	0.19	0.55	0.18	0.62	7.43
05/31/2011	0.67	0.42	0.62	0.77	1.01	0.78	1.53	7.67
06/23/2011	1.92	1.23	0.97	1.75	0.95	0.89	1.69	5.93
07/27/2011	2.73	2.69	1.98	2.34	2.39	1.75	1.25	4.65
08/29/2011	0.29	0.25	0.50	0.85	2.34	0.62	0.79	1.93
09/23/2011	NR	1.64	0.72	NR	1.93	1.03	NR	NR
09/26/2011	0.26	NR	NR	1.22	NR	NR	NR	NR
09/28/2011	0.26	0.16	0.95	1.22	1.29	0.22	0.25	3.75
10/24/2011	0.20	0.17	0.79	1.05	1.21	0.30	0.19	1.23
11/21/2011	0.46	0.24	0.25	0.54	0.94	0.26	0.35	4.76
12/30/2011	0.45	0.25	0.19	0.59	0.45	0.14	0.29	2.31
05/30/2012	0.85	0.54	0.60	0.29	0.30	0.45	0.50	2.39
06/29/2012	0.24	0.27	0.23	0.64	1.64	0.30	0.17	2.36
08/28/2012	0.94	0.81	0.26	1.78	0.91	0.29	0.35	0.39
08/29/2012	1.03	0.76	0.71	0.62	0.69	0.70	0.64	1.64
08/30/2012	1.04	0.68	0.35	0.40	0.72	0.57	0.72	0.57
09/07/2012	1.25	0.74	0.51	0.53	1.04	0.30	1.25	0.74
09/14/2012	2.82	2.18	1.76	1.73	2.26	2.04	1.35	3.76
09/21/2012	2.29	1.93	1.29	1.89	2.50	2.02	1.49	2.75
06/12/2013	NR	NR	NR	NR	NR	NR	NR	NR
06/14/2013	0.68	0.61	0.54	0.52	0.56	0.65	0.49	0.54
07/17/2013	NR	NR	NR	NR	NR	NR	NR	NR
07/18/2013	0.46	0.48	0.61	0.40	0.31	0.36	0.37	1.02
07/19/2013	0.56	0.50	0.51	0.60	0.28	0.35	0.57	1.02
07/26/2013	0.37	0.25	0.18	0.42	0.14	0.21	0.19	1.96

Table 2-4. Biosparge Barrier Dissolved Oxygen Measurements

	Upgradient			Downgradient			In Biosparge Wall	
Location	**ASMW01**	**ASMW02**	**ASMW03**	**ASMW04**	**ASMW05**	**ASMW06**	**ASPZ01R[b]**	**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)**
08/02/2013	0.46	0.52	0.88	0.59	0.40	0.45	0.54	4.13
08/09/2013	0.41	0.52	0.88	0.54	0.38	0.52	0.43	0.48
08/16/2013	0.57	0.64	0.91	0.61	0.44	0.48	0.38	3.11
10/29/2013	1.68	1.28	1.00	1.13	1.18	1.12	0.76	1.03
11/26/2013	0.47	0.33	0.20	0.55	0.17	0.19	0.10	2.55
12/30/2013	0.52	0.31	0.36	0.58	0.34	0.35	0.23	1.41
01/31/2014	0.22	0.19	0.16	0.54	0.18	0.14	0.10	4.68
02/26/2014	0.24	0.15	0.15	0.86	0.18	0.17	0.28	2.90
03/28/2014	0.61	0.35	0.21	0.77	0.25	0.25	0.26	5.54
05/05/2014	0.85	0.37	0.33	0.18	0.36	0.26	0.08	0.23
05/30/2014	0.47	0.20	0.22	0.52	0.14	0.20	0.16	4.85
06/27/2014	0.37	0.25	0.28	0.86	0.17	0.19	0.14	4.36
07/30/2014	0.29	0.09	0.23	0.37	0.10	0.26	0.30	1.20
08/28/2014	0.42	0.39	0.30	0.77	0.46	0.70	0.66	4.85
09/29/2014	1.19	0.50	0.51	1.21	0.43	0.44	0.37	2.26
10/27/2014	NR	NR	NR	1.20	0.79	0.45	NR	NR
11/26/2014	0.48	0.35	0.39	NR	1.07	NR	0.81	4.82
12/30/2014	0.50	0.29	0.35	0.21	1.00	0.26	0.65	1.65
01/29/2015	1.00	0.65	0.47	0.20	0.63	0.43	0.50	1.23
02/27/2015	1.43	0.87	0.67	2.41	1.01	0.50	0.37	6.14
03/30/2015	0.16	0.17	0.16	1.51	0.82	0.22	0.22	4.99
04/29/2015	1.02	0.88	1.39	2.23	1.25	0.88	1.21	4.49
05/29/2015	0.49	0.35	0.32	1.88	0.86	0.27	0.37	5.22
07/28/2015	0.42	0.37	0.68	1.17	0.56	0.07	0.46	3.50
08/28/2015	1.16	0.20	0.28	1.99	0.98	1.39	0.17	1.75
09/30/2015	0.36	0.64	0.37	2.73	1.00	0.17	0.17	1.58
10/30/2015	0.24	0.16	0.16	1.93	0.88	0.07	0.32	3.14
11/25/2015	0.16	0.59	0.13	1.91	0.74	0.24	0.11	2.20
12/30/2015	0.40	0.32	0.27	2.10	0.94	0.21	0.57	2.37
01/28/2016	1.44	0.51	0.90	2.80	1.00	0.33	0.95	2.60
02/25/2016	0.45	0.37	2.78	3.14	1.81	0.36	0.62	3.76
03/31/2016	0.53	0.14	0.51	2.47	3.22	0.41	0.13	3.82
04/28/2016	0.48	0.15	0.20	2.23	1.33	0.07	0.11	5.55
05/23/2017	0.63	2.49	0.20	0.19	0.46	0.22	0.24	0.18
06/26/2017	0.21	0.24	0.20	0.35	0.16	0.32	0.14	5.66
07/31/2017	0.11	0.03	1.29	0.25	0.10	0.29	0.20	1.23
08/31/2017	0.86	0.11	0.81	0.31	0.14	0.35	1.18	0.16
09/26/2017	0.31	1.79	0.19	0.61	0.19	0.38	0.18	5.24
10/24/2017	1.07	0.18	1.35	0.68	0.19	0.79	1.57	0.37
11/27/2017	0.16	0.35	0.23	0.14	1.72	0.12	0.10	0.13
12/20/2017	0.66	0.20	0.14	0.20	1.63	0.12	0.38	3.53
01/30/2018	0.71	0.37	0.19	0.24	2.05	0.10	0.43	3.58
02/27/2018	0.13	0.06	0.05	0.60	1.56	0.04	0.07	0.06
03/27/2018	0.15	0.08	0.07	0.71	1.35	0.06	0.09	0.08
04/24/2018	0.19	0.10	0.09	0.85	1.12	0.09	0.11	0.10
05/22/2018	0.58	0.51	0.24	1.17	3.70	0.31	5.09	0.24
06/26/2018	0.62	0.48	0.29	1.29	3.07	0.45	4.78	0.31
07/23/2018	0.79	0.55	0.42	1.55	2.98	0.55	4.55	0.39
08/27/2018	0.75	0.61	0.45	1.77	3.19	0.51	4.27	0.45
09/25/2018	0.88	0.75	0.68	1.55	2.89	0.55	3.56	0.49
10/30/2018	2.49	0.70	0.81	0.71	0.38	0.54	0.25	4.07
11/20/2018	1.37	1.14	1.13	0.65	1.66	1.01	3.75	2.59
12/18/2018	1.51	1.09	0.31	3.05	5.08	0.32	0.37	8.37
01/31/2019	0.43	0.69	0.19	1.43	2.83	0.40	0.64	2.79
02/28/2019	1.57	1.33	0.91	1.29	2.20	0.77	0.65	4.40
03/27/2019	1.79	1.59	1.12	1.42	2.42	0.96	0.78	4.10
04/23/2019	2.11	1.62	1.29	1.55	2.63	1.26	0.88	4.25
05/29/2019	2.29	2.25	1.56	2.08	2.25	1.58	1.02	3.56
06/27/2019	2.59	2.15	1.86	1.69	2.14	1.85	1.22	3.25
07/31/2019	2.17	2.41	2.07	1.85	2.27	1.62	1.29	2.89
08/27/2019	1.88	1.95	1.75	1.58	2.07	1.55	1.36	2.51
09/24/2019	1.96	2.19	1.95	1.51	2.22	1.69	1.54	2.36
11/04/2019	3.80	3.78	4.77	2.95	5.34	2.73	8.22	3.12
11/26/2019	6.22	5.56	4.46	4.23	4.41	4.86	0.76	8.08
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	NR	NR	NR	NR	NR	NR	2.11	3.03
07/12/2022	5.24	6.04	NR	NR	NR	NR	NR	NR

Table 2-4. Biosparge Barrier Dissolved Oxygen Measurements

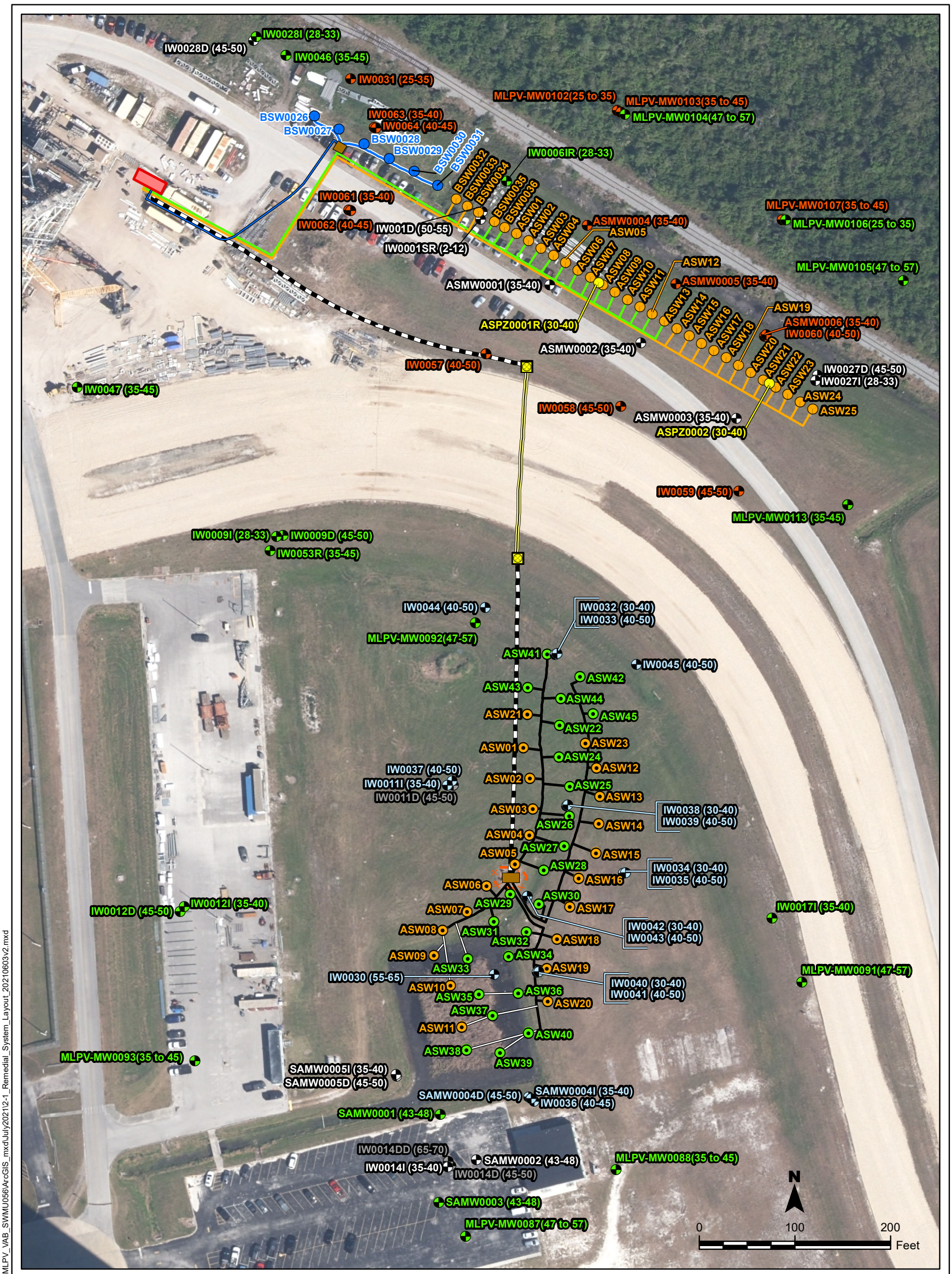
	Upgradient			Downgradient			In Biosparge Wall	
Location	**ASMW01**	**ASMW02**	**ASMW03**	**ASMW04**	**ASMW05**	**ASMW06**	**ASPZ01R[b]**	**ASPZ02**
Screen Interval (feet BLS)	**35 to 40**	**35 to 40**	**35 to 40**	**35 to 40**	**35 to 40**	**35 to 40**	**30 to 40**	**30 to 40**
Sample Date	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**	**DO (mg/L)**
08/16/2022	6.17	5.12	NR	NR	NR	NR	NR	NR
09/12/2022	3.65	2.77	4.32	NR	NR	NR	NR	NR
10/11/2022	5.10	6.64	6.58	NR	NR	NR	NR	NR
11/15/2022	4.97	6.31	6.47	NR	NR	NR	NR	NR
12/12/2022	NR	NR	NR	NR	NR	NR	NR	NR
01/16/2023	7.27	7.74	6.39	NR	NR	NR	NR	NR
02/14/2023	6.69	6.45	6.05	NR	NR	NR	NR	NR
03/02/2023	NR	NR	NR	NR	NR	NR	NR	NR
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
05/16/2023	3.36	5.56	4.96	6.36	3.65	2.33	3.56	7.86
06/16/2023	6.07	5.61	6.05	6.42	3.94	1.01	2.72	7.46
07/18/2023	NR	3.89	4.03	NR	NR	NR	2.35	6.67
08/16/2023	NR	4.96	6.11	0.51	0.65	1.01	3.53	7.11
09/22/2023	NR	6.01	6.59	6.64	2.75	4.09	5.25	7.62
10/23/2023	NR	5.24	5.02	5.53	1.33	0.86	1.32	5.41
11/20/2023	NR	6.32	6.06	6.38	6.35	5.60	3.52	7.67
12/20/2023	NR	6.46	6.81	NR	NR	NR	5.02	8.43
Historical Avg	**1.10**	**0.94**	**0.91**	**1.26**	**1.38**	**0.81**	**1.22**	**3.22**

Notes:
[a] Compressor had been inactive for 32 days when these readings were collected
[b] The original biosparge well ASPZ01 was replaced with ASPZ01R (same construction details) on October 16 2008
Avg = Average
BLS = Below land surface
DO = Dissolved oxygen
mg/L = Milligrams per liter
NR = Not recorded
SWMU = Solid Waste Management Unit
March 4, 2021 readings are part of baseline data collected due to biosparge system fire in December 2020
Gray highlighting indicates that the operational parameters were collected during the reporting period (May through December 2023)
This table is formatted with a graded color scale to provide visual representation of DO ranging from low (red) to high (dark green).

Table 2-5. Monitoring Well Retrofitting Details

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-IW0017I	11/16/2023		X				8	Removed dirt and added new grout to manhole
2	MLPV-IW0032	11/16/2023		X		X	X	9	
3	MLPV-IW0033	11/16/2023		X		X	X	9	
4	MLPV-IW0038	11/16/2023		X		X		10	Removed corrugated piping and created well pads
5	MLPV-IW0039	11/16/2023		X		X		10	Removed corrugated piping and created well pads
6	MLPV-IW0044	11/16/2023	X	X		X		11	
7	MLPV-SAMW0005I	11/16/2023	X					12	Uncovered wells, cleaned pads and added new grout to manholes
8	MLPV-SAMW0005D	11/16/2023	X					12	
9	MLPV-ASMW0004	11/16/2023	X	X		X	X	13	
10	MLPV-ASMW0005	11/16/2023		X				14	Removed dirt and added new grout to manhole
11	MLPV-ASMW0006	11/16/2023	X	X				15	Removed dirt and added new grout to manhole
12	MLPV-IW0060	11/16/2023	X	X				15	Removed dirt and added new grout to manhole
13	MLPV-IW0006IR	11/16/2023	X					16	Pad and well in good condition. Located in dirt near swale.
14	MLPV-IW0031	11/16/2023		X				17	Removed dirt and added new grout to manhole
15	MLPV-IW0046	11/16/2023	X					18	Pad and well in good condition. Located in dirt near swale.
16	MLPV-IW0028I	11/16/2023	X	X		X		19	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-IW0028D	11/16/2023	X	X				19	Reinforced well pad with concrete mix

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



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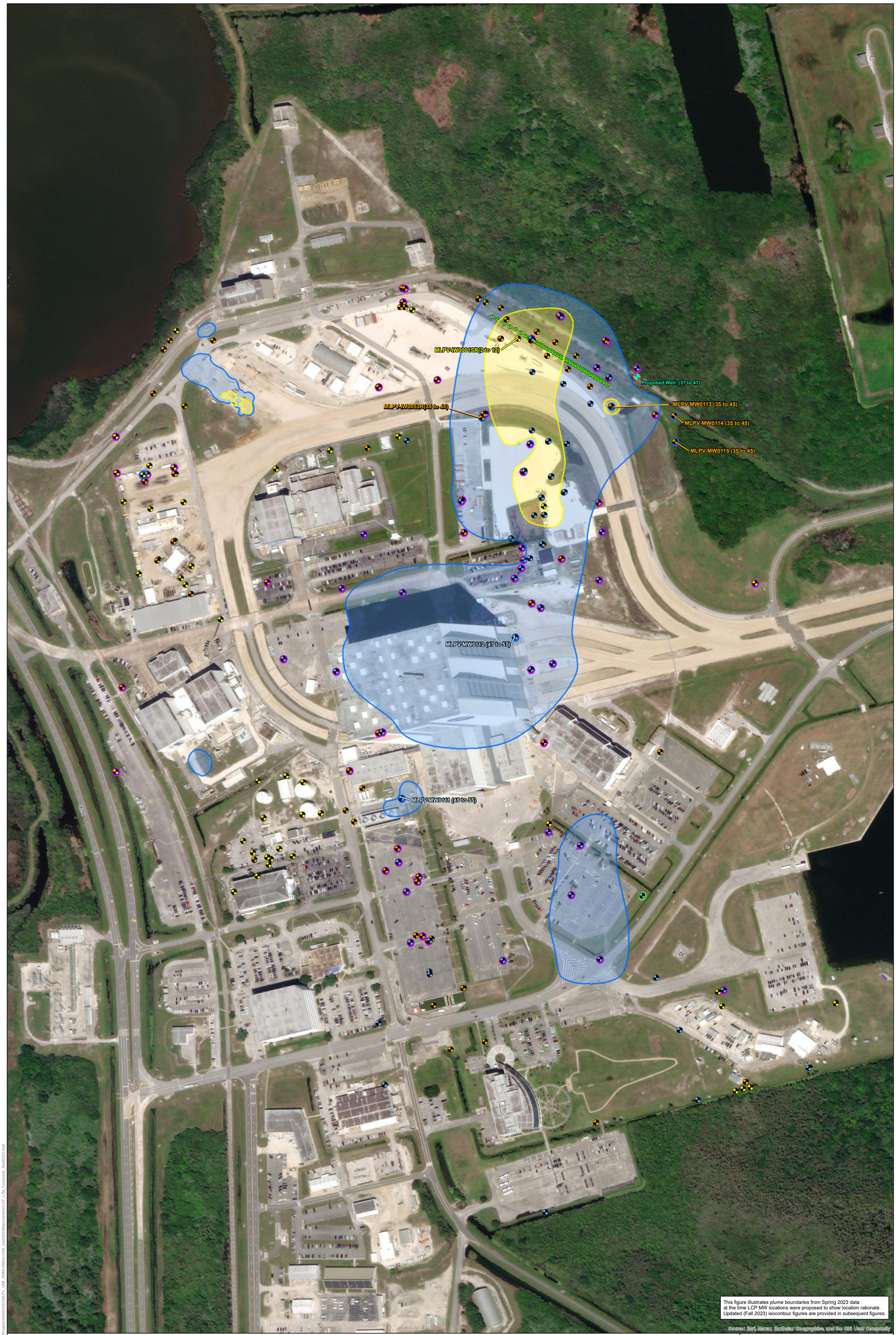
Legend

- 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, Leg 1 & 2
- Biosparge Expansion Well Location, Leg 5
- Air Sparge Well Location, Leg 3
- Air Sparge Well Location, Leg 4
- 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
- Sparge Manifold Location (not to scale)
- Junction Box

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
5. Airsparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.

FIGURE 2-1
Air Sparge and Biosparge System Layout

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 Scheduled for Sampling
- 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 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).
3. Per Kennedy Space Center Remediation Information System monitoring 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.
5. IW0053R was installed in Fall 2023 to replace existing LTM well IW0053, which was destroyed and could not be located.
6. IW0001S was abandoned in Fall 2023 and replaced by IW0001SR as a part of Site MW maintenance. The well is not currently under a sampling plan.

N

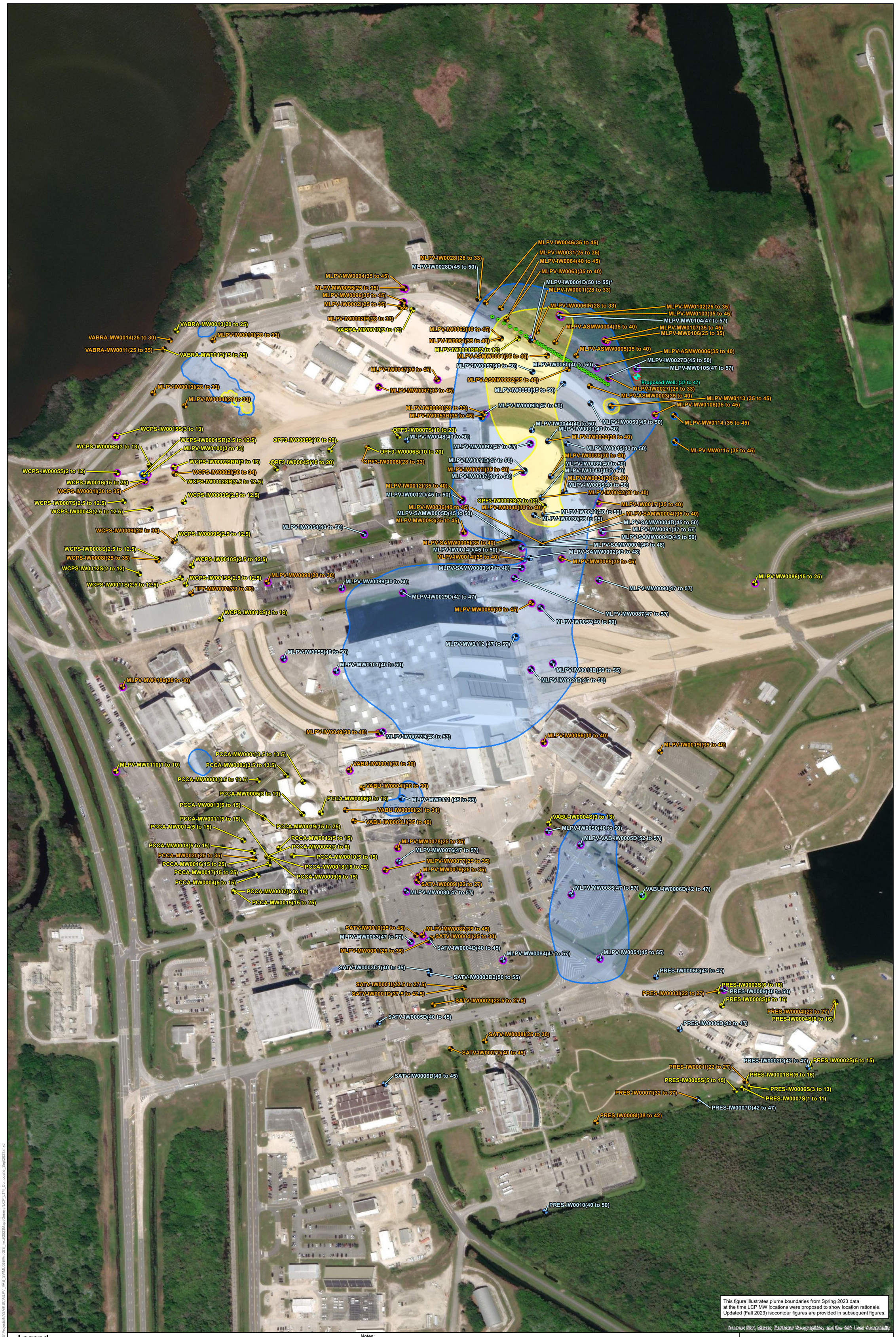
0 200 400 800 Feet

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901

FIGURE 2-2
LCP LTM 2023 Monitoring Well Installations

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

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Legend

- Shallow Monitoring Well Location (1 to 25)
- Intermediate Monitoring Well Location (20 to 45)
- Deep Monitoring Well Location (40 to 57)
- Existing Well Scheduled for Sampling
- 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 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).
3. Per Kennedy Space Center Remediation Information System monitoring 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.
5. IW0053R was installed in Fall 2023 to replace existing LTM well IW0053, which was destroyed and could not be located.
6. IW0001S was abandoned in Fall 2023 and replaced by IW0001SR as a part of Site MW maintenance. The well is not currently under a sampling plan.

N

0 200 400 800 Feet

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901

FIGURE 2-3
LCP LTM 2023

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

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

Groundwater sampling for monitoring locations in the MLP/VAB groundwater monitoring program occur at a frequency of semi-annual, annual, or biennial 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). The 2022-April 2023 CMI and IM Annual Status Report dated, January 2024, details the installation of 35 out of the 37 monitoring wells. Two remaining monitoring well locations could not be accessed within the VAB perimeter and were later installed and sampled in the Fall of 2023 as discussed in **Section 2.3**. Data from these wells are included in the evaluations for both the LCP and other focus areas.

On October 11, 12, 20, and 23, the 2023 semi-annual and annual sampling events were performed concurrently for the Former Hot Spot 2 (Air Sparge Area), Biosparge, and Hot Spot 3 (OFW) areas. One monitoring well in the Former Hot Spot 2 area, MLPV-IW0033, was submerged during the October event and therefore sampled in November 2023 after raising the top-of-casing. Two monitoring wells from the Hot Spot 3 (OFW) were resampled in November 2023 to verify October 2023 concentrations.

Monitoring well purging and sampling activities were conducted using the low flow purging method in general accordance with DEP Standard Operating Procedures (SOPs) (DEP 2005), the KSC Sampling and Analysis Plan (NASA 2017b), and the DEP 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, percent salinity, and turbidity. Groundwater samples were submitted to Eurofins Environment Testing Southeast (Eurofins) 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 I**. Groundwater sampling logs and calibration records are provided in **Appendix J**. 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 K**. Data were uploaded to KSC's Remediation Information System (RIS) upon receipt. RIS completion tickets are provided in **Appendix L**.

3.1 GROUNDWATER ELEVATION AND FLOW DIRECTION

Depth to groundwater measurements were collected from accessible monitoring wells during a sitewide event that was performed in July 2023 (wet season) and from accessible monitoring wells prior to the October 2023 sampling event. 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**. Wet season groundwater contour maps 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 greater than 40 feet bls.

Groundwater contour maps indicate radial flow at each interval emanating from different areas. Radial groundwater flow originates southwest of the VAB in the shallow interval, southwest and northeast of the VAB in the intermediate interval, and north and southeast of the VAB in the deep interval. Groundwater generally flows outward in each cardinal direction. Historically, radial flow has been centered around the VAB with groundwater flowing in the same cardinal directions (north south, east and westwardly). The presence of radial flow at this site is likely influenced by the topography changes made during the construction of the VAB and onsite swales. Water level measurement logs are provided in **Appendix M**.

3.2 HCP INTERIM GROUNDWATER MONITORING

The semi-annual sampling plan for Former Hot Spot 2 included 13 monitoring wells from the 30 to 50 foot bls intervals, as noted in **Table 3-2** (MLPV-IW0011I, MLPV-IW0033, MLPV-IW0034, MLPV-IW0035, MLPV-IW0036, MLPV-IW0037, MLPV-IW0039, MLPV-IW0041, MLPV-IW0043, MLPV-IW0044, MLPV-IW0045, MLPV-SAMW0004D, and MLPV-SAMW0004I). Due to a rain event and flooding within the Former Hot Spot 2 area, four monitoring wells (MLPV-IW0033, MLPV-IW0039, MLPV-IW0044, and MLPV-IW0045) were submerged during the initial sampling event scheduled October 12 and 13, 2023 and sampling for these wells was performed during a return visit on October 23, 2023. During the October 23, 2023 site visit, it was observed that monitoring well MLPV-IW0033 was still submerged and sampling for that monitoring well was rescheduled for November 2023, post-retrofit.

Samples were analyzed for a reduced analyte list of cDCE, tDCE, and VC using U.S. Environmental Protection Agency (USEPA) Method 8260B by a fixed-base laboratory.

Additionally, one newly installed replacement monitoring well (MLPV-MW0053R) was sampled northwest of the Former Hot Spot 2 area in November 2023 as part of the LCP LTM plan. The monitoring well was sampled for TCE, cDCE, tDCE, and VC using USEPA Method 8260B. Data from this well is also included in the evaluation of the Former Hot Spot 2 area.

Groundwater analytical results for Former Hot Spot 2 and surrounding area are summarized in **Table 3-2** and illustrated on **Figure 3-4**.

3.2.1 30 feet to 40 feet bls Sampling Interval Results

The October 2023 laboratory analytical results indicated CVOC concentrations in groundwater were less than GCTLs or laboratory detection limits in two monitoring wells, MLPV-IW0011I and MLPV-IW0034. The concentration of VC exceeded the GCTL in groundwater collected from monitoring well MLPV-SAMW0004I at 8.4 µg/L. CVOC concentrations did not exceed their respective NADC in any of the sampled monitoring wells.
The results from the October 2023 sampling event are consistent with previous concentrations reported in March 2023. Concentration of VC in MLPV-SAMW0004I, located upgradient of the inactive air sparge system, indicates a decreasing trend since 2021.

Analytical results from the monitoring well sampled under the biennial LCP LTM plan (MLPV-IW0053R, located northwest of the inactive air sparge system) indicated CVOC concentrations were less than GCTLs or laboratory detection limits, with the exception of VC. Concentration of VC were detected above the GCTL at 18 µg/L, less than half of previous VC detections.

3.2.2 40 feet to 50 feet bls Sampling Interval Results

The October and November 2023 laboratory analytical results indicate concentrations of CVOCs in groundwater exceeded their GCTLs for at least one COC in each of the sampled monitoring wells. No detections of tDCE were present above the GCTL or laboratory detection limit. Exceedances were as follows:

- **cDCE GCTL**: MLPV-IW0043 (92 µg/L) and MLPV-IW0044 (100 µg/L).
- **VC GCTL**: MLPV-IW0033 (700 µg/L), MLPV-IW0035 (84 µg/L), MLPV-IW0036 (25 µg/L), MLPV-IW0037 (180 µg/L), MLPV-IW0039 (210 µg/L), MLPV-IW0041 (180 µg/L), MLPV-IW0043 (200 µg/L), MLPV-IW0044 (230 µg/L), MLPV-IW0045 (100 µg/L), and MLPV-SAMW0004D (2 µg/L).
- **cDCE NADC**: No exceedances
- **VC NADC**: MLPV-IW0033 (700 µg/L), MLPV-IW0037 (180 µg/L), MLPV-IW0039 (210 µg/L), MLPV-IW0041 (180 µg/L), MLPV-IW0043 (200 µg/L), and MLPV-IW0044 (230 µg/L).

Analytical results from the October and November 2023 sampling event are consistent with the previous CVOC concentrations reported in March 2023, except monitoring well MLPV-IW0044. In groundwater collected from monitoring well MLPV-IW0044, the concentration of cDCE was reported above the GCTL for the first time since 2014. In groundwater collected from monitoring well MLPV-IW0039, the concentration of cDCE was reported below the GCTL for the first time since 2018.

3.2.3 Summary of Centerline AS System Treatment Area 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, as shown in **Figure 2-1**. The air sparge wells along this centerline are screened to depths ranging from 42 feet bls (within the retention pond) to 46 feet bls (outside of the retention pond). These monitoring 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**: Monitoring wells MLPV-IW0032, MLPV-IW0038, MLPV-IW0040, and MLPV-IW0042 are sampled annually in the Spring and were not sampled during this reporting period.

- **40 feet to 50 feet bls:** Concentrations of cDCE exceeded its GCTL in groundwater collected from monitoring well MLPV-IW0043. The concentration of cDCE in groundwater collected from monitoring well MLPV-IW0039 decreased below its GCTL in October. The concentration of cDCE in groundwater from monitoring well MLPV-IW0033 remained below its GCTL for the second consecutive sampling event. VC concentrations exceeded its NADC in groundwater collected from each centerline monitoring well (MLPV-IW0033, MLPV-IW0039, MLPV-IW0041, and MLPV-IW0043) with the greatest increase in MLPV-IW0033 from 560 to 700 µg/L.

A review of concentration trends in this area and interval indicate CVOC concentrations have decreased since sampling began and exhibit a relatively stable trend in the air sparging area since the system was shut down in 2018. Increasing concentrations of VC in monitoring well MLPV-IW0033, located at the downgradient end of the AS system, are indicative of contaminant mass flux from beneath the treatment area. This has been evaluated in the Former Hot Spot 2 area Remedial Alternatives Evaluation.

Trend graphs for select wells (MLPV-IW0033, MLPV-IW0039, MLPV-IW0041, and MLPV-IW0043) within the centerline of the offline air sparge system treatment area are provided as **Appendix N**.

3.2.4 Summary of Perimeter AS System Treatment Area 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. Perimeter analytical results indicate the following:

- **30 feet to 40 feet bls**: Monitoring wells MLPV-SAMW0004I, MLPV-IW0011I, and MLPV-IW0034 are sampled semi-annually. CVOC concentrations were less than their respective GCTLs or not detected, except for VC in the southern-most located (upgradient) monitoring well MLPV-SAMW0004I. Results are consistent with previous years with VC concentrations the lowest since 2019 in MLPV-SAMW0004I.

- **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 indicated concentrations of cDCE in groundwater decreased to below the GCTL in monitoring well MLPV-IW0037 and increased by several orders of magnitude above the GCTL in MLPV-IW0044. Concentrations of VC are above its GCTL from groundwater collected from monitoring wells MLPV-IW0035, MLPV-IW0036, MLPV-IW0045, and MLPV-SAMW0004D. Concentrations of VC are greater than its NADC in MLPV-IW0037 and MLPV-IW0044. Concentrations reflect a stable or decreasing trend within the footprint of the air sparge system. Increasing cDCE or VC concentrations are present in monitoring wells downgradient of the system (MLPV-IW0044 and MLPV-IW0045) and in the vicinity of where the 2022 RAE recommended a permeable reactive barrier to mitigate contaminant mass flux migrating towards the biosparge barrier.

3.3 BIOSPARGE BARRIER PERFORMANCE MONITORING

Semi-annual performance monitoring for the biosparge system includes a network of 18 monitoring wells (MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0006IR, MLPV-IW0028I, MLPV-IW0031, MLPV-IW0046, MLPV-IW0057, MLPV-IW0058, MLPV-IW0059, MLPV-IW0060, MLPV-IW0061, MLPV-IW0062, MLPV-IW0063, MLPV-IW0064, MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107), as noted in **Table 3-3**. On October 11, 12, and 20, 2023, groundwater from these monitoring wells was collected and analyzed for select CVOCs (TCE, cDCE, tDCE, and VC) using USEPA Method 8260B by a fixed-base laboratory.

Additionally, three monitoring wells (MLPV-MW0113 through MLPV-MW0115) were sampled southeast of the biosparge barrier wall in November 2023 as part of the LCP LTM plan. These monitoring wells were installed northwest (MLPV-MW0113), east (MLPV-MW0114), and southeast (MLPV-MW0115) of MLPV-MW0108, shown in **Figure 3-5**, due to the March 2023 semi-annual sampling event analytical results. Data indicated an isolated plume where VC was

greater than the GCTL. 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**. Trend charts for MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, and MLPV-IW0060, downgradient of the barrier, are provided in **Appendix N**.

3.3.1 25 feet to 35 feet bls Sampling Interval Results

Four monitoring wells, MLPV-IW006IR, MLPV-IW0028I, MLPV-IW0031, and MLPV-MW0102 were evaluated from this interval. The October 2023 laboratory analytical results indicate CVOC concentrations in groundwater were less than GCTLs or below laboratory detection limits for each monitoring well, excluding MLPV-MW0102. Concentrations of VC were greater than the GCTL at 7.4 ug/L in groundwater collected from this monitoring well; however, concentrations were previously above the NADC. The VC concentration decreased to less than the GCTL in downgradient well MLPV-IW0031 since the previous sampling event in March 2023.

3.3.2 35 feet to 40 feet bls Sampling Interval Results

Eight monitoring wells, MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0046, MLPV-IW0061, MLPV-IW0063, MLPV-MW0103, and MLPV-MW0107 were evaluated from this interval.

The October 2023 laboratory analytical results indicate concentrations of VC, cDCE, tDCE, and TCE were less than their respective GCTLs in each monitoring well excluding MLPV-IW0061, MPLV-MW103, and MLPV-MW0107. Concentrations of VC in groundwater collected from monitoring well MLPV-MW0103 (130 µg/L) exceeded the NADC. Groundwater collected from monitoring wells MLPV-IW0061 and MPLV-MW0103 show concentrations of VC exceeded the GCTL at 12 ug/l and 11 ug/L, respectively.

Analytical results from the monitoring wells southeast of the biosparge barrier belonging to the LCP LTM plan (MLPV-MW0113 through MLPV-MW0115) indicate CVOC concentrations were less than GCTLs or laboratory detection limits.

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 October 2023 laboratory analytical results indicate concentrations of TCE, cDCE, and tDCE were less than their respective GCTLs or laboratory detection limits in each monitoring well at this interval. Concentrations of VC were greater than the NADC in groundwater collected from upgradient monitoring wells, MLPV-IW0057, MLPV-IW0058, and MLPV-IW0062. VC concentrations were greater than the GCTL in groundwater collected from each monitoring well, except MLPV-IW0064.

3.3.4 Summary of Biosparge Barrier Performance Monitoring Results

Monitoring wells upgradient of the biosparge barrier, MLPV-IW0057 through MLPV-IW0059, were sampled to evaluate the potential reduction in size of the cDCE and VC plumes migrating from the Former Hot Spot 2 area. Results from these monitoring wells indicated an overall reduction of CVOC concentrations. Groundwater parameters in these monitoring wells exhibit DO concentrations less than 0.5 milligrams per liter (mg/L) and oxidation reduction potential measurements less than -200 millivolts (mV), both of which are favorable conditions for reductive dechlorination. This could indicate a reduction in concentrations within the HCP as is approaches the biosparge barrier. Geochemical parameters from the biosparge area monitoring wells are provided on **Table 3-7.**

Monitoring wells upgradient of the barrier expansion (northernmost barrier) include MLPV-IW0061 and MLPV-IW0062, located northwest of MLPV-IW0057. Concentrations of VC remain above its GCTL in monitoring well MLPV-IW0061 and above its NADC in MLPV-IW0062; however, overall CVOC concentrations exhibit a decreasing trend, indicating the LCP and HCP boundary is retracting from the northwest. Groundwater parameters of DO less than 0.5 mg/L and oxidation reduction potentials in the -200 to -300 mV range is favorable for reductive dechlorination. Similarly, monitoring wells northwest of the barrier (MLPV-IW0028I and MLPV-IW0046) without detections of CVOCs in groundwater collected and sampled during the October event confirms retraction of the LCP.

Monitoring wells downgradient of the barrier include MLPV-ASMW0004, MLPV-ASMW0005, MLPV-ASMW0006, MLPV-IW0031, MLPV-IW0060, MLPV-IW0063, MLPV-IW0064, MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107. Concentrations of cDCE, tDCE and TCE have remained less than their respective GCTLs or laboratory detection limits since 2018 or earlier. VC is the main contaminant in the LCP and HCP in the biosparge area. VC concentrations have fluctuated in correlation with operation of the biosparge system. An increase of VC concentrations was last observed while the biosparge system was shut down for replacement, repair and expansion in July 2022 through February 2023 (during the 2022- April 2023 reporting period). Most recent reductions of VC concentrations in MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 indicate the biosparge barrier is effectively mitigating the HCP since startup in April 2023. Plume maps illustrating the overall footprint of the cDCE and VC plumes in the biosparge area at each interval are provided on **Figure 3-6** through **Figure 3-9**.

3.4 HOT SPOT 3 (OFW AREA) PERFORMANCE MONITORING

On October 12, 2023, the annual groundwater monitoring event for the four OFW Area monitoring wells, VABRA-MW0011, VABRA-MW0012, VABRA-MW0013, and VABRA-MW0014, was conducted. Groundwater was collected 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**. Trend charts are provided in **Appendix N**.

3.4.1 15 to 25 feet bls Sampling Interval Results

Laboratory analytical results from VABRA-MW0013 indicated CVOC concentrations in groundwater were not detected. VC concentrations in groundwater collected from VABRA-MW0012 in October showed an exceedance of GCTL for the first time 2017. Therefore, it was resampled in November 2023 in which the analytical results indicated CVOC concentrations were below the laboratory detection limits, which is consistent with historical results.

3.4.2 25 to 35 feet bls Sampling Interval Results

Laboratory analytical results from VABRA-MW0014 indicate CVOC concentrations in groundwater were not detected. VC concentrations in groundwater collected from VABRA-MW0011 in October showed an exceedance of its GCTL for the first time 2017. Therefore, it was resampled in November 2023 in which the analytical results indicated CVOC concentrations were below the laboratory detection limits, which is consistent with historical results.

3.4.3 Summary of Hot Spot 3 (OFW) Results

The groundwater analytical results from the October 2023 annual sampling event are consistent with the previous year, indicating CVOC concentrations remain less than their respective GCTLs or not detected in VABRA-MW0013 and VABRA-MW0014. Concentrations of VC in VABRA-MW0011 and VABRA-MW0012 exceeded GCTLs for the first time since 2017. Detections did not correlate with groundwater levels, purging techniques followed SOPs, and lab report quality control analyses reported no irregularities or qualifiers associated with the sample batch. Temporary detections can be attributed to either inadvertent cross-contamination or temporary changes in the rate of migration and attenuation of the upgradient plume. However, subsequent reduction to non-detect (November 2023) indicates that the plume leading edge has not migrated to this area. **Figure 3-10** provides the updated upgradient CVOC plume using the 2023 monitoring well results and the historical 2018 DPT groundwater results that support no GCTL exceedances.

3.5 BIENNIAL LCP LONG TERM GROUNDWATER MONITORING

On November 16, 2023, groundwater from six newly installed monitoring wells from the biennial network was collected and analyzed for a reduced CVOC analyte list of cDCE, TCE, tDCE, and VC using USEPA Method 8260B by a fixed-base laboratory. One replacement

monitoring well, MLPV-IW0053R, is located in Former Hot Spot 2 and discussed in **Section 3.2**, and three monitoring wells, MLPV-MW0113 through MLPV-MW0115, are located southeast of the biosparge barrier and discussed in **Section 3.3**. Two remaining monitoring wells, MLPV-MW0111 and MLPV-MW0112, are located within the VAB perimeter to evaluate the groundwater interval greater than 45 feet bls.

Analytical results from November 2023 indicate CVOC concentrations are below laboratory detection limits in groundwater collected from monitoring well MLPV-MW0111, located southwest of the VAB. This indicates a collapse of the isolated LCP previously detected in the area. Analytical results also indicate VC concentrations exceed the GCTL in monitoring well MLPV-MW0112, located east of the VAB, and confirm the LCP presence in the deeper interval.

A full list of the monitoring wells sampled along with groundwater analytical data are summarized in **Table 3-5** and illustrated on **Figure 3-11** and **Figure 3-12**. Geochemical parameters from the sampling events are provided on **Table 3-9**. LCP Area analytical results were evaluated in combination with the analytical results from the overlapping sites within the SWMU and discussed in previous sections to construct a figure that illustrates a combined sitewide plume footprint on **Figure 3-13**.

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Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:	MLPV-IW0001S		MLPV-IW0001SR		MLPV-MW0086		MLPV-MW0100		MLPV-MW0110		VABU-IW0004S		OPF3-IW0006S		PRES-IW0001SR		PRES-IW0006S	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	2 - 12		2 - 12		15 - 25		3 - 13		1 - 11		3 - 13		10 - 20		6 - 16		3 - 13	
TOC Elevation (feet NAVD88):	4.78		NA		NA		NA		NA		6.52		5.44		7.93		4.04	
TOC Elevation Re-Survey (feet NAVD88):	NA		4.57		5.54		4.66		3.80		NA		NA		NA		NA	
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
09/18-20/2018	5.27	-0.49	-	-	-	-	-	-	-	-	4.49	2.03	4.92	0.52	7.18	0.75	4.9	-0.86
5/11/2020	CNL	CNL	-	-	-	-	-	-	-	-	4.54	1.98	5.23	0.21	7.75	0.18	5.52	-1.48
9/14/2020	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
3/7/2023	NM	NM	-	-	4.38	1.16	4.01	0.65	2.72	1.08	NM	NM	NM	NM	NM	NM	NM	NM
7/13/2023	OBSTRUCTION		-	-	2.84	2.70	2.98	1.68	2.95	0.85	3.81	2.71	3.11	2.33	6.06	1.87	4.1	-0.06
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-IW0002I		MLPV-IW0002IR		MLPV-IW0006IR		MLPV-IW0009I		MLPV-IW0011I		MLPV-IW0012I		MLPV-IW0014I		MLPV-IW0017I		MLPV-IW0027I	
Area:	VAB		VAB		VAB		VAB		Hot Spot 2/VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	28 - 33		28 - 33		28 - 33		28 - 33		35 - 40		35 - 40		35 - 40		35 - 40		28 - 33	
TOC Elevation (feet NAVD88):	5.58		NA		2.87		5.78		4.03		5.41		5.24		5.85		2.08	
TOC Elevation Re-Survey (feet NAVD88):	NA		6.46		NA		4.07		6.30		NA		NA		5.49		3.11	
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	4.65	1.13	2.65	1.38	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	5.7	0.08	3.41	0.62	4.94	0.47	4.6	0.64	5.54	0.31	2.63	-0.55
10/30/2019	NM	NM	-	-	NM	NM	NM	NM	1.74	2.29	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	NM	NM	-	-	NM	NM	NM	NM	3.08	0.95	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	CNL	CNL	-	-	5.40	-2.53	5.91	-0.13	3.80	0.23	5.21	0.20	4.89	0.35	8.32	-2.47	2.60	-0.52
6/2/2020	NM	NM	-	-	NM	NM	4.29	1.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	NM	NM	-	-	3.45	-0.58	NM	NM	1.28	2.75	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	CNL	CNL	-	-	2.43	0.44	5.00	0.78	2.85	1.18	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	NM	NM	0.92	3.11	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	NM	NM	2.33	1.70	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	0.77	2.20	0.67	3.05	2.73	5.75	-1.72	NM	NM	3.96	1.28	4.68	1.17	2.31	-0.23
7/13/2023	NM	NM	5.00	1.46	1.65	1.22	2.04	2.03	3.80	2.50	2.81	2.60	2.38	2.86	3.44	2.41	1.79	1.32
10/11/2023	NM	NM	NM	NM	1.63	1.24	NM	NM	4.03	2.27	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:	PRES-IW0007S		PCCA-MW0004		PCCA-MW0007		PCCA-MW0008		PCCA-MW0009		PCCA-MW0010		PCCA-MW0011		PCCA-MW0012		PCCA-MW0013	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	1 - 11		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15		5 - 15	
TOC Elevation (feet NAVD88):	1.65		7.96		8.22		7.22		7.6		7.86		7.59		7.89		6.99	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		NA		NA		NA		NA		NA		NA		NA	
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	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
09/18-20/2018	NM	NM	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
5/11/2020	3.17	-1.52	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
9/14/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	2.16	-0.51	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
3/7/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/13/2023	CNL	CNL	4.31	3.65	5.56	2.66	4.78	2.44	3.61	3.99	3.55	4.31	3.31	4.28	3.48	4.41	2.45	4.54
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	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		2.70		5.87	
TOC Elevation Re-Survey (feet NAVD88):	2.68		2.60		4.88		5.87		4.83		5.97		NA		3.53		NA	
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
7/13/2023	1.51	0.57	1.44	1.17	UNDER WATER		3.16	2.71	1.45	2.39	3.21	2.76	0.76	2.59	2.26	1.27	4.06	1.81
10/11/2023	1.46	1.22	1.41	1.19	NM	NM	3.46	2.41	NM	NM	NM	NM	NM	NM	2.23	1.30	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:	PCCA-MW0014		WCPS-IW0001SR		WCPS-IW0002SR		WCPS-IW0002SRR		WCPS-IW0005S		WCPS-IW0006S		WCPS-IW0009S		WCPS-IW0010S		WCPS-IW0012S	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	5 - 15		2.5 - 12.5		2.5 - 12.5		3 - 13		2 - 12		3 - 13		2.5 - 12.5		2.5 - 12.5		2 - 12	
TOC Elevation (feet NAVD88):	7.25		4.23		5.39		NA		4.48		4.88		5.3		5.83		4.77	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		NA		5.50		NA		NA		NA		NA		NA	
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	4.42	2.83	3.02	1.21	NM	NM	-	-	3.45	1.03	3.81	1.07	4.02	1.28	NM	NM	NM	NM
09/18-20/2018	4.81	2.44	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
5/11/2020	4.98	2.27	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
9/14/2020	NM	NM	2.14	2.09	NM	NM	-	-	2.73	1.75	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	4.30	2.95	3.33	0.9	CNL	CNL	-	-	3.87	0.61	4.17	0.71	4.39	0.91	4.83	1.00	NM	NM
3/7/2023	NM	NM	3.42	0.81	DESTROYED		4.81	0.69	3.74	0.74	NM	NM	NM	NM	NM	NM	NM	NM
7/13/2023	3.30	3.95	2.34	1.89			3.56	1.94	2.9	1.58	3.15	1.73	3.12	2.18	3.49	2.34	CNL	CNL
10/11/2023	NM	NM	NM	NM			NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM			NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-IW0053		MLPV-IW0053R		MLPV-IW0056		MLPV-IW0061		MLPV-IW0063		MLPV-MW0077		MLPV-MW0078		MLPV-MW0079		MLPV-MW0081	
Area:	VAB		VAB		VAB		Biosparge Area		Biosparge Area		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	35 - 40		35 - 40		30 - 40		35 - 40		35 - 40		25 - 35		25 - 35		25 - 35		25 - 35	
TOC Elevation (feet NAVD88):	4.76		NA		7.9		5.78		3.67		NA		NA		NA		NA	
TOC Elevation Re-Survey (feet NAVD88):	NA		4.33		NA		5.85		3.79		6.89		6.99		6.99		6.91	
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	1.46	5.51	1.48	5.60	1.39	5.57	1.34
7/13/2023	DESTROYED		-	-	NO ACCESS		4.51	1.34	2.53	1.26	4.21	2.68	4.26	2.73	4.39	2.60	4.51	2.40
10/11/2023			-	-	NM	NM	4.50	1.35	2.51	1.28	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023			2.68	1.65	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:	WCPS-IW0013S		WCPS-IW0014S		WCPS-IW0015S	
Area:	VAB		VAB		VAB	
Screened Interval (feet bls):	2.5 - 12.5		4 - 14		3 - 13	
TOC Elevation (feet NAVD88):	5.79		6.88		5.63	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		NA	
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)
5/23/2016	4.12	1.67	5.36	1.52	4.9	0.73
09/18-20/2018	4.73	1.06	6.02	0.86	5.43	0.2
5/11/2020	4.99	0.80	6.32	0.56	5.62	0.01
9/14/2020	NM	NM	NM	NM	4.45	1.18
3/18/2021	5.27	0.52	4.35	2.53	5.65	-0.02
3/7/2023	NM	NM	NM	NM	CNL	CNL
7/13/2023	2.97	2.82	UNDER CAR		CNL	CNL
10/11/2023	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM

INTERMEDIATE WELL ID:	MLPV-MW0082		MLPV-MW0088		MLPV-MW0089		MLPV-MW0093		MLPV-MW0094		MLPV-MW0095		MLPV-MW0096	
Area:	VAB		Former Hot Spot 2		Former Hot Spot 2		Former Hot Spot 2		Biosparge Area		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	35 - 45		35 - 45		35 - 45		35 - 45		35 - 45		25 - 35		35 - 45	
TOC Elevation (feet NAVD88):	NA		NA		NA		NA		NA		NA		NA	
TOC Elevation Re-Survey (feet NAVD88):	7.01		5.45		7.23		5.64		6.37		6.25		6.63	
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)	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	5.64	1.37	4.06	1.39	6.84	0.39	COVERED		5.70	0.67	5.58	0.67	5.88	0.75
7/13/2023	4.54	2.47	4.25	1.20	4.25	2.98	2.78	2.86	4.54	1.83	4.97	1.28	5.17	1.46
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
TOC Elevation Re-Survey (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023
7/13/2023
10/11/2023
11/20/2023

INTERMEDIATE WELL ID:	MLPV-MW0097		MLPV-MW0098		MLPV-MW0102		MLPV-MW0103		MLPV-MW0106		MLPV-MW0107		MLPV-MW0108		MLPV-MW0109	
Area:	Biosparge Area		VAB		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		VAB	
Screened Interval (feet bls):	35 - 45		20 - 30		25 - 35		35 - 45		25 - 35		35 - 45		35 - 45		20 - 30	
TOC Elevation (feet NAVD88):	NA		NA		NA		NA		NA		NA		NA		NA	
TOC Elevation Re-Survey (feet NAVD88):	6.74		6.64		1.47		1.07		2.58		2.61		4.43		5.91	
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	5.84	0.90	5.47	1.17	0.82	0.65	0.50	0.57	1.89	0.69	1.85	0.76	3.58	0.85	5.01	0.90
7/13/2023	4.84	1.90	4.02	2.62	0.33	1.14	0.00	1.07	1.47	1.11	1.44	1.17	2.80	1.63	3.97	1.94
10/11/2023	NM	NM	NM	NM	0.51	0.96	0.43	0.64	NM	NM	1.40	1.21	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
TOC Elevation Re-Survey (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023
7/13/2023
10/11/2023
11/20/2023

INTERMEDIATE WELL ID:	MLPV-MW0113		MLPV-MW0114		MLPV-MW0115		MLPV-SAMW0004I		MLPV-SAMW0005I		MLPV-ASMW0001		MLPV-ASMW0002		MLPV-ASMW0003	
Area:	VAB		VAB		VAB		Hot Spot 2		VAB		Biosparge Area		Biosparge Area		Biosparge Area	
Screened Interval (feet bls):	35 - 45		35 - 45		35 - 45		35 - 40		35 - 40		35 - 40		35 - 40		35 - 40	
TOC Elevation (feet NAVD88):	NA		NA		NA		ND		5.88		5.22		5.19		5.24	
TOC Elevation Re-Survey (feet NAVD88):	6.05		3.03		3.59		5.57		5.70		NA		NA		NA	
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
09/18-20/2018	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
10/30/2019	-	-	-	-	-	-	3.14	-	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	-	-	-	-	-	-	4.6	-	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	-	-	-	-	-	-	5.27	-	5.55	-	6.51	-1.29	8.55	-3.36	7.05	-1.81
6/2/2020	-	-	-	-	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	-	-	-	-	-	-	2.7	-	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	-	-	-	-	-	-	4.32	-	4.59	-	5.5	-0.28	5.49	-0.30	6.02	-0.78
9/13/2021	-	-	-	-	-	-	2.32	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	-	-	-	-	-	-	3.34	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	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	-	-	-	-	-	-	4.28	1.29	NM	NM	NM	NM	NM	NM	NM	NM
7/13/2023	-	-	-	-	-	-	2.75	2.82	3.80	2.08	CNL	CNL	4.65	0.54	5.07	0.17
10/11/2023	-	-	-	-	-	-	3.00	2.57	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	4.58	1.47	1.63	1.40	2.03	1.56	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
TOC Elevation Re-Survey (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023
7/13/2023
10/11/2023
11/20/2023

INTERMEDIATE WELL ID:	MLPV-ASMW0004		MLPV-ASMW0005		MLPV-ASMW0006		PCCA-MW0015		PCCA-MW0016		PCCA-MW0017		PCCA-MW0018		PCCA-MW0019		PCCA-MW0020	
Area:	Biosparge Area		Biosparge Area		Biosparge Area		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	35 - 40		35 - 40		35 - 40		15 - 25		15 - 25		15 - 25		15 - 25		15 - 25		25 - 35	
TOC Elevation (feet NAVD88):	5.00		5.00		5.00		8.11		7.33		7.59		7.55		7.01		7.38	
TOC Elevation Re-Survey (feet NAVD88):	2.00		2.64		1.96		NA		NA		NA		NA		NA		NA	
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	5.55	2.56	4.62	2.71	4.82	2.77	4.8	2.75	4.18	2.83	4.62	2.76
09/18-20/2018	NM	NM	NM	NM	NM	NM	6.03	2.08	5.15	2.18	5.37	2.22	5.33	2.22	4.75	2.26	5.18	2.2
10/30/2019	0.96	4.04	1.54	3.46	0.74	4.26	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	1.81	3.19	2.4	2.60	1.63	3.37	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
5/11/2020	2.68	2.32	3.22	1.78	2.50	2.50	6.28	1.83	5.36	1.97	5.53	2.06	5.59	1.96	4.97	2.04	5.51	1.87
6/2/2020	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	0.71	4.29	1.22	3.78	0.35	4.65	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/18/2021	1.65	3.35	2.18	2.82	1.42	3.58	6.61	1.5	4.74	2.59	4.91	2.68	4.87	2.68	4.32	2.69	4.71	2.67
9/13/2021	0.27	4.73	0.68	4.32	0.21	4.79	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	0.91	4.09	1.48	3.52	0.73	4.27	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
12/14/2022	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/7/2023	1.40	3.60	2.31	2.69	1.24	3.76	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/13/2023	0.82	4.18	1.37	3.63	0.63	4.37	4.22	3.89	3.66	3.67	3.84	3.75	3.81	3.74	3.18	3.83	3.70	3.68
10/11/2023	0.81	1.19	1.34	1.30	0.34	1.62	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
TOC Elevation Re-Survey (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023
7/13/2023
10/11/2023
11/20/2023

INTERMEDIATE WELL ID:	VABU-IW0001I		WCPS-IW0016		PRES-IW0007I		PRES-IW0008I		SATV-IW0009I		SATV-IW0010		TPF-MW0001	
Area:	VAB		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	20 - 30		15 - 25		32 - 37		38 - 42		22 - 27		35 - 45		23 - 28	
TOC Elevation (feet NAVD88):	8.36		4.57		4.62		6.18		6.93		6.85		7.62	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		NA		NA		NA		NA		NA	
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)
5/23/2016	NM	NM	2.52	2.05	3.78	0.84	NM	NM	5.25	1.68	5.25	1.6	6.2	1.42
09/18-20/2018	7.33	1.03	4.05	0.52	4.12	0.5	5.53	0.65	5.85	1.08	5.82	1.03	6.85	0.77
10/30/2019	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
5/11/2020	7.58	0.78	4.45	0.12	4.68	-0.06	6.00	0.18	6.18	0.75	6.20	0.65	7.12	0.50
6/2/2020	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
3/18/2021	NM	NM	3.91	0.66	3.79	0.83	5.17	1.01	5.44	1.49	5.42	1.43	6.51	1.11
9/13/2021	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
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	NM	NM	3.91	0.66	NM	NM	NM	NM	5.52	1.41	NM	NM	NM	NM
7/13/2023	5.56	2.80	2.86	1.71	3.37	1.25	4.42	1.76	4.36	2.57	4.43	2.42	6.31	1.31
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

SHALLOW WELL ID:
Area:
Screened Interval (feet bls):
TOC Elevation (feet NAVD88):
TOC Elevation Re-Survey (feet NAVD88):
Date:
5/23/2016
09/18-20/2018
5/11/2020
9/14/2020
3/18/2021
3/7/2023
7/13/2023
10/11/2023
11/20/2023

INTERMEDIATE WELL ID:	VABRA-MW0011		VABRA-MW0012		VABRA-MW0013		VABRA-MW0014	
Area:	Hot Spot 3 (OFW)		Hot Spot 3 (OFW)		Hot Spot 3 (OFW)		Hot Spot 3 (OFW)	
Screened Interval (feet bls):	25 - 35		15 - 25		20 - 25		25 - 30	
TOC Elevation (feet NAVD88):	3.15		3.21		2.91		3.53	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		NA		NA	
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)
5/23/2016	NM	NM	NM	NM	NM	NM	NM	NM
09/18-20/2018	NM	NM	NM	NM	2.61	0.30	3.22	0.31
10/30/2019	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
5/11/2020	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
9/14/2020	2.20	0.95	2.2	1.01	1.76	1.15	2.32	1.21
3/18/2021	3.07	0.08	3.1	0.11	3.63	-0.72	3.21	0.32
9/13/2021	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
4/21/2022	NM	NM	NM	NM	NM	NM	NM	NM
12/14/2022	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
7/13/2023	2.52	0.63	2.48	0.73	2.09	0.82	2.51	1.02
10/11/2023	2.03	1.12	2.05	1.16	1.59	1.32	2.17	1.36
11/20/2023	2.15	1.00	2.35	0.86	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

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	
TOC Elevation Re-Survey (feet NAVD88):	NA		4.10		NA		NA		NA		NA		2.45		3.11		NA	
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
7/13/2023	3.19	1.32	2.00	2.10	2.81	2.59	5.93	2.85	5.44	2.89	5.37	2.89	1.07	1.38	1.84	1.19	3.91	2.93
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

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	
TOC Elevation Re-Survey (feet NAVD88):	ND		4.91		5.95		NA		6.32		4.73		6.06		NA		4.08	
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	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
7/13/2023	FLOODED		UNDER WATER		3.38	2.57	3.07	2.72	3.84	2.48	1.35	2.41	3.31	2.75	0.75	2.58	CNL	CNL
10/11/2023	NM	NM	1.47	0.66	3.53	2.42	3.31	2.48	4.02	2.30	2.51	1.25	3.51	2.55	0.96	2.37	0.00	2.28
11/20/2023	NM	NM	2.68	2.23	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

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	
TOC Elevation Re-Survey (feet NAVD88):	3.23		NA		NA		NA		NA		NA		NA		NA		5.69	
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	2.10	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
7/13/2023	1.03	2.20	2.93	1.30	5.14	2.97	4.60	2.55	3.88	2.24	4.55	2.54	4.33	2.63	4.81	2.79	4.16	1.53
10/11/2023	1.00	2.23	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	4.18	1.51
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

DEEP WELL ID:	MLPV-IW0058		MLPV-IW0059		MLPV-IW0060		MLPV-IW0062		MLPV-IW0064		MLPV-MW0076		MLPV-MW0080	
Area	Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		VAB		VAB	
Screened Interval (feet bls):	45 - 50		45 - 50		40 - 50		40 - 45		40 - 45		47 - 57		47 - 57	
TOC Elevation (feet NAVD88):	5.54		6.18		1.88		5.84		3.64		NA		NA	
TOC Elevation Re-Survey (feet NAVD88):	NA		NA		1.98		5.92		3.95		6.94		7.11	
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)
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	3.70	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	4.80	0.74	5.39	0.79	1.42	0.46	5.18	0.66	3.04	0.60	5.71	1.23	5.69	1.42
7/13/2023	4.07	1.47	4.56	1.62	0.72	1.16	4.55	1.37	2.37	1.58	4.46	2.48	4.45	2.66
10/11/2023	4.11	1.43	4.31	1.87	0.34	1.64	4.49	1.43	2.34	1.61	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

DEEP WELL ID:	MLPV-MW0083		MLPV-MW0084		MLPV-MW0085		MLPV-MW0087		MLPV-MW0090		MLPV-MW0091		MLPV-MW0092		MLPV-MW0099	
Area	VAB		VAB		VAB		Former Hot Spot 2		Former Hot Spot 2		Former Hot Spot 2		Former Hot Spot 2		VAB	
Screened Interval (feet bls):	47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		47 - 57		40 - 50	
TOC Elevation (feet NAVD88):	NA		NA		NA		NA		NA		NA		NA		NA	
TOC Elevation Re-Survey (feet NAVD88):	7.06		7.38		7.79		6.07		6.15		6.49		5.66		6.39	
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	5.69	1.37	6.20	1.18	6.39	1.40	4.72	1.35	COVERED		5.16	1.33	4.54	1.12	5.05	1.34
7/13/2023	4.61	2.45	5.06	2.32	5.39	2.40	3.21	2.86	COVERED		3.89	2.60	3.43	2.23	3.32	3.07
10/11/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

DEEP WELL ID:	MLPV-MW0101		MLPV-MW0104		MLPV-MW0105		MLPV-MW0111		MLPV-MW0112		MLPV-SAMW0001		MLPV-SAMW0002		MLPV-SAMW0003	
Area	VAB		Biosparge Area		Biosparge Area		Biosparge Area		Biosparge Area		VAB		VAB		VAB	
Screened Interval (feet bls):	40 - 50		47 - 57		47 - 57		45 - 55		47 - 57		43 - 48		43 - 48		43 - 48	
TOC Elevation (feet NAVD88):	NA		NA		NA		NA		NA		6.80		ND		6.80	
TOC Elevation Re-Survey (feet NAVD88):	8.58		1.24		2.39		7.43		7.68		NA		5.56		NA	
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	7.14	1.44	0.91	0.33	1.47	0.92	-	-	-	-	3.81	2.99	NM	NM	4.15	2.65
7/13/2023	5.56	3.02	0.00	1.24	0.72	1.67	-	-	-	-	2.2	4.60	2.57	2.99	2.61	4.19
10/11/2023	NM	NM	NM	NM	NM	NM	-	-	-	-	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	5.15	2.28	5.46	2.22	NM	NM	NM	NM	NM	NM

Table 3-1. MLP/VAB Monitoring Well Groundwater Elevations (Sitewide)

DEEP WELL ID:	MLPV-SAMW0004D		MLPV-SAMW0005D		VAB-IW0005D		VABU-IW0006D		PRES-IW0002D		PRES-IW0007D		PRES-IW0009		PRES-IW0010	
Area	Hot Spot 2		Hot Spot 2		VAB		VAB		VAB		VAB		VAB		VAB	
Screened Interval (feet bls):	45 - 50		45 - 50		52 - 57		42 - 47		42 - 47		42 - 47		40 - 50		40 - 50	
TOC Elevation (feet NAVD88):	ND		ND		7.41		6.29		5.11		4.63		5.17		2.26	
TOC Elevation Re-Survey (feet NAVD88):	5.59		5.66		NA		NA		NA		NA		NA		NA	
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	4.84	1.45	NM	NM	3.84	0.79	3.97	1.2	1.3	0.96
09/18-20/2018	NM	NM	-	-	4.88	2.53	5.36	0.93	4.7	0.41	4.13	0.5	4.46	0.71	1.68	0.58
10/30/2019	3.10	-	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/17/2020	4.51	-	-	-	NM	NM	NM	NM	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	4.97	0.20	2.19	0.07
6/2/2020	NM	NM	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
9/14/2020	2.66	-	-	-	NM	NM	NM	NM	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	4.14	1.03	1.31	0.95
9/13/2021	2.30	NM	-	-	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
3/14/2022	3.31	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
3/7/2023	4.21	1.38	-	-	4.55	2.86	NM	NM	NM	NM	NM	NM	4.12	1.05	NM	NM
7/13/2023	2.72	2.87	NM	NM	3.46	3.95	4.01	2.28	CNL	CNL	3.38	1.25	3.39	1.78	0.91	1.35
10/11/2023	2.97	2.62	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

Notes:
bls = Below land surface
BTOC = Below top of casing
CNL = Could not locate
NA = Not applicable
ND = No data
NM = Not measured
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 Monitoring Results Report (NASA, March 2019).
Source of top-of-casing value for monitoring wells MLPV-SAMW0001 and MLPV-SAMW0003 is unknown. Variant in elevation compared to surrounding monitoring wells may impact contours.

Table 3-2. Former Hot Spot 2 (Air Sparge System Area) CVOC Groundwater Analytical Results

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
		10/11/2023	NS	**0.57 I**	0.73 U	**0.72 I**
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) CVOC Groundwater Analytical Results

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
		11/20/2023	NS	46	7.3 U	700
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
		10/11/2023	NS	0.55 I	0.73 U	0.91 I
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
		10/11/2023	NS	0.96 I	1.4	84

Table 3-2. Former Hot Spot 2 (Air Sparge System Area) CVOC Groundwater Analytical Results

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**
		10/11/2023	NS	**1.0**	**0.90 I**	**25**
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**
		10/11/2023	NS	**49**	1.5 U	**180**
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) CVOC Groundwater Analytical Results

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
		10/23/2023	NS	3.5	0.73 U	210
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) CVOC Groundwater Analytical Results

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**
		10/12/2023	NS	**2.5**	1.5 U	**180**
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**
		10/11/2023	NS	**92**	3.7 U	**200**

Table 3-2. Former Hot Spot 2 (Air Sparge System Area) CVOC Groundwater Analytical Results

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**
		10/23/2023	NS	**100**	**4.8**	**230**
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**
		10/23/2023	NS	**16**	**1.6**	**100**
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**
		10/11/2023	NS	0.53 U	**0.86 I**	**2.0**

Table 3-2. Former Hot Spot 2 (Air Sparge System Area) CVOC Groundwater Analytical Results

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**
		10/11/2023	NS	**1.1**	0.73 U	**8.4**

Notes:
µg/L = micrograms per liter
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
Q = The sample was held beyond the accepted hold time
U = The analyte was not detected
bls = below land surface
CVOC = Chlorinated volatile organic compound
FDEP = Florida Department of Environmental Protection
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)
NS = Not sampled
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

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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
		10/20/2023	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
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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**
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U
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
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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
		10/20/2023	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 CVOC Groundwater Analytical Results

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
		10/20/2023	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**
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U
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**
		10/12/2023	4.5 U	**4.1 I**	3.7 U	**290**

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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**
		10/12/2023	1.8 U	**7.2**	1.5 U	**140**
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**
		10/12/2023	0.89 U	**0.53 I**	0.73 U	**4.0**
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**
		10/20/2023	0.89 U	0.53 U	0.73 U	**2.4**

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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**
		10/12/2023	0.89 U	**0.63 I**	0.73 U	**12**
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**
		10/12/2023	1.8 U	**2.8**	1.5 U	**140**
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**
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

Table 3-3. Biosparge Area CVOC Groundwater Analytical Results

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**
		10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U
MLPV-MW0102	25 to 35	3/10/2023	0.89 U	**9.6**	**2.8**	**440**
		10/20/2023	0.89 U	**0.73 I**	0.73 U	**7.4**
MLPV-MW0103	35 to 45	3/10/2023	0.89 U	**30**	**3.7**	**1000**
		10/20/2023	0.89 U	**3.7**	**0.76 I**	**130**
MLPV-MW0107	35 to 45	3/10/2023	0.89 U	**0.75 I**	0.73 U	**21**
		10/20/2023	0.89 U	**0.62 I**	0.73 U	**11**

Notes:
µg/L = micrograms per liter
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
Y = Incorrect pH readings from sample received/analyzed
bls = below land surface
CVOC = Chlorinated volatile organic compound
FDEP = Florida Department of Environmental Protection
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)
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

Table 3-4. Hot Spot 3 (Outstanding Florida Waters Area) - CVOCs Groundwater Analytical Results

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
		10/12/2023	0.89 U	0.53 U	0.73 U	**5.4**
		11/16/2023	0.89 U	0.53 U	0.73 U	0.71 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
		10/12/2023	0.89 U	0.53 U	0.73 U	**2.0**
		11/16/2023	0.89 U	0.53 U	0.73 U	0.71 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
		10/12/2023	0.89 U	0.53 U	0.73 U	0.71 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
		10/12/2023	0.89 U	0.53 U	0.73 U	0.71 U

Notes:
µg/L = micrograms per liter
I = Analytical result was greater than or equal to the method detection limit, but less than the practical quantitation limit
U = The analyte was not detected
bls = Below land surface
CVOC = Chlorinated volatile organic compound
FDEP = Florida Department of Environmental Protection
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)
VABRA = prefix for Vehicle Assembly Building Reassessment monitoring well
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

Table 3-5. LCP LTM CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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-IW0053R	35 to 45	11/16/2023	0.89 U	**2.4**	0.73 U	NS	**18**
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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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**
		Re-assigned to semi-annual sampling in Biosparge Area					
MLPV-MW0103	35 to 45	3/10/2023	0.89 U	**30.0**	**3.7**	NS	**1000**
		Re-assigned to semi-annual sampling in Biosparge Area					
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 CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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**
		Re-assigned to semi-annual sampling in Biosparge Area					
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-MW0111	45 to 55	11/16/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0112	47 to 57	11/16/2023	0.89 U	0.53 U	0.73 U	NS	**2.3**
MLPV-MW0113	35 to 45	11/16/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0114	35 to 45	11/16/2023	0.89 U	0.53 U	0.73 U	NS	0.71 U
MLPV-MW0115	35 to 45	11/16/2023	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

Table 3-5. LCP LTM CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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					
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
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

Table 3-5. LCP LTM CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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					
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**
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**

Table 3-5. LCP LTM CVOC Groundwater Analytical Results

Category			Volatile Organic Compounds (VOCs)				
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHEN	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					
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:
µg/L = micrograms per liter
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
bls = below land surface
CVOC = Chlorinated volatile organic compound
FDEP = Florida Department of Environmental Protection
GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)
LCP = low concentration plume
LTM = long-term monitoring
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
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
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.

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
IW0011I	35 to 40	05/29/2012	24.30	6.99	1.210	2.10	46.00	0.55	0.61	clear yellow
		01/27/2014	24.20	7.41	6.780	7.80	-93.00	0.27	2.81	clear
		07/22/2014	26.20	7.76	1.760	6.80	-147.00	0.44	0.85	clear
		01/21/2015	24.10	7.60	1.470	5.40	54.00	0.23	0.74	clear
		07/15/2015	26.00	7.11	1.640	17.20	-76.00	0.13	0.82	clear
		01/12/2016	23.40	7.21	1.450	5.10	-147.00	0.24	0.73	clear
		07/11/2016	26.90	7.26	1.520	2.10	-147.00	0.24	0.80	clear
		11/07/2017	25.50	7.20	2.410 [a]	1.90	-249.00	0.15 [a]	0.23	clear
		05/31/2018	26.20	7.35	2.520	5.90	230.00	0.23	0.13	clear
		03/06/2019	21.60	7.06	20.20	1.40	-246.00	0.43 [a]	0.11	clear
		10/31/2019	25.98	7.23	2.150	4.03	-254.30	0.09	NR	clear
		3/18/2020	24.68	6.68	0.880	2.97	-183.90	0.38	0.44	yellow
		9/15/2020	26.20	7.23	1.730	1.08	-152.60	0.22	0.85	clear
		3/16/2021	23.90	7.26	1.640	1.89	-126.10	0.14	0.83	clear
		9/13/2021	26.70	7.16	1.261	1.71	-171.25	0.08	0.64	clear
		4/21/2022	25.36	6.32	0.281	2.63	-12.00	2.22	0.14	clear
		3/9/2023	24.06	6.83	0.219	2.05	-24.40	5.49	0.10	clear
		10/11/2023	26.99	7.14	0.410	10.21	-98.30	0.27	0.37	clear
IW0030	55 to 65	06/28/2010	29.20	7.19	2.970	11.10	-145.00	0.28	1.53	clear
		05/31/2012	27.10	7.47	3.650	13.80	-128.00	0.53	1.95	clear
		07/23/2014	26.00	7.55	3.310	11.40	-103.00	0.8	1.73	clear
		07/15/2015	25.90	7.49	3.140	14.30	-151.00	0.23	1.63	clear
		01/12/2016	20.30	7.53	3.330	2.00	-75.00	0.45	1.75	clear
		07/13/2016	29.20	7.49	3.200	5.00	-114.00	0.15	1.66	clear
		11/08/2017	24.50	7.56	3.410	0.70	-83.00	0.2	0.18	clear
		05/30/2018	27.50	7.54	3.600	13.00	375.00	0.09	0.19	clear
		03/05/2019	20.70	7.48	3.190	1.90	-16.00	0.28	0.17	clear
IW0032	30 to 40	05/31/2012	26.70	7.19	1.920	8.90	-252.00	0.28	0.97	clear
		09/26/2012	24.70	7.07	0.910	1.90	-105.00	0.95	0.45	clear
		08/19/2013	24.90	6.63	1.040	2.50	151.00	1.89	0.51	clear
		10/24/2013	24.20	6.91	1.050	7.70	-23.00	0.66	0.52	clear
		01/27/2014	24.20	7.25	1.010	8.00	32.00	0.69	0.52	clear
		04/16/2014	23.40	6.81	2.280	6.00	230.00	0.29	1.17	clear
		07/21/2014	25.40	7.38	3.880	14.70	-17.00	6.01	2.03	clear
		01/20/2015	24.70	7.28	2.400	10.10	35.00	4.63	1.23	clear
		07/15/2015	26.80	7.04	2.280	2.70	-17.00	1.11	1.17	clear
		10/06/2015	24.90	6.74	2.260	2.30	102.00	5.89	1.16	clear
		01/12/2016	23.20	7.19	1.970	2.50	94.00	5.49	1.00	clear
		07/13/2016	25.60	7.11	2.770	6.10	1.00	0.58	1.43	clear
		11/07/2017	26.00	8.61 [a]	2.230	0.86	160.00	5.10 [a]	0.11	clear
		05/31/2018	25.20	7.56	2.610	2.20	253.00	0.19	0.14	clear
		03/06/2019	21.10	7.08	2.460	0.39	-151.00	0.28 [a]	0.13	clear
		3/18/2020	23.81	7.08	4.440	2.32	-136.40	0.22	2.43	yellow
		11/30/2020	22.74	7.22	1.670	1.35	-52.70	0.45	0.26	clear
		3/16/2021	24.40	7.12	1.880	15.22	-119.40	0.13	0.98	clear
		4/21/2022	25.16	6.71	0.8210	5.46	-233.10	0.08	0.53	clear
		3/14/2023	23.00	7.20	0.5620	2.97	-117.90	0.15	0.31	clear
IW0033	40 to 50	05/31/2012	24.90	7.26	22.80	11.70	-152.00	0.23	13.75	clear
		09/26/2012	24.50	7.20	6.240	8.50	-89.00	0.79	3.42	clear
		08/19/2013	24.90	6.85	3.130	5.40	36.00	0.58	1.63	clear
		10/24/2013	24.00	7.01	7.400	4.00	-67.00	0.57	4.07	clear
		01/27/2014	23.60	7.25	5.300	9.90	10.00	0.20	2.81	clear
		04/16/2014	23.50	6.95	6.830	4.00	-62.00	0.21	3.74	clear
		07/21/2014	25.10	7.28	7.720	11.30	-108.00	0.91	4.21	clear
		01/20/2015	24.30	7.20	5.010	10.80	-47.00	1.59	2.69	clear
		07/15/2015	26.00	6.98	6.110	8.90	-80.00	0.4	3.31	clear
		10/06/2015	24.60	6.62	6.330	14.10	5.00	2.92	3.50	clear
		01/12/2016	23.40	7.06	4.600	3.00	-4.00	1.4	2.46	clear
		07/13/2016	25.80	6.94	6.650	12.00	-37.00	0.18	3.64	clear
		03/07/2017	24.20	7.31	6.420	13.50	-97.00	0.67	3.51	clear
		11/07/2017	25.10	8.79 [a]	5.630	30.00	165.00	1.83 [a]	0.3	clear
		05/31/2018	25.20	7.66	5.080	3.30	146.00	0.18	0.27	clear
		03/06/2019	20.60	6.96	5.290	4.20	-129.00	0.29 [a]	0.29	clear
		10/31/2019	25.81	7.22	6.520	2.09	-107.50	0.11	NR	yellow
		3/18/2020	24.17	7.10	11.790	4.12	-137.80	0.12	6.84	clear
		11/30/2020	23.37	7.15	5.990	11.52	-66.10	0.41	0.72	clear
		3/16/2021	24.70	7.11	6.680	5.19	-118.50	0.11	3.67	clear
		4/21/2022	24.86	6.89	6.487	5.23	-239.20	0.07	3.59	clear
		3/14/2023	23.40	7.13	6.046	12.70	-124.20	0.01	3.41	clear
		11/20/2023	25.60	7.25	4.834	10.40	-63.10	0.97	2.55	clear

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
IW0034	30 to 40	05/29/2012	25.50	6.96	5.480	13.10	-188.00	0.18	3.92	clear
		01/27/2014	24.60	7.03	5.530	10.90	-3.00	0.60	2.73	clear
		07/22/2014	26.20	7.00	2.800	5.30	-81.00	0.50	1.45	clear
		01/21/2015	24.70	6.86	2.400	16.30	-123.00	0.25	1.23	clear
		07/15/2015	26.20	6.98	2.340	2.30	-118.00	1.32	1.20	clear
		01/11/2016	24.20	7.08	1.800	5.10	-146.00	0.38	0.91	clear
		07/13/2016	26.10	7.05	2.480	16.30	-158.00	0.11	1.27	clear
		11/07/2017	26.00	8.69 [a]	1.770	17.10	185.00	2.20 [a]	0.09	clear
		05/31/2018	26.60	6.90	1.710	5.80	-26.00	0.75	0.09	clear
		03/06/2019	22.50	7.07	1.810	3.50	-63.00	0.31	0.09	clear
		10/31/2019	27.34	7.26	1.560	57.10	-85.50	0.22	NR	brown
		3/18/2020	25.99	6.95	1.290	14.90	-71.90	0.17	0.64	yellow
		9/15/2020	27.40	7.08	1.220	3.96	-92.90	0.22	0.57	clear
		3/15/2021	24.60	7.11	1.040	1.22	-94.20	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	-192.80	0.08	0.41	clear
		3/9/2023	23.96	7.17	0.625	11.30	-231.90	0.10	0.31	clear
		10/11/2023	26.71	7.18	0.651	6.98	-135.20	0.20	0.33	clear
IW0035	40 to 50	05/29/2012	25.90	7.00	10.930	13.70	-154.00	0.17	6.27	clear
		01/27/2014	24.70	7.20	3.720	13.50	-19.00	0.16	1.6	clear
		07/22/2014	26.30	7.08	6.580	10.10	-88.00	0.62	3.59	clear
		01/21/2015	24.50	7.10	6.030	8.80	-88.00	0.22	3.28	clear
		07/15/2015	26.10	7.09	5.130	6.40	-90.00	1.29	2.75	clear
		01/11/2016	23.40	7.14	4.100	12.90	-82.00	0.34	2.18	clear
		07/13/2016	27.00	7.04	4.800	3.90	-70.00	0.14	2.56	clear
		11/07/2017	26.00	9.91 [a]	5.080	3.70	43.00	0.11 [a]	0.27	clear
		05/31/2018	26.00	7.02	4.660	4.20	-80.00	0.25	0.25	clear
		03/06/2019	22.60	7.11	4.920	2.40	-48.00	0.24	0.26	clear
		10/31/2019	27.19	7.14	5.010	21.40	-108.30	0.18	NR	clear
		3/18/2020	26.03	7.09	4.890	8.18	-68.00	0.18	2.56	clear
		9/15/2020	27.20	7.13	3.940	2.66	-65.40	0.17	1.99	clear
		3/15/2021	25.00	7.14	4.650	1.42	-72.60	0.20	2.31	clear
		4/21/2022	24.66	6.91	3.040	12.34	-202.10	0.09	1.60	clear
		3/9/2023	24.20	7.17	2.932	3.46	-175.60	0.11	1.54	clear
		10/11/2023	25.95	7.04	2.981	9.47	-106.50	0.21	1.57	clear
IW0036	40 to 45	05/29/2012	25.50	7.15	14.990	12.30	-326.00	0.39	8.69	clear
		01/28/2014	24.90	7.53	2.540	11.90	-81.00	0.28	1.3	clear
		07/22/2014	25.10	7.61	2.540	10.40	-71.00	0.95	1.31	clear
		01/22/2015	24.30	7.49	3.190	14.60	-216.00	0.19	1.66	clear
		07/15/2015	26.40	7.44	3.000	5.00	-250.00	1.11	1.55	clear
		01/12/2016	24.00	7.30	2.850	4.10	-193.00	0.42	1.48	clear
		07/13/2016	26.30	7.22	2.510	1.80	-168.00	0.10	1.20	clear
		11/07/2017	25.80	9.44 [a]	2.240	1.60	125.00	0.14 [a]	0.12	clear
		05/30/2018	25.90	7.30	2.080	1.20	438.00	0.01	0.11	clear
		03/06/2019	22.30	7.46	2.230	1.30	-85.00	0.32	0.11	clear
		10/31/2019	26.50	7.27	2.680	1.27	-203.70	0.28	NR	clear
		3/18/2020	24.22	7.48	2.380	1.07	-109.40	0.17	1.24	clear
		9/18/2020	27.50	7.37	1.810	10.67	-264.70	0.12	0.88	clear
		3/15/2021	25.50	7.24	2.530	5.09	-195.40	0.35	1.29	clear
		9/14/2021	27.84	7.20	1.997	1.33	-158.39	0.13	1.03	clear
		3/16/2022	24.86	7.23	2.296	2.74	-306.20	0.17	1.19	clear
		3/13/2023	25.91	7.26	2.196	2.11	-254.10	0.08	1.14	clear
		4/26/2023	26.00	7.33	2.192	4.45	-133.10	0.20	1.16	clear
		10/11/2023	26.47	7.28	1.989	1.31	-158.40	0.11	1.03	clear
IW0037	40 to 50	05/29/2012	24.20	7.13	6.250	18.70	-17.00	1.14	3.41	clear
		01/27/2014	23.80	7.37	4.660	7.20	-35.00	0.08	2.60	clear
		07/22/2014	25.70	7.21	7.950	16.90	-111.00	0.31	4.41	clear
		01/21/2015	23.90	7.09	8.110	17.50	-85.00	0.22	4.5	clear
		07/15/2015	25.50	7.11	7.900	18.90	-122.00	0.10	4.36	clear
		01/12/2016	23.00	7.26	5.740	12.90	-112.00	0.39	3.12	clear
		07/11/2016	26.40	7.67	6.230	15.70	-83.00	0.17	3.27	clear
		11/07/2017	25.70	7.19	6.19 [a]	12.20	-95.00	0.81 [a]	3.36	clear
		05/31/2018	25.00	7.24	6.970	3.90	234.00	0.20	0.38	clear
		10/31/2019	25.87	7.26	8.100	1.41	-78.80	0.16	NR	clear
		03/06/2019	20.60	7.10	6.720	0.82	-112.00	0.23 [a]	0.37	clear
		03/06/2019	20.60	7.10	6.720	0.82	-112.00	0.23 [a]	0.37	clear
		3/18/2020	24.55	7.23	8.090	2.21	-77.90	0.18	4.53	clear
		9/15/2020	26.10	7.18	5.490	4.97	-83.60	0.18	2.88	yellow
		3/16/2021	24.40	7.26	8.060	2.84	-80.40	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	0.5277	17.53	-227.40	0.08	0.31	clear
		3/9/2023	24.39	7.09	5.254	4.08	-169.60	0.10	2.87	clear
		10/11/2023	26.32	7.15	4.174	8.21	-85.80	0.10	2.25	clear

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
IW0038	30 to 40	05/29/2012	24.10	7.13	0.740	11.10	-79.00	1.17	0.36	clear
		09/26/2012	25.00	7.03	1.490	6.20	-59.00	0.95	1.48	clear
		08/19/2013	26.50	6.62	1.920	8.10	96.00	1.38	0.97	clear
		10/24/2013	25.00	6.75	2.540	13.50	-44.00	0.63	1.31	clear
		01/27/2014	25.10	7.03	2.600	8.30	-40.00	0.32	1.31	clear
		04/16/2014	25.80	6.77	3.380	6.40	43.00	0.59	1.77	clear
		07/22/2014	26.40	6.92	4.300	5.90	5.00	4.97	2.28	clear
		01/21/2015	25.70	7.06	4.030	5.10	29.00	5.84	2.13	clear
		07/14/2015	27.60	7.61	3.970	0.81	-14.00	1.03	2.09	clear
		10/06/2015	27.20	6.82	4.020	1.20	102.00	9.73	2.12	clear
		01/12/2016	25.50	7.18	3.240	2.40	140.00	8.61	1.69	clear
		07/13/2016	28.40	7.04	4.230	6.20	20.00	0.29	2.24	clear
		11/07/2017	26.80	7.05	2.860 [a]	2.50	154.00	7.23 [a]	1.48	clear
		05/31/2018	26.00	6.99	3.300	0.42	9.80	0.85	0.17	clear
		03/06/2019	21.90	7.02	3.060	0.28	30.00	0.54 [a]	0.16	clear
		3/18/2020	25.20	7.10	2.390	0.88	-10.70	0.14	1.22	clear
		3/15/2021	25.50	7.19	1.590	0.72	-36.40	0.19	0.79	clear
		3/16/2022	23.87	6.99	0.976	1.92	-12.90	0.32	0.49	clear
		3/10/2023	23.60	7.14	4.114	1.70	-139.10	0.13	2.21	clear
		4/26/2023	24.90	7.16	0.817	34.90	-36.20	0.51	0.46	clear
IW0039	40 to 50	05/29/2012	23.70	7.13	6.820	14.40	-56.00	0.5	3.74	clear
		09/26/2012	25.10	7.10	7.340	8.90	-120.00	0.79	4.04	clear
		08/19/2013	26.70	6.90	2.670	7.60	-78.00	0.36	1.37	clear
		10/24/2013	24.80	6.98	7.550	6.90	-92.00	0.47	4.16	clear
		01/27/2014	25.20	7.19	4.340	3.20	-15.00	0.11	1.75	clear
		04/16/2014	25.10	6.92	7.480	13.10	-62.00	0.15	4.12	clear
		07/22/2014	26.40	7.51	5.740	15.00	-92.00	0.53	3.14	clear
		01/21/2015	25.30	6.88	5.150	7.50	-71.00	0.21	2.76	clear
		07/14/2015	27.20	7.29	5.100	6.20	-94.00	0.94	2.73	clear
		10/06/2015	26.70	6.64	4.640	7.20	-52.00	0.52	2.47	clear
		01/12/2016	25.40	7.02	3.910	3.70	-27.00	0.44	2.06	clear
		07/13/2016	27.20	6.90	4.910	3.70	-30.00	0.15	2.62	clear
		03/07/2017	24.30	7.13	6.270	15.10	-52.00	0.21	3.42	clear
		11/07/2017	26.40	6.95	4.30 *	2.60	0.00	0.45 [a]	2.27	clear
		05/31/2018	25.80	6.94	4.730	8.60	-41.00	0.30	0.25	clear
		03/06/2019	22.30	7.11	6.370	3.70	-68.00	0.86 [a]	0.35	clear
		10/31/2019	26.25	7.28	6.190	4.00	-76.30	0.16	NR	clear
		3/18/2020	25.56	7.14	7.210	4.79	-77.20	0.18	3.91	clear
		9/15/2020	27.30	7.09	4.440	3.98	-54.30	0.25	2.23	clear
		3/15/2021	25.50	7.22	7.230	1.06	-75.10	0.17	3.93	clear
		9/14/2021	28.50	7.30	2.086	4.11	-200.40	0.29	NR	clear
		3/16/2022	23.91	6.98	4.113	2.28	-25.60	0.12	2.76	clear
		3/10/2023	23.72	7.18	0.808	1.55	-147.10	0.12	0.40	clear
		4/26/2023	25.15	6.94	0.483	6.53	-63.50	0.04	0.23	clear
		10/23/2023	26.09	6.89	2.840	6.09	-178.30	0.12	1.34	clear
IW0040	30 to 40	05/29/2012	25.70	7.08	9.810	18.60	-175.00	0.13	4.27	clear
		09/26/2012	25.40	7.30	2.140	6.20	-118.00	0.41	1.09	clear
		08/19/2013	26.30	6.95	2.070	5.00	24.00	1.89	1.05	clear
		10/24/2013	24.90	7.03	1.850	5.80	-156.00	0.66	0.94	clear
		01/27/2014	24.80	7.35	1.870	9.10	-6.00	0.84	0.96	clear
		04/16/2014	25.30	6.81	2.490	10.20	-93.00	0.12	1.28	clear
		07/23/2014	25.60	7.30	4.360	15.40	-46.00	0.41	2.31	clear
		01/22/2015	24.60	7.24	4.250	2.90	6.00	2.65	2.25	clear
		07/15/2015	26.30	7.15	3.950	18.80	-41.00	1.20	2.08	clear
		10/06/2015	25.80	6.99	3.670	11.40	20.00	5.47	1.93	clear
		01/11/2016	22.30	7.23	3.190	2.00	96.00	5.50	1.67	clear
		07/13/2016	27.50	7.22	3.010	13.10	-11.00	0.30	1.56	clear
		11/07/2017	26.30	8.34 [a]	2.760	10.60	281.00	3.19 [a]	0.14	clear
		05/30/2018	25.90	7.18	2.390	11.80	-83.00	0.52	0.12	clear
		03/05/2019	22.40	7.06	2.440	19.70	-72.00	0.81	0.13	clear
		3/18/2020	28.28	7.31	3.170	13.16	-141.00	0.15	1.62	clear
		3/16/2021	24.90	7.10	1.420	5.09	-116.80	0.13	0.53	clear
		4/21/2022	23.44	7.10	0.795	16.85	-214.10	0.09	0.39	clear
		3/9/2023	26.75	7.38	0.780	6.29	-214.50	0.10	0.39	clear

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
IW0041	40 to 50	05/29/2012	25.20	7.11	19.210	78.40	-143.00	0.07	11.15	cloudy
		09/26/2012	25.40	7.32	8.500	11.50	-138.00	0.75	4.76	clear
		08/19/2013	26.00	6.87	2.950	16.40	-78.00	0.27	1.53	clear
		10/24/2013	24.60	6.93	8.210	12.80	-79.00	0.20	4.55	clear
		01/27/2014	24.30	7.23	1.850	15.40	-31.00	0.20	1.00	clear
		04/16/2014	24.80	6.83	8.120	13.60	-85.00	0.08	4.50	clear
		07/23/2014	24.30	7.52	2.120	10.20	-22.00	0.69	1.40	clear
		01/22/2015	24.40	7.39	4.480	10.30	-88.00	0.22	2.39	clear
		07/15/2015	26.40	7.08	4.900	15.80	-110.00	0.12	2.62	clear
		10/06/2015	26.30	6.90	4.180	10.50	-91.00	0.25	2.21	clear
		01/11/2016	23.30	7.19	4.300	16.20	-91.00	0.45	2.28	clear
		07/13/2016	27.20	7.02	4.340	7.00	-52.00	0.09	2.35	clear
		03/07/2017	24.50	7.19	5.630	10.70	-83.00	0.17	3.04	clear
		11/07/2017	25.90	8.54 [a]	4.870	1.90	279.00	0.12 [a]	0.26	clear
		05/30/2018	26.40	7.10	4.200	10.90	-60.00	0.40	0.22	clear
		03/05/2019	22.70	7.17	5.260	2.10	-56.00	0.26	0.28	clear
		10/31/2019	27.54	7.20	4.700	20.90	-134.00	0.16	NR	clear
		3/18/2020	25.80	7.18	9.640	2.07	-130.10	0.16	5.24	clear
		9/18/2020	26.50	7.14	3.920	4.25	-70.20	0.12	2.00	clear
		3/16/2021	23.90	7.16	4.810	5.32	-111.10	0.42	2.92	clear
		9/14/2021	26.76	6.97	3.652	3.51	-10.52	0.10	1.95	clear
		3/15/2022	25.51	7.06	4.286	12.38	-211.40	0.04	2.31	clear
		3/9/2023	26.65	7.30	4.214	1.92	-225.00	0.07	2.27	clear
		10/12/2023	26.56	7.48	2.299	4.84	-73.20	0.65	1.13	clear
IW0042	30 to 40	05/29/2012	23.80	7.30	0.910	47.60	-108.00	0.43	0.45	clear
		09/26/2012	25.30	7.30	0.790	17.90	-211.00	0.35	0.38	clear
		08/19/2013	26.10	6.88	0.900	16.20	-110.00	0.22	0.44	clear
		10/24/2013	24.80	6.94	1.260	15.10	-128.00	0.41	0.62	clear
		01/28/2014	24.80	7.11	1.200	10.50	-105.00	0.41	0.6	clear
		04/16/2014	25.20	6.69	1.870	15.20	-75.00	0.18	0.95	clear
		07/22/2014	25.70	7.10	1.830	12.30	-126.00	0.20	0.93	clear
		01/20/2015	25.20	7.13	3.170	12.10	-81.00	0.16	1.65	clear
		07/14/2015	26.80	6.69	3.880	18.30	-123.00	0.12	2.04	clear
		10/06/2015	26.30	6.52	3.530	4.70	-36.00	0.19	1.85	clear
		01/11/2016	23.30	6.88	2.580	11.30	-96.00	0.37	1.33	clear
		07/13/2016	27.80	6.75	3.410	5.90	31.00	0.10	1.78	clear
		11/07/2017	26.20	7.07	2.28 [a]	5.00	-17.00	0.17 [a]	1.16	clear
		05/30/2018	25.00	7.05	3.610	8.90	-64.00	0.30	0.19	clear
		03/06/2019	22.70	7.64	2.580	0.70	-46.00	0.29	0.13	clear
		3/18/2020	27.33	7.29	1.720	1.40	-63.00	0.13	0.83	clear
		3/16/2021	24.10	7.21	0.846	4.37	-99.30	0.22	0.38	clear
		3/16/2022	23.90	6.99	0.520	11.91	-110.20	0.11	0.25	clear
		3/14/2023	21.30	7.18	0.490	0.59	-72.60	0.19	0.26	clear
IW0043	40 to 50	05/29/2012	24.80	7.20	7.540	76.80	31.00	0.39	4.15	clear
		09/26/2012	25.20	7.39	7.270	10.90	-139.00	0.89	4.04	clear
		08/19/2013	25.60	6.94	2.360	6.80	-80.00	0.27	1.21	clear
		10/24/2013	24.70	7.10	8.980	9.70	-100.00	0.30	5.02	clear
		01/28/2014	25.00	7.13	4.860	8.80	-75.00	0.17	2.90	clear
		04/16/2014	24.70	6.97	8.710	12.90	-94.00	0.10	4.86	clear
		07/22/2014	25.70	7.22	7.080	8.70	-124.00	0.75	3.90	clear
		01/20/2015	24.90	7.29	6.010	9.20	-113.00	0.11	3.26	clear
		07/14/2015	26.60	6.95	6.480	12.90	-143.00	0.08	3.51	clear
		10/06/2015	26.40	6.70	5.450	6.20	-89.00	0.27	2.93	clear
		01/11/2016	22.60	7.17	5.730	2.60	-103.00	0.44	3.10	clear
		07/13/2016	27.80	7.05	4.840	17.30	-65.00	0.11	2.58	clear
		03/07/2017	24.50	7.14	7.640	17.50	-78.00	0.21	4.20	clear
		11/07/2017	26.00	7.09	5.13 [a]	1.60	-82.00	0.17 [a]	2.75	clear
		05/30/2018	25.10	7.15	4.430	14.70	-82.00	0.25	0.24	clear
		03/06/2019	21.60	7.52	6.970	2.10	-59.00	0.32	0.41	clear
		10/31/2019	27.96	7.38	6.110	0.61	-83.70	0.26	NR	clear
		3/18/2020	25.90	7.38	7.180	3.94	-69.60	0.28	3.87	clear
		9/18/2020	27.40	7.00	3.530	6.38	-82.90	0.12	1.76	clear
		3/16/2021	24.30	7.13	6.780	5.19	-93.70	0.14	3.17	clear
		3/16/2022	24.33	7.13	3.863	7.42	-185.50	0.06	2.07	clear
		3/14/2023	21.90	7.16	4.626	0.54	-92.20	0.14	2.61	clear
		10/11/2023	27.93	7.19	2.347	10.19	-142.50	0.12	1.22	clear

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
IW0044	40 to 50	07/06/2012	24.40	7.13	5.610	58.70	-119.00	0.37	3.03	clear
		01/28/2014	23.80	7.58	2.490	10.00	-61.00	0.24	1.26	clear
		07/23/2014	25.00	7.08	2.500	15.40	-54.00	1.10	1.31	clear
		01/20/2015	23.20	7.46	6.600	18.00	-116.00	0.12	3.61	clear
		07/15/2015	24.20	7.05	6.450	16.60	-109.00	0.53	3.52	clear
		01/12/2016	23.70	7.00	7.690	42.00	-124.00	0.28	4.25	clear
		07/12/2016	26.50	7.03	6.210	11.70	-113.00	0.10	3.37	clear
		11/07/2017	24.80	7.10	4.81 [a]	6.30	-130.00	0.70 [a]	2.57	clear
		05/30/2018	24.10	7.16	7.720	3.50	325.00	0.01	0.43	clear
		03/05/2019	23.00	7.18	6.160	2.30	-99.00	0.47	0.34	clear
		10/31/2019	25.45	7.17	5.000	5.33	-167.20	0.21	NR	clear
		3/18/2020	24.69	7.07	12.360	7.98	-104.20	0.17	7.07	clear
		11/30/2020	22.83	7.16	4.970	15.36	-31.40	0.47	0.96	clear
		3/16/2021	23.50	7.06	5.000	2.98	-80.70	0.18	2.76	clear
		4/21/2022	25.27	6.79	3.475	4.33	-234.00	0.08	1.85	clear
		3/14/2023	22.80	7.15	6.228	3.31	-86.80	0.10	3.55	clear
		10/23/2023	24.90	7.04	2.728	8.51	-91.90	0.22	1.41	clear
IW0045	40 to 50	07/06/2012	24.10	7.04	3.470	64.50	-100.00	0.16	1.82	clear
		01/27/2014	23.40	7.17	3.250	9.70	6.00	0.32	1.70	clear
		07/22/2014	24.60	7.35	5.420	15.90	-81.00	0.75	2.90	clear
		01/20/2015	22.30	7.14	4.120	17.90	-91.00	0.27	2.19	clear
		07/15/2015	26.20	6.92	4.080	15.10	-80.00	0.69	2.16	clear
		01/12/2016	24.60	6.93	4.600	2.20	-145.00	0.28	2.45	clear
		07/12/2016	26.70	6.99	4.350	16.60	-131.00	0.09	2.30	clear
		11/07/2017	25.50	9.66 [a]	4.610	7.70	78.00	0.11 [a]	0.20	clear
		05/30/2018	25.10	7.62	4.850	1.20	358.00	0.01	0.26	clear
		03/06/2019	21.70	6.90	4.510	2.70	-84.00	0.33 [a]	0.24	clear
		10/31/2019	25.95	7.14	4.790	1.44	-107.00	0.13	NR	clear
		3/18/2020	25.16	7.23	5.170	0.85	-83.80	0.15	2.77	clear
		9/15/2020	28.40	7.00	4.980	2.32	-77.90	0.15	2.49	clear
		3/16/2021	23.90	7.14	5.650	1.06	-69.60	0.25	3.12	clear
		4/21/2022	26.14	6.87	1.933	5.56	-305.60	0.07	1.66	clear
		3/14/2023	24.20	6.97	3.314	4.98	-119.80	0.02	1.76	clear
		10/23/2023	26.50	6.94	2.568	15.32	-131.20	0.54	1.28	clear
SAMW0004I	35 to 40	05/29/2012	25.30	7.03	9.010	12.50	-182.00	0.16	5.04	clear
		01/28/2014	24.40	7.38	2.210	8.80	-71.00	0.20	1.14	clear
		07/22/2014	25.00	7.43	6.000	14.30	-93.00	0.21	2.51	clear
		01/22/2015	24.30	7.48	1.080	3.30	-161.00	0.14	0.54	clear
		07/15/2015	27.50	7.40	1.120	1.30	-130.00	1.11	0.55	clear
		01/12/2016	24.20	7.23	1.110	4.50	-144.00	0.36	0.55	clear
		07/13/2016	28.20	7.17	1.040	3.00	-90.00	0.14	0.51	clear
		11/07/2017	26.00	7.18	1.01 [a]	2.20	-191.00	0.20 [a]	0.50	clear
		05/30/2018	25.40	7.12	1.360	0.86	363.00	0.08	0.07	clear
		03/06/2019	23.00	7.73	1.310	2.30	-67.00	0.33	0.07	clear
		10/31/2019	27.36	7.20	1.320	2.38	-168.60	0.18	NR	clear
		3/18/2020	24.88	7.35	1.070	1.50	-87.60	0.16	0.53	clear
		9/18/2020	27.40	7.14	1.060	5.31	204.20	0.18	0.5	clear
		3/15/2021	26.50	7.10	1.120	2.10	-200.50	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	-300.00	0.06	0.49	clear
		3/13/2023	26.60	7.17	0.571	7.74	-261.70	0.11	0.28	clear
		10/11/2023	26.81	7.18	0.836	1.38	-209.10	0.09	0.42	clear

Table 3-6. Former Hot Spot 2 (Air Sparge Area) Groundwater Geochemical Parameters

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 (%)	Color
SAMW0004D	45 to 50	05/29/2012	25.30	6.93	18.97	4.30	-102.00	0.13	11.28	clear
		01/28/2014	23.40	7.30	2.490	9.90	-87.00	0.21	1.30	clear
		07/22/2014	25.20	7.03	7.750	8.30	-100.00	0.98	3.95	clear
		01/22/2015	24.20	7.05	8.240	4.70	-157.00	0.16	4.57	clear
		07/15/2015	27.60	7.14	8.730	2.20	-146.00	0.98	4.85	clear
		01/12/2016	24.10	6.86	8.830	2.20	-194.00	0.30	4.93	clear
		07/13/2016	27.80	7.08	7.180	17.80	-276.00	0.05	3.91	clear
		11/07/2017	26.10	7.15	6.560 [a]	0.86	-252.00	0.21 [a]	3.59	clear
		05/30/2018	24.60	7.16	6.860	2.60	302.00	0.02	0.38	clear
		03/06/2019	22.60	7.33	8.610	1.00	-122.00	0.30	0.48	clear
		10/31/2019	27.15	7.12	8.330	2.43	-221.50	0.24	NR	clear
		3/18/2020	25.35	7.30	8.480	3.96	-116.40	0.16	4.68	clear
		9/18/2020	27.30	7.16	6.590	3.08	-270.40	0.12	3.43	clear
		3/15/2021	25.60	7.09	8.170	8.11	-240.70	0.29	4.41	clear
		9/14/2021	29.04	7.14	5.004	1.40	-221.96	0.10	2.72	clear
		3/16/2022	23.97	7.17	6.481	0.00	-318.00	0.11	3.59	clear
		3/13/2023	26.06	7.16	5.839	19.01	-312.80	0.11	3.21	clear
		10/11/2023	26.85	6.87	3.139	53.50	-219.60	0.03	2.34	clear

Notes:
[a] Probe failed continuing calibration verification (CCV)
% = percent.
°C = degrees Celsius.
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.
bls = below land surface.
NR = not recorded.
Locations have prefix "MLPV-"

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
ASMW0001	35 to 40	09/22/2009	25.50	7.50	0.8500	5.40	-275.00	0.87	0.41	clear
		03/23/2010	23.60	7.29	0.7600	12.70	-184.00	0.62	0.37	clear
		10/01/2010	24.70	7.50	0.8400	1.70	-80.00	0.32	0.41	clear
		03/15/2011	23.80	7.54	0.6500	8.30	-151.00	1.46	0.32	clear
		09/26/2011	25.20	7.18	0.7700	1.54	-128.00	0.26	0.37	clear
		03/16/2012	24.20	7.24	0.7500	0.88	-141.00	0.27	0.37	clear
		08/24/2012	24.90	7.23	1.2700	1.77	-146.00	8.59	0.63	clear
		03/18/2013	24.60	7.07	0.7600	2.12	-106.00	0.15	0.37	clear
		10/25/2013	24.60	7.25	0.7400	0.28	-133.00	0.66	0.36	clear
ASMW0002	35 to 40	09/22/2009	26.20	7.04	0.6800	6.70	-314.00	0.74	0.32	clear
		03/23/2010	23.90	7.12	0.6200	6.10	-278.00	0.46	0.30	clear
		10/01/2010	24.20	7.35	0.6700	1.30	-176.00	0.14	0.33	clear
		03/15/2011	23.90	7.46	0.5500	2.30	-225.00	0.96	0.27	clear
		09/23/2011	25.00	6.84	0.6800	0.77	-202.00	1.64	0.33	clear
		03/16/2012	24.30	7.17	0.6300	0.52	-198.00	0.29	0.31	clear
		08/23/2012	24.50	7.16	0.9100	0.62	-293.00	1.50	0.44	clear
		03/18/2013	24.50	6.98	0.6400	1.13	-206.00	0.17	0.31	clear
		10/25/2013	24.50	7.18	0.6300	0.41	-217.00	1.17	0.30	clear
ASMW0003	35 to 40	09/22/2009	25.70	7.43	0.5600	2.80	-318.00	0.59	0.27	clear
		03/23/2010	23.80	7.20	0.5100	1.69	-271.00	0.43	0.25	clear
		10/01/2010	24.60	7.40	0.5800	1.20	-166.00	0.11	0.28	clear
		03/15/2011	24.00	7.59	0.5000	10.20	-223.00	0.51	0.24	clear
		09/23/2011	24.70	4.06	0.6000	0.47	-247.00	0.72	0.29	clear
		03/16/2012	24.30	7.20	0.5600	0.87	-212.00	0.26	0.27	clear
		08/23/2012	24.80	7.40	0.8100	1.55	-207.00	6.69	0.39	clear
		03/18/2013	24.40	7.00	0.5700	1.11	-190.00	0.16	0.27	clear
		10/25/2013	24.60	7.21	0.5500	0.70	-178.00	0.84	0.26	clear
ASMW0004	35 to 40	09/22/2009	25.40	7.20	7.2100	12.00	-38.20	0.18	3.97	clear
		03/24/2010	23.00	7.06	6.4900	4.57	-94.90	0.41	3.54	clear
		10/01/2010	25.20	7.14	5.8200	3.00	-108.00	0.31	3.15	clear
		03/15/2011	23.60	7.79	4.3000	6.50	60.10	1.17	2.45	clear
		09/26/2011	24.70	7.15	6.3300	3.49	-128.00	1.22	3.50	clear
		03/16/2012	24.10	7.29	4.5400	1.26	-82.90	0.36	2.42	clear
		08/28/2012	25.10	7.08	7.0900	2.12	-105.00	0.89	3.89	clear
		03/18/2013	23.80	7.04	4.1400	2.08	-69.10	0.12	2.19	clear
		10/25/2013	24.40	7.05	4.2600	2.26	-95.60	0.94	2.26	clear
		01/27/2014	23.80	7.10	4.3100	6.31	35.80	0.51	1.40	clear
		04/17/2014	23.80	6.91	4.2000	7.40	-62.00	0.21	2.23	clear
		07/22/2014	25.30	7.19	4.7500	4.21	-131.00	0.64	2.54	clear
		10/27/2014	24.80	7.04	6.1800	7.27	1.00	1.20	3.36	clear
		01/19/2015	23.70	7.42	5.0400	9.39	-80.00	1.37	2.71	clear
		04/06/2015	24.70	7.13	3.8000	3.10	195.00	1.29	2.01	clear
		07/14/2015	26.30	7.12	4.5700	10.20	-61.20	0.38	2.43	clear
		01/11/2016	23.50	7.75	3.7000	10.10	5.60	1.59	1.95	clear
		07/12/2016	26.30	7.42	3.1100	3.09	-127.00	0.20	1.62	clear
		03/06/2017	23.90	7.39	2.3100	4.80	-168.00	0.18	1.18	clear
		11/08/2017	25.20	9.23	3.3700	1.75	-40.90	0.28 [a]	0.18	clear
		05/30/2018	25.80	7.20	3.5100	7.96	-65.70	0.66	0.18	clear
		11/15/2018	24.20	7.21	4.0100	5.45	-74.00	0.94	0.21	clear
		03/11/2019	25.30	6.78	4.2600	7.24	15.80	1.45	NR	clear
		11/1/2019	24.88	7.45	4.1000	0.65	299.50	1.71	NR	clear
		3/19/2020	24.72	7.40	3.5400	1.27	15.20	0.24	1.87	clear
		9/16/2020	26.90	7.25	4.3300	1.09	-41.30	1.17	2.19	clear
		3/17/2021	23.60	7.28	3.7960	2.86	-25.60	0.21	2.06	clear
		9/15/2021	28.62	7.02	3.7530	31.71	-149.72	0.13	2.01	clear
		11/17/2021	25.50	7.35	3.5700	3.98	-193.80	0.30	NR	clear
		3/15/2022	23.17	7.07	3.2800	13.12	-111.70	0.09	1.74	clear
		3/8/2023	25.20	7.52	2.4470	6.67	8.50	1.75	NR	clear
		4/26/2023	25.28	7.32	2.1030	15.02	-20.00	2.12	1.09	clear
		10/20/2023	26.96	7.23	1.1935	53.26	152.10	5.59	0.60	clear

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
ASMW0005	35 to 40	09/22/2009	26.70	7.46	32.7000	0.45	-148.00	0.70	1.64	clear
		03/24/2010	23.30	7.27	2.4900	3.16	9.50	1.30	1.28	clear
		10/01/2010	24.80	7.26	2.3900	2.20	-96.30	0.89	1.22	clear
		03/15/2011	23.10	7.94	2.3600	5.20	-7.50	2.19	1.26	clear
		09/23/2011	25.10	6.91	2.3800	0.38	17.70	1.93	1.22	clear
		03/16/2012	23.90	7.33	1.4100	0.37	-84.70	0.34	0.71	clear
		08/28/2012	25.20	7.11	3.0100	0.78	-72.70	1.14	1.56	clear
		03/18/2013	23.80	7.03	1.7100	0.80	-64.60	0.11	0.86	clear
		10/25/2013	24.40	6.97	2.2600	0.36	-107.00	1.14	1.16	clear
		01/27/2014	23.70	7.17	2.2200	3.79	1.80	0.34	1.21	clear
		04/17/2014	23.50	6.83	2.4700	4.68	-39.30	0.15	1.27	clear
		07/22/2014	25.70	7.09	4.7300	7.24	-135.00	0.46	2.50	clear
		10/27/2014	24.70	6.88	2.9900	1.18	-40.40	0.79	1.55	clear
		01/19/2015	23.20	7.27	2.6800	7.68	-71.60	0.44	1.39	clear
		04/06/2015	24.40	7.06	2.2300	5.30	145.00	1.19	1.14	clear
		07/14/2015	25.10	7.17	2.3400	2.17	119.00	0.94	1.20	clear
		01/11/2016	23.30	7.74	2.3300	5.16	-26.40	0.66	1.20	clear
		07/12/2016	25.40	7.26	2.3500	3.72	-28.20	0.65	1.20	clear
		03/06/2017	23.80	7.29	1.9100	7.70	-109.00	0.17	0.97	clear
		11/08/2017	25.30	7.06	2.4800	4.31	44.70	1.54	1.27	clear
		05/30/2018	25.10	7.14	2.7800	1.86	7.40	1.87	0.14	clear
		11/16/2018	23.60	7.05	2.9200	3.59	69.70	1.94	0.15	clear
		03/11/2019	25.20	6.60	3.2700	3.13	58.00	2.63	NR	clear
		11/1/2019	25.02	7.33	3.9400	0.49	-244.20	4.28	NR	clear
		3/19/2020	24.96	7.18	3.5100	0.79	-15.40	0.61	1.84	clear
		9/16/2020	26.70	7.04	3.7800	3.75	56.30	3.86	1.93	clear
		3/17/2021	24.00	7.17	3.4300	4.76	60.90	1.72	1.83	clear
		9/15/2021	27.78	6.89	3.4450	1.38	43.43	0.09	1.83	clear
		3/14/2022	23.74	6.86	2.8980	3.88	8.90	0.08	1.41	clear
		3/9/2023	24.00	7.41	2.5630	2.64	74.40	5.02	1.35	clear
		4/26/2023	25.33	7.29	1.9110	16.74	31.60	5.56	0.98	clear
		10/20/2023	26.37	7.29	1.6234	50.43	163.40	7.22	0.83	clear
ASMW0006	35 to 40	09/22/2009	25.70	7.73	4.0500	11.00	-363.00	0.69	2.11	clear
		03/24/2010	23.60	6.92	3.4500	0.44	-124.00	0.28	1.81	clear
		10/01/2010	24.80	6.95	3.6600	2.30	-110.00	0.29	1.93	clear
		03/15/2011	23.30	8.13	2.9300	3.30	-88.90	1.95	1.56	clear
		09/23/2011	24.90	7.12	3.7400	2.46	-131.00	1.03	1.97	clear
		03/16/2012	24.10	7.15	3.3600	1.83	-84.70	0.34	1.76	clear
		08/24/2012	24.90	6.85	5.4000	12.60	-128.00	0.56	2.91	clear
		03/18/2013	23.90	6.87	3.1500	1.31	-95.00	0.12	1.64	clear
		10/25/2013	24.20	6.96	3.2600	0.64	-88.30	1.15	1.70	clear
		01/27/2014	23.50	7.22	3.1300	1.76	-1.80	0.20	1.73	clear
		04/17/2014	23.70	6.88	3.4400	6.69	-51.10	0.18	1.80	clear
		06/20/2014	25.00	6.90	3.4800	8.40	-80.00	0.16	1.82	clear
		07/22/2014	25.60	7.19	3.2100	3.26	-113.00	0.27	1.68	clear
		10/27/2014	24.80	6.99	4.1300	0.52	-69.00	0.45	2.19	clear
		01/19/2015	23.50	7.24	3.8300	6.64	-106.00	0.22	2.02	clear
		04/06/2015	24.50	7.41	3.1100	7.70	-82.10	0.73	1.62	clear
		07/14/2015	26.00	7.45	3.7400	7.96	-119.00	1.01	1.97	clear
		01/11/2016	23.50	8.03	3.3400	1.03	-106.00	0.34	1.75	clear
		07/12/2016	25.60	7.44	2.6000	4.36	-134.00	0.07	1.34	clear
		03/06/2017	23.80	7.09	2.6000	13.20	-65.30	0.18	1.34	clear
		11/08/2017	25.30	8.41	3.5000	14.10	19.40	0.07 [a]	0.18	clear
		02/20/2018	24.50	7.04	3.3300	4.04	-115.00	0.41	0.17	clear
		05/29/2018	26.60	6.91	3.1600	1.00	-90.60	0.14 [a]	0.17	clear
		11/16/2018	23.90	7.03	3.0200	10.20	-97.20	0.43	0.16	clear
		03/11/2019	25.20	6.86	3.1900	0.95	-57.70	1.18	NR	clear
		11/1/2019	25,19	7.33	3.9800	0.61	-289.10	0.23	NR	clear
		3/19/2020	24.89	7.10	3.9100	6.77	-56.00	0.19	2.07	clear
		9/16/2020	26.60	6.99	3.9300	1.08	-73.80	0.20	2.00	yellow tint
		3/17/2021	25.50	7.02	3.9800	4.04	-68.20	0.14	2.08	clear
		9/15/2021	26.68	6.93	3.4130	2.27	-99.34	0.13	1.81	clear
		3/14/2022	23.58	6.80	3.2410	3.88	-61.40	0.10	1.72	clear
		3/9/2023	24.00	7.24	3.4440	1.71	-85.20	0.40	1.87	clear
		4/26/2023	2.39	7.21	3.0800	18.39	-223.20	0.09	1.63	clear
		10/20/2023	25.92	7.08	3.1756	11.56	-189.40	0.28	1.68	clear

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
IW0001D	50 to 55	6/3/2021	24.80	7.43	0.9300	2.81	-212.00	0.77	NR	clear
		9/16/2020	27.20	8.36	3.1300	19.20	-182.60	0.10	1.67	yellow tint
IW0006IR	28 to 33	9/16/2020	28.80	7.07	5.9900	5.22	-100.60	0.25	0.27	clear
		3/16/2021	25.70	7.45	1.1970	2.13	-167.40	0.16	0.58	clear
		9/15/2021	26.57	7.17	0.8500	26.32	-231.22	0.09	0.42	clear
		3/15/2022	23.14	7.28	1.0690	1.97	-246.40	0.09	0.54	clear
		3/8/2023	25.30	7.66	1.2800	8.59	37.70	8.96	0.63	clear
		10/20/2023	27.80	7.84	1.1253	25.86	148.10	11.62	0.58	clear
IW0028I	28 to 33	3/16/2021	24.90	7.55	2.7600	1.44	-107.70	0.11	1.42	clear
		9/14/2021	27.64	7.30	2.6390	20.44	-179.79	0.12	1.38	clear
		3/15/2022	25.50	7.30	2.5800	3.42	-206.90	0.08	1.35	clear
		3/15/2023	20.45	6.98	0.9732	3.57	-324.40	0.30	0.49	clear
		10/20/2023	31.00	6.98	0.2182	2.86	-163.20	0.51	0.10	clear
IW0031	25 to 35	09/27/2011	25.40	7.39	2.8000	14.30	-137.00	0.85	1.45	clear
		08/24/2012	25.30	7.11	4.6600	1.31	-177.00	1.43	2.49	clear
		03/18/2013	24.70	7.27	2.6900	7.40	-75.80	0.15	1.39	clear
		10/25/2013	24.50	7.43	2.5400	3.95	-117.00	0.96	1.31	clear
		04/17/2014	23.90	7.34	2.8400	16.70	-100.00	0.08	1.47	yellow tint
		10/27/2014	25.20	7.38	2.7100	10.60	-84.30	0.85	1.40	clear
		01/20/2015	24.00	7.70	2.6700	6.94	-96.80	0.23	1.38	clear
		07/14/2015	26.30	7.36	2.3200	7.68	-187.00	0.13	1.19	clear
		01/11/2016	23.80	7.90	2.3300	1.40	-163.00	0.32	1.19	clear
		05/31/2016	25.50	7.58	2.1700	4.31	-44.10	0.50	1.09	clear
		03/06/2017	24.60	7.49	2.0000	7.20	-66.50	0.13	1.02	clear
		08/09/2017	26.30	7.61	1.7700	2.70	-61.40	0.14	0.92	clear
		11/08/2017	25.70	6.69	1.9800	3.55	-83.10	0.11	1.00	clear
		02/20/2018	24.70	7.22	2.0300	3.17	-121.00	0.52	0.10	clear
		05/29/2018	25.60	7.14	2.1400	6.08	431.00	0.10	0.11	clear
		11/16/2018	22.70	7.10	1.9100	NR	-96.20	0.50	0.10	clear
		03/12/2019	24.30	7.35	1.9700	1.66	40.00	0.53	NR	clear
		11/1/2019	25.17	7.14	2.0400	1.18	-78.50	0.26	NR	clear
		3/19/2020	26.66	7.18	3.8300	2.62	-41.70	0.28	1.97	clear
		3/17/2021	23.10	7.19	1.7800	7.65	-66.70	0.23	0.92	clear
		9/15/2021	28.50	7.52	1.8090	13.29	-214.50	0.25	NR	clear
		3/15/2022	25.69	7.13	1.5810	8.93	-107.50	0.09	0.81	clear
		3/8/2023	24.80	7.76	1.6110	1.37	-168.90	0.33	0.81	clear
		4/26/2023	26.05	6.98	1.4710	12.46	-372.80	0.04	0.77	clear
		10/20/2023	27.71	7.22	1.7454	16.46	-29.00	0.34	0.89	clear
IW0046	35 to 45	3/16/2021	25.70	7.28	13.7900	3.26	-42.00	0.28	7.84	clear
		9/14/2021	28.78	7.13	11.5420	6.75	-54.93	0.18	6.67	clear
		3/15/2022	25.39	7.02	13.1560	2.55	-72.90	0.16	7.68	clear
		3/8/2023	25.70	7.92	1.1360	1.53	-257.70	0.69	0.55	clear
		4/26/2023	25.53	7.64	10.0930	12.44	-393.80	0.13	5.77	clear
		10/20/2023	28.34	7.38	0.8493	3.19	-289.30	0.16	0.42	clear
IW0057	40 to 50	12/04/2014	23.90	7.14	0.7500	14.30	-143.00	0.49	0.37	clear
		01/19/2015	24.20	7.46	6.0200	18.60	-169.00	0.15	3.27	clear
		07/14/2015	25.10	7.09	5.1900	15.30	-164.00	0.31	2.79	clear
		01/11/2016	23.00	7.85	5.3600	5.39	-111.00	0.34	2.90	clear
		07/11/2016	26.50	7.69	4.2600	2.96	-97.20	0.18	2.19	clear
		03/06/2017	24.30	7.24	5.4600	15.50	-115.00	0.51	2.94	clear
		11/08/2017	25.30	7.27	5.2500	3.70	-101.00	0.11	2.82	clear
		05/29/2018	26.50	7.07	5.5200	5.54	-108.00	0.35[a]	NR	clear
		11/14/2018	25.50	7.05	5.3300	2.86	-98.10	0.55	0.17	clear
		03/12/2019	24.40	7.09	5.5900	9.15	-59.70	0.13	NR	cloudy
		11/1/2019	24.50	7.19	5.3400	0.59	-114.00	0.95	NR	clear
		3/19/2020	26.00	7.21	5.2900	1.08	-70.50	0.24	2.79	clear
		9/18/2020	27.10	7.18	5.6600	2.47	-130.20	0.13	2.92	clear
		3/17/2021	23.40	7.25	5.7800	4.36	-99.60	0.37	3.24	clear
		9/14/2021	26.80	7.36	4.0880	14.21	-205.30	0.39	NR	clear
		3/14/2022	23.57	7.21	6.0850	17.69	-215.00	0.06	3.35	clear
		3/8/2023	24.46	8.25	0.1568	59.56	-118.90	4.80	0.07	clear
		4/26/2023	25.96	6.70	4.0760	12.25	-169.00	0.08	2.19	clear
		10/12/2023	26.83	7.21	3.9998	11.81	-208.10	0.21	2.08	clear

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
IW0058	45 to 50	12/04/2014	23.80	7.25	1.7800	18.60	-159.00	0.01	0.90	clear
		01/19/2015	24.00	7.47	2.1300	18.20	-153.00	0.32	1.09	clear
		07/17/2015	24.70	7.09	2.6600	12.70	-108.00	0.24	1.37	clear
		01/11/2016	22.90	8.02	3.3200	11.20	-86.80	0.40	1.74	clear
		07/11/2016	26.90	7.51	2.0400	4.10	-67.20	0.17	1.00	clear
		03/06/2017	24.10	7.26	3.1400	15.30	-90.30	0.27	1.63	clear
		11/08/2017	25.20	9.40 [a]	3.5100	5.54	117.00	0.07 [a]	0.18	clear
		05/29/2018	26.20	7.04	3.9300	12.40	-99.20	0.18 [a]	0.21	clear
		11/14/2018	25.10	6.97	4.0000	5.03	-91.50	0.69	0.21	clear
		03/12/2019	24.60	7.11	4.1400	7.99	-52.50	NR	NR	cloudy
		11/1/2019	24.60	7.14	4.3300	1.32	-117.00	0.66	NR	clear
		3/19/2020	24.94	7.18	4.5600	1.18	-58.40	0.37	2.44	clear
		9/18/2020	26.50	7.24	4.2400	3.72	-125.90	0.25	2.18	clear
		3/17/2021	23.90	7.18	4.6400	0.81	-93.90	0.25	2.54	clear
		9/14/2021	26.10	7.38	3.0490	15.49	-205.60	0.25	-	clear
		3/14/2022	23.86	7.11	4.4500	18.47	-192.40	0.06	2.40	clear
		3/9/2023	23.12	6.94	3.6200	288.71	49.10	0.21	1.93	clear
		10/12/2023	26.28	7.18	2.3821	9.86	-181.70	0.22	1.19	clear
IW0059	45 to 50	12/04/2014	23.70	7.27	5.6300	13.10	-167.00	0.72	3.04	clear
		01/19/2015	23.30	7.55	0.7200	13.90	-192.00	0.18	0.35	clear
		07/14/2015	24.80	7.02	0.8600	13.40	-227.00	0.24	0.42	clear
		01/11/2016	23.20	7.85	1.2300	2.99	-196.00	0.33	0.64	clear
		07/11/2016	25.50	6.99	1.1900	15.50	-153.00	0.26	0.59	clear
		03/06/2017	24.20	7.07	2.7000	7.90	-96.30	0.26	1.41	clear
		11/08/2017	25.80	7.10	3.1400	0.99	-146.00	0.12	1.63	clear
		05/29/2018	27.60	6.91	3.7000	41.10	-117.00	0.54[a]	0.19	clear
		11/16/2018	22.90	7.06	3.2900	8.68	-137.00	0.60	0.17	clear
		03/12/2019	24.50	7.04	3.3400	8.98	-33.20	0.23	NR	cloudy
		11/1/2019	27.50	7.07	3.0700	0.38	-172.00	0.31	NR	clear
		3/19/2020	25.24	7.17	3.1600	1.64	-65.20	0.28	1.64	clear
		9/18/2020	27.20	7.18	3.0200	1.37	-138.40	0.15	1.50	clear
		3/17/2021	24.50	7.18	2.9000	12.36	-89.10	0.15	1.46	clear
		9/15/2021	26.50	7.40	1.4760	6.12	-207.90	0.30	NR	clear
		3/14/2022	24.22	7.11	3.0240	6.19	-188.10	0.07	1.60	clear
		3/9/2023	24.17	7.02	1.6902	62.75	-155.60	0.17	0.86	clear
		10/12/2023	26.48	7.21	1.3282	7.38	-200.60	0.21	0.66	clear
IW0060	40 to 50	12/04/2014	23.80	7.14	7.4100	13.20	-155.00	0.02	4.08	clear
		01/19/2015	22.60	7.80	8.4400	4.84	-246.00	0.16	4.69	clear
		04/06/2015	24.70	7.25	7.2200	10.90	-231.00	0.25	3.99	clear
		07/14/2015	26.00	7.54	6.4900	5.65	-124.00	1.10	3.53	clear
		01/11/2016	23.40	7.74	7.4000	4.79	-137.00	0.29	4.08	clear
		07/13/2016	25.30	7.37	6.2100	3.19	-91.80	0.10	3.35	clear
		03/06/2017	23.80	7.26	6.1000	15.50	-74.00	0.17	3.25	clear
		11/08/2017	25.10	8.14	6.6900	4.57	67.50	0.06 [a]	0.36	clear
		02/20/2018	24.50	7.07	7.5500	4.89	-110.00	0.80	0.42	clear
		05/29/2018	25.80	7.04	6.6900	18.20	-86.90	0.19 [a]	0.37	clear
		11/15/2018	24.50	7.14	6.3800	4.28	-107.00	0.97	0.35	clear
		03/11/2019	25.30	7.02	5.7100	5.12	-57.00	0.49	NR	clear
		11/1/2019	25.28	7.56	6.7100	5.57	-374.30	0.20	NR	clear
		3/19/2020	25.22	7.25	6.5000	1.64	-64.20	0.24	3.52	clear
		9/16/2020	26.50	7.25	6.7400	1.02	-67.30	0.25	3.55	clear
		3/17/2021	25.30	7.11	6.8000	5.32	-72.70	0.23	3.74	clear
		9/15/2021	26.89	7.10	5.7870	1.63	-139.25	0.11	3.18	clear
		3/14/2022	23.57	6.94	5.5920	2.99	-127.80	0.09	3.06	clear
		3/9/2023	24.00	7.41	6.7810	5.12	-83.40	0.30	3.79	clear
		10/20/2023	26.44	7.29	7.7129	9.50	-53.50	0.33	4.32	clear

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
IW0061	35 to 40	01/18/2016	22.40	7.15	1.9700	53.10	-192.00	0.25	1.00	light grey
		03/28/2016	24.80	8.83	2.2000	155.00	-81.10	0.33	1.12	cloudy grey
		05/31/2016	24.30	7.88	2.0400	6.91	-123.00	0.60	1.05	clear
		03/07/2017	24.60	7.63	2.0800	16.20	-122.00	0.57	1.06	clear
		08/09/2017	25.90	7.31	1.8100	3.73	-97.10	0.22	0.91	clear
		11/08/2017	25.50	10.6 [a]	2.0800	0.98	17.70	0.05 [a]	0.11	clear
		02/20/2018	25.40	4.71	2.0700	3.19	-172.00	0.22	0.10	clear
		05/30/2018	25.30	7.39	2.2200	0.83	326.00	0.10	0.11	clear
		11/14/2018	25.40	7.25	2.0500	0.68	-129.00	0.60	0.10	clear
		03/12/2019	24.20	7.28	2.0400	11.60	-111.00	0.32	NR	clear
		10/31/2019	27.50	7.44	2.1600	0.51	-198.00	0.40	NR	clear
		3/19/2020	25.97	7.48	3.7400	2.18	-110.20	0.17	1.93	clear
		9/18/2020	26.60	7.45	1.9200	2.25	-198.60	0.29	0.94	clear
		3/16/2021	26.40	7.46	2.0700	5.32	-128.40	0.12	1.02	clear
		9/13/2021	27.00	7.62	1.3970	11.52	-220.60	1.17	NR	clear
		3/15/2022	24.23	7.40	2.1920	2.94	-264.10	0.12	1.14	clear
		3/8/2023	27.80	7.78	0.0077	0.00	-269.30	7.88	0.00	clear
		4/26/2023	25.53	7.57	1.7850	5.98	-298.00	0.05	0.92	clear
		10/12/2023	27.66	7.36	1.7303	0.32	-264.80	0.28	0.86	clear
IW0062	40 to 45	01/18/2016	19.60	6.86	12.0000	155.00	-422.00	0.16	6.86	grey
		03/28/2016	24.70	7.74	13.3000	160.00	-68.20	0.25	7.62	cloudy grey
		05/31/2016	24.70	7.58	11.3000	3.22	-124.00	0.62	6.48	clear
		03/07/2017	24.50	7.25	11.2000	13.60	-126.00	0.26	6.33	clear
		08/09/2017	26.00	7.32	9.7100	9.52	-96.80	0.19	5.45	clear
		11/08/2017	25.40	11.0 [a]	10.5000	5.24	-49.60	0.07 [a]	0.59	clear
		02/20/2018	25.80	7.19	10.8000	11.80	-118.00	0.27	0.61	clear
		05/30/2018	25.00	7.17	11.0000	3.34	275.00	0.00	0.63	clear
		11/14/2018	25.50	7.15	9.5900	2.67	-120.00	0.76	0.54	clear
		03/12/2019	24.00	7.36	9.8900	14.40	-91.00	0.18	NR	cloudy
		10/31/2019	28.60	7.18	9.8400	2.65	-138.00	0.40	NR	clear
		3/19/2020	25.86	7.26	17.7400	2.29	-103.30	0.25	10.21	clear
		9/18/2020	27.00	7.18	9.0400	1.62	-123.70	0.17	4.83	clear
		3/16/2021	26.70	7.19	9.4200	15.32	-96.20	0.19	5.12	clear
		9/13/2021	26.90	7.44	6.0510	16.20	-200.60	1.11	NR	clear
		3/15/2022	24.44	7.23	8.7720	12.62	-179.60	0.08	4.96	clear
		3/8/2023	25.12	7.33	6.6075	16.68	-279.60	0.17	3.66	clear
		4/26/2023	26.06	7.42	6.8840	18.17	-241.40	0.07	3.83	clear
		10/12/2023	27.81	7.22	7.4347	0.00	-123.90	0.21	4.16	clear
IW0063	35 to 40	01/18/2016	20.20	7.18	7.5100	107.0	-484.00	0.17	4.17	grey
		03/28/2016	25.00	8.03	8.1700	339.0	-78.70	0.21	4.53	cloudy grey
		05/31/2016	25.10	7.62	6.9900	14.60	-130.00	0.50	3.82	clear
		03/07/2017	24.60	7.42	6.7800	8.30	-117.00	0.15	3.71	clear
		08/09/2017	26.00	7.37	5.9600	3.38	-88.40	0.14	3.23	clear
		11/08/2017	25.90	6.99	5.5500	2.09	-121.00	0.11	2.99	clear
		02/20/2018	25.00	6.92	5.7900	4.14	-117.00	0.35	0.31	clear
		05/29/2018	26.00	7.01	6.1300	2.52	403.00	0.10	0.33	clear
		11/14/2018	26.20	6.72	5.9200	2.51	-65.40	0.61	0.32	clear
		03/11/2019	25.90	6.21	6.2000	13.20	-15.20	1.30	NR	clear
		11/1/2019	25.60	6.95	5.7500	0.79	-30.50	0.35	NR	clear
		3/19/2020	25.57	7.02	11.3300	2.57	-74.70	0.48	6.37	clear
		9/18/2020	28.20	7.14	5.6200	4.15	-28.70	0.16	2.83	clear
		3/17/2021	23.60	7.02	4.7000	4.64	-58.70	0.11	2.68	clear
		9/14/2021	27.20	7.41	3.0890	6.21	-207.70	0.42	NR	clear
		11/17/2021	26.30	7.37	4.4500	2.79	-189.40	0.28	NR	clear
		3/15/2022	25.03	7.07	3.8430	6.85	-72.50	0.06	0.37	clear
		3/8/2023	25.80	7.60	4.4520	14.44	-104.20	0.57	2.32	clear
		10/20/2023	26.92	6.97	4.1615	41.80	-32.10	1.08	2.24	clear

Table 3-7. Biosparge Barrier Groundwater Geochemical Parameters

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)
IW0064	40 to 45	01/18/2016	24.00	6.95	16.4000	115.00	-475.00	0.16	9.61	grey
		03/28/2016	24.90	7.77	18.5000	14.20	-65.60	0.22	10.90	clear
		05/31/2016	24.90	7.39	15.7000	10.60	-110.00	0.50	9.21	clear
		03/07/2017	24.70	7.24	16.0000	16.60	-90.50	0.20	9.32	clear
		08/09/2017	26.10	7.18	13.9000	12.30	-63.30	0.13	8.00	clear
		11/08/2017	25.90	7.00	14.5000	15.60	-114.00	0.16	8.38	clear
		02/20/2018	24.90	6.88	14.9000	4.21	-115.00	0.34	0.85	clear
		05/29/2018	26.20	6.94	15.4000	0.78	437.00	0.09	0.89	clear
		11/14/2018	25.90	6.86	14.5000	5.59	-97.00	0.48	0.84	clear
		03/11/2019	25.50	6.41	15.2000	7.10	-54.00	0.20	NR	clear
		11/1/2019	25.40	7.06	13.9300	1.36	-103.90	0.23	NR	clear
		3/19/2020	25.77	7.12	26.3600	2.15	-84.90	0.27	15.96	clear
		9/18/2020	27.40	7.12	13.6800	4.36	-125.70	0.08	7.41	clear
		3/17/2021	24.10	7.03	12.9300	3.66	-69.10	0.11	7.58	clear
		9/14/2021	28.40	7.28	10.3500	6.37	-200.70	0.93	NR	clear
		11/17/2021	26.80	7.21	11.6700	5.87	-185.40	0.25	NR	clear
		3/15/2022	24.94	6.82	11.3810	8.92	-86.20	0.04	6.57	clear
		3/8/2023	25.40	7.51	11.1780	2.41	-109.40	0.97	6.29	clear
		10/20/2023	28.38	7.16	8.3278	14.59	-59.60	0.24	4.70	clear
MW0102	25 to 35	10/20/2023	24.88	7.20	1.2078	28.76	-183.60	0.23	0.61	clear
MW0103	35 to 45	10/20/2023	25.05	7.20	9.8163	98.63	-215.30	0.26	5.60	clear
MW0107	35 to 45	10/20/2023	24.75	6.97	2.2417	108.40	-174.40	0.23	1.16	clear

Notes:

[a] Probe failed continuing calibration verification (CCV)

% = percent.

°C = degrees Celsius.

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.

bls = below land surface.

NR = not recorded.

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 (Outstanding Florida Waters Area) Groundwater Geochemical Parameters

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 (%)	Color
MW0011	25 to 35	11/10/2015	25.5	6.83	0.8200	17.3	-299.0	0.38	0.40	clear
		01/11/2016	23.5	7.66	1.7000	15.2	-236.0	0.29	0.86	clear
		07/11/2016	27.6	7.77	0.5600	13.9	-250.0	0.21	0.26	clear
		02/20/2017	23.5	7.24	0.6700	9.00	-336.0	0.13	0.34	clear
		08/09/2017	28.0	7.44	0.5600	2.30	-233.0	0.13	0.27	clear
		02/19/2018	25.3	7.27	0.6200	5.90	-261.0	0.05	0.03	clear
		08/06/2018	27.7	7.95	0.6600	2.10	-329.0	0.10	0.03	clear
		02/18/2019	25.2	7.34	0.6600	1.60	-325.0	0.50 [a]	0.03	clear
		10/31/2019	27.9	7.20	0.6700	0.78	-311.0	0.79	NR	clear
		9/18/2020	27.7	7.13	0.6700	5.62	-308.7	0.14	0.31	clear
		9/15/2021	27.3	7.44	0.5910	15.29	-208.8	0.18	NR	clear
		12/14/2022	24.9	8.39	1.0600	5.41	-312.5	0.17	NR	clear
		10/12/2023	27.1	7.29	0.5844	0.59	-346.1	0.19	0.29	clear
		11/16/2023	25.2	7.50	0.5410	3.97	-251.0	0.22	0.26	clear
MW0012	15 to 25	11/10/2015	26.1	6.71	0.5400	11.8	-238.0	0.13	0.26	clear
		01/11/2016	24.5	7.64	0.6000	6.70	-267.0	0.22	0.29	clear
		07/11/2016	28.5	7.70	0.5100	13.3	-234.0	0.17	0.23	clear
		02/20/2017	23.5	7.21	0.6100	11.3	-344.0	0.09	0.3	clear
		08/09/2017	27.6	7.35	0.5100	1.60	-237.0	0.10	0.24	clear
		02/19/2018	25.4	7.26	0.6100	8.90	-294.0	0.07	0.03	clear
		08/06/2018	27.0	7.45	0.6400	1.30	-341.0	0.01	0.03	clear
		02/18/2019	25.0	7.30	0.6000	2.00	-313.0	0.57 [a]	0.03	clear
		10/31/2019	28.0	7.18	0.5900	1.13	-322.0	0.78	NR	clear
		9/18/2020	27.6	7.20	0.6100	9.51	-306.5	0.13	0.28	clear
		9/15/2021	27.6	7.55	0.5190	4.38	-212.7	0.13	NR	clear
		12/14/2022	25.4	8.29	0.9510	5.09	-314.2	0.25	NR	clear
		10/12/2023	27.3	7.28	0.5273	0	-362.7	0.18	0.26	clear
		11/16/2023	25.3	7.50	0.4828	3.09	-250.6	0.50	0.23	clear
MW0013	20 to 25	09/13/2018	27.9	7.41	0.6600	13.4	-312.0	0.40	0.32	clear
		02/18/2019	25.0	7.37	0.7000	5.00	-224.0	0.51 [a]	0.03	clear
		10/31/2019	28.2	7.23	0.6700	1.89	-319.0	0.36	NR	clear
		9/18/2020	27.8	7.21	0.6700	4.54	-242.3	0.21	0.31	clear
		9/15/2021	26.3	7.43	0.5760	10.21	-209.7	0.22	NR	clear
		12/14/2022	25.5	8.21	1.0860	5.36	-302.7	0.39	NR	clear
		10/12/2023	26.4	7.48	0.3864	0.18	-275.4	0.09	0.19	clear
MW0014	25 to 30	09/13/2018	26.9	7.40	0.6700	11.4	-315.0	0.51	0.32	clear
		02/18/2019	25.1	7.38	0.6600	9.40	-317.0	0.45 [a]	0.03	clear
		10/31/2019	27.3	7.22	0.6900	12.4	-474.0	0.08	NR	clear
		9/18/2020	28.2	7.29	0.6800	2.53	-306.7	0.12	0.31	clear
		9/15/2021	26.7	7.53	0.5940	5.44	-214.9	1.02	NR	clear
		12/14/2022	25.0	8.28	1.1210	6.54	-322.7	0.37	NR	clear
		10/12/2023	26.9	7.21	0.6381	0.00	-315.0	0.13	0.31	clear

Notes:

[a] Probe failed continuing calibration verification (CCV).

% = percent.

°C = degrees Celsius.

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.

bls = below land surface.

NR = not recorded.

Locations have prefix "VABRA-"

Table 3-9. LCP LTM Groundwater Geochemical Parameters

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 (%)	Color
IW0001D	50 to 55	6/8/2020	24.80	7.43	0.9330	2.81	-212.0	0.77	0.46	clear
		3/9/2023	23.20	7.89	7.9820	4.50	-167.9	0.46	4.59	clear
IW0002IR	28 to 33	3/8/2023	26.46	7.34	0.8242	0.00	-372.5	0.11	0.41	clear
IW0009I	28 to 33	3/14/2023	21.57	7.70	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	26.50	7.10	0.1803	8.13	15.3	0.37	0.09	clear
IW0017I	35 to 40	3/14/2023	22.60	7.53	0.3701	1.12	-49.4	0.65	0.23	clear
IW0018D	50 to 55	3/15/2023	19.30	7.38	6.1790	1.58	-98.6	0.26	3.89	clear
IW0020D	65 to 70	6/3/2020	24.77	7.16	2.9070	17.50	-116.7	0.33	1.52	clear
		3/21/2023	23.30	7.07	2.2432	2.11	-153.2	0.11	3.95	clear
IW0022D	48 to 55	3/15/2023	26.60	7.36	6.4238	5.10	-100.2	5.65	3.61	clear
IW0027I	28 to 33	3/9/2023	24.60	7.65	1.5450	4.40	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	10.70	-229.0	0.42	0.66	clear
IW0049	38 to 48	3/15/2023	26.30	7.28	7.2250	1.55	-99.3	4.01	4.52	clear
IW0050	40 to 50	3/9/2023	26.45	7.10	0.7929	2.18	-276.4	0.20	0.39	clear
IW0051	45 to 55	3/9/2023	26.61	7.10	5.8418	10.87	-195.5	0.19	3.21	clear
IW0052	40 to 50	3/14/2023	24.10	7.39	1.7940	12.20	-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	0.30	clear
IW0053R		11/16/2023	23.40	7.94	2.8283	4.31	-284.5	0.31	1.47	clear
IW0054	40 to 50	3/15/2023	24.18	7.43	0.5716	29.23	-366.0	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	24.00	7.20	0.7760	13.01	-280.7	0.33	0.39	clear
MW0076	47 to 57	3/8/2023	27.91	7.46	7.0015	1.02	-223.5	0.31	3.95	clear
MW0077	25 to 35	3/8/2023	28.77	7.58	0.8000	2.23	-440.7	0.10	NR	clear
MW0078	25 to 35	3/8/2023	28.61	7.38	0.9238	6.42	-279.6	0.61	0.49	clear
MW0079	25 to 35	3/8/2023	28.51	7.66	0.9155	0.01	-274.4	0.36	0.48	clear
MW0080	47 to 57	3/8/2023	29.09	7.29	7.9000	2.86	-292.5	0.12	NR	clear
MW0081	25 to 35	3/9/2023	29.03	7.14	1.3296	0.58	-353.5	0.25	0.67	clear

Table 3-9. LCP LTM Groundwater Geochemical Parameters

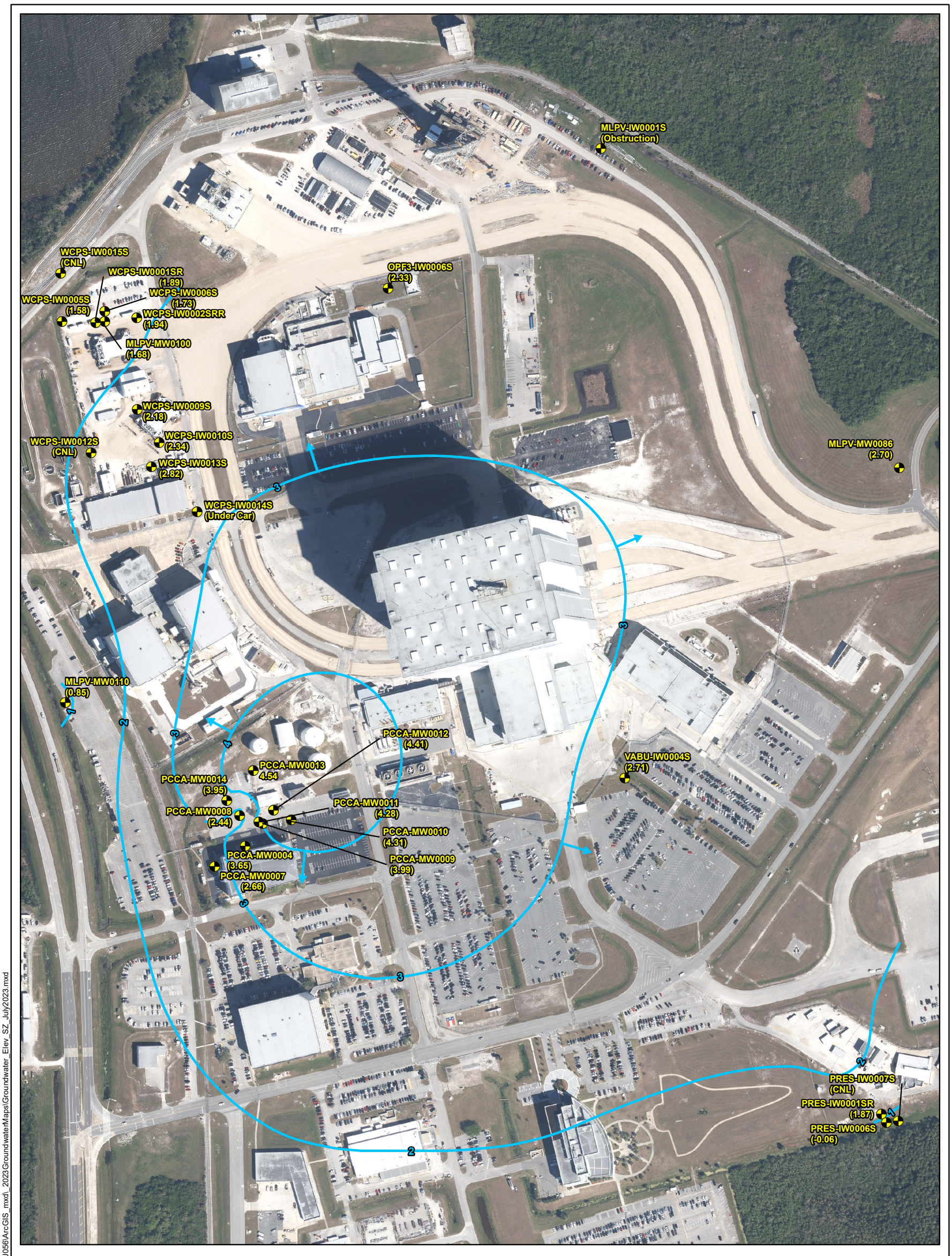
Location	Screened Interval (feet bls)	Date	Temp. (°C)	pH (S.U.)	Con-ductivity (mS/cm)	Turbidity (NTU)	Oxidation-Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Salinity (%)	Color
MW0082	35 to 45	3/8/2023	28.64	7.58	1.8000	27.14	-340.1	0.04	NR	clear
MW0083	47 to 57	3/8/2023	28.13	7.61	9.4193	30.15	-269.7	0.34	5.14	clear
MW0084	47 to 57	3/9/2023	27.21	7.37	7.0179	6.88	-278.0	0.02	3.91	clear
MW0085	47 to 57	3/9/2023	28.11	7.30	4.0555	14.93	-230.6	0.07	2.18	clear
MW0086	15 to 25	3/14/2023	23.61	6.89	0.5891	15.52	-246.8	0.47	0.29	clear
MW0087	47 to 57	3/13/2023	25.36	7.27	3.7811	8.31	-266.7	0.20	1.41	clear
MW0088	35 to 45	3/14/2023	23.10	7.32	0.8171	34.81	-255.0	0.11	0.42	clear
MW0089	35 to 45	3/14/2023	22.82	7.83	0.6039	4.75	-299.3	0.19	0.34	clear
MW0090	47 to 57	3/13/2023	24.44	7.16	5.5572	2.13	-276.3	0.20	3.05	clear
MW0091	47 to 57	3/9/2023	26.02	7.60	4.1812	8.06	-235.7	0.15	2.25	clear
MW0092	47 to 57	3/9/2023	24.66	7.53	5.1882	2.42	-282.0	0.10	2.83	clear
MW0093	35 to 45	3/15/2023	23.87	8.45	1.1926	5.18	-351.5	0.16	0.65	clear
MW0094	35 to 45	3/8/2023	25.40	7.72	9.2650	1.70	-54.1	0.80	5.12	clear
MW0095	25 to 35	3/8/2023	25.50	7.68	0.6490	1.73	-273.1	0.60	0.31	clear
MW0096	35 to 45	3/8/2023	26.52	7.77	8.0097	160.42	-306.9	0.29	4.50	clear
MW0097	35 to 45	3/9/2023	24.93	8.15	2.7468	2.10	-294.7	0.11	1.55	clear
MW0098	20 to 30	3/13/2023	26.50	6.87	0.1000	4.78	82.3	6.90	0.00	clear
MW0099	40 to 50	3/13/2023	25.78	7.55	1.1905	9.15	-369.9	0.17	0.98	clear
MW0100	15 to 25	3/9/2023	24.78	6.77	0.7203	6.75	-373.9	0.14	0.35	clear
MW0101	40 to 50	3/9/2023	26.10	7.35	0.9172	11.98	-411.1	0.03	0.46	clear
MW0102	25 to 35	3/10/2023	24.52	7.38	2.3260	21.20	-202.5	0.12	1.21	clear
MW0103	35 to 45	3/10/2012	25.72	7.44	6.1199	95.00	-214.7	0.08	3.38	clear
MW0104	47 to 57	3/10/2023	24.55	7.60	3.6417	20.28	-380.8	0.09	1.94	clear
MW0105	47 to 57	3/10/2023	24.23	7.61	5.0118	42.50	-191.7	0.12	2.73	clear
MW0106	25 to 35	3/10/2023	24.84	7.26	1.6548	66.13	-276.3	0.09	0.85	clear
MW0107	35 to 45	3/10/2023	24.53	7.15	2.0442	62.97	-254.3	0.14	1.06	clear
MW0108	35 to 45	3/9/2023	23.93	7.39	1.4161	45.71	-314.4	0.11	0.72	clear
MW0109	20 to 30	3/9/2023	28.20	7.10	0.5757	3.27	-382.9	0.17	0.29	clear
MW0110	1 to 11	3/9/2023	25.91	6.71	0.4938	6.31	-328.3	0.20	0.24	clear

Table 3-9. LCP LTM Groundwater Geochemical Parameters

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 (%)	Color
MW0111	45 to 55	11/16/2023	26.90	7.79	2.2860	3.41	-43.8	0.50	1.12	clear
MW0112	47 to 57	11/16/2023	24.24	7.47	4.2961	3.12	-192.0	1.60	2.30	clear
MW0113	35 to 45	11/16/2023	24.80	7.56	0.5240	5.97	-99.7	0.34	0.26	clear
MW0114	35 to 45	11/16/2023	24.20	7.95	0.5520	5.34	-83.0	0.19	0.27	clear
MW0115	35 to 45	11/16/2023	24.90	7.73	0.7420	1.76	-21.9	0.15	0.36	clear
PRES-IW0009	40 to 50	3/9/2023	25.80	7.25	2.6959	12.29	-152.8	7.75	1.41	clear
WCPS-IW0001SR	2.5 to 12.5	9/14/2020	30.50	7.35	0.5800	1.55	-99.2	0.39	0.25	clear
		3/9/2023	24.36	7.12	0.5500	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	29.90	7.69	0.3400	1.65	-78.4	2.35	0.15	clear
		3/9/2023	25.99	7.33	0.5197	6.62	-270.0	2.06	0.25	clear
WCPS-IW0006S	3 to 13	6/3/2020	27.93	7.57	0.3410	1.36	66.6	2.97	0.15	clear
WCPS-IW0015S	3 to 13	9/14/2020	30.70	7.40	0.4100	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
VAB-IW0005D	52 to 57	6/8/2020	25.90	7.12	0.3830	1.29	-212.0	0.49	0.18	clear
		3/9/2023	26.01	7.19	3.1262	5.40	-159.5	0.16	1.65	clear
VABU-IW0001I	22 to 30	6/8/2020	26.80	7.32	0.7200	2.91	-146.0	0.40	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	27.30	6.64	5.8900	5.99	-136.0	0.48	3.05	clear
		3/14/2023	25.07	7.14	3.1684	13.50	-247.9	0.13	1.90	clear
SAMW0002	43.2 to 47.7	6/8/2020	27.60	7.00	7.0700	7.65	-100.0	0.30	3.67	clear
SAMW0003	43.2 to 47.7	6/8/2020	28.20	7.53	4.0000	6.44	-163.0	0.45	1.51	clear
		3/16/2023	24.21	6.97	4.9990	6.99	-234.8	0.30	2.72	clear
SATV-IW0009I	22 to 27	6/8/2020	27.60	7.38	0.8970	1.92	-287.0	0.67	0.41	clear
		3/8/2023	29.51	7.34	0.0010	8.43	NR	0.10	NR	clear

Notes:

% = percent.
°C = degrees Celsius.
g/L = grams per liter.
S.U. = standard units.
mg/L = milligrams per liter.
mS/cm = milliSiemens per centimeter.
mV = millivolts.
NTU = Nephelometric Turbidity Unit.
pH = negative log of hydrogen ion concentration.
bls = below land surface.
LCP = Low concentration plume
LTM = Long-term monitoring
NR = not recorded.
Locations have prefix "MLPV-".
Thirteen additional monitoring wells were sampled using passive diffusion bags, therefore geochemical parameters are not present.



Legend

- Shallow Monitoring Well Location (Groundwater Elevation in feet bls, NAVD88 Feet)
- Groundwater Contour (NAVD88 Feet)
- Approximate Direction of Groundwater Flow

Notes:
1. bls = Below land surface.
2. CNL = Could Not Locate.
3. NAVD88 = North American Vertical Datum of 1988.
4. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
5. SWMU = Solid Waste Management Unit.
6. Results shown as feet bls.

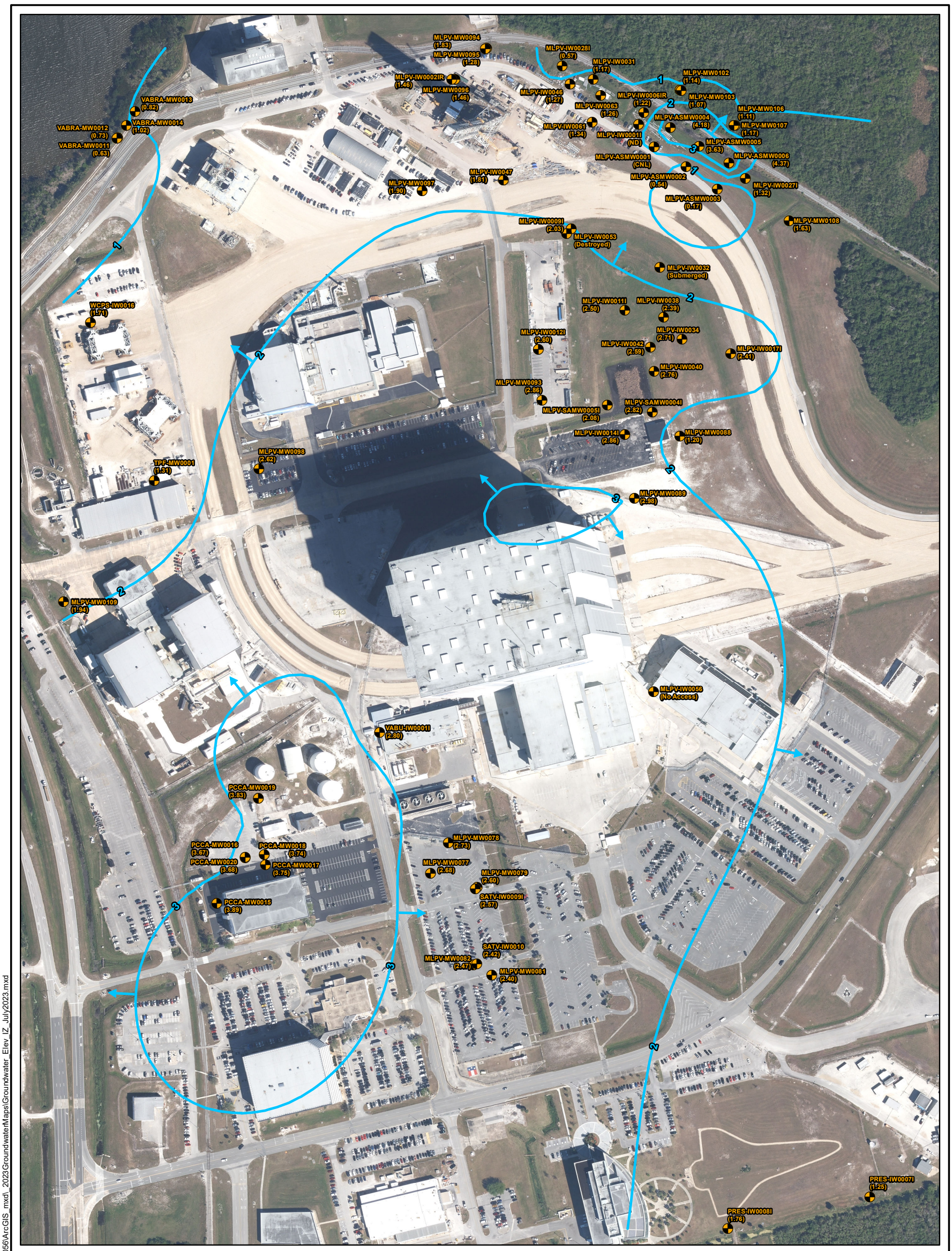
N

0 325 650 Feet

FIGURE 3-1
Sitewide Groundwater Contour Map
Shallow Interval (2 to 20 Feet bls)
July 13, 2023

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

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Legend

- Intermediate Monitoring Well Location (Groundwater Elevation in feet bls, NAVD88 Feet)
- Groundwater Contour (NAVD88 ft.) Approximate
- Direction of Groundwater Flow

Notes:
1. bls = Below land surface.
2. CNL = Could Not Locate.
3. NAVD88 = North American Vertical Datum of 1988.
4. ND = No Data.
5. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
6. SWMU = Solid Waste Management Unit.
7. Results shown as feet bls.

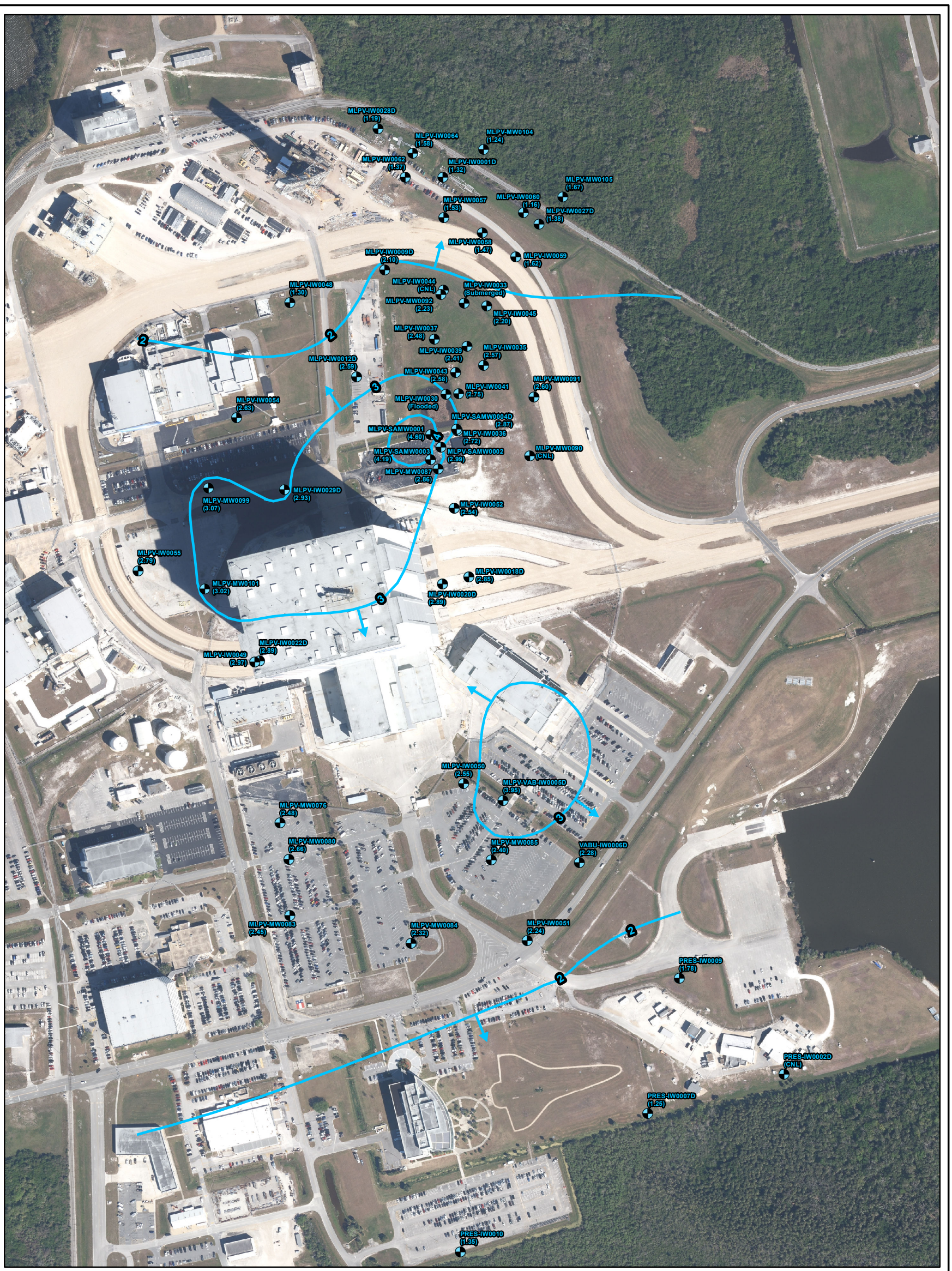
N

0 300 600 Feet

FIGURE 3-2
Sitewide Groundwater Contour Map
Intermediate Interval (20 to 45 Feet bls)
July 13, 2023

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

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Legend

- Deep Monitoring Well Location (Groundwater Elevation in feet bls, NAVD88 Feet)
- Groundwater Contour (NAVD88 Feet)
- Approximate Direction of Groundwater Flow

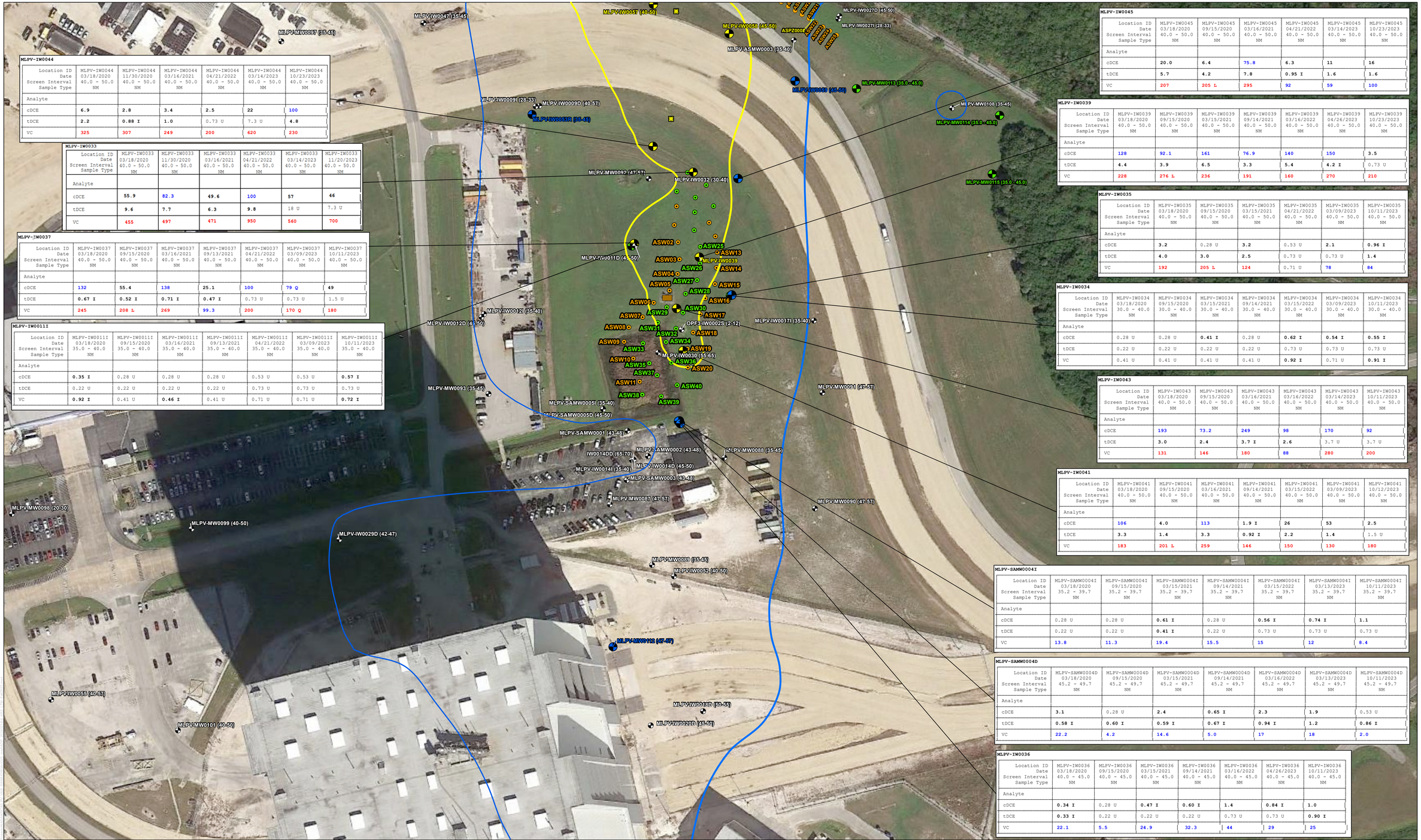
Notes:
1. bls = Below land surface.
2. CNL = Could Not Locate.
3. NAVD88 = North American Vertical Datum of 1988.
4. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
5. SWMU = Solid Waste Management Unit.
6. Results shown as feet bls.

N

0 350 700 Feet

FIGURE 3-3
Sitewide Groundwater Contour Map
Deep Interval (45 to 70 Feet bls)
July 13, 2023

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



MLPV-IW0044

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0044 10/23/2023 40.0 - 50.0 NM
Analyte						
cDCE	6.9	2.8	3.4	2.5	22	100
tDCE	2.2	0.88 I	1.0	0.73 U	7.3 U	4.8
VC	325	307	249	200	620	230

MLPV-IW0033

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0033 11/20/2023 40.0 - 50.0 NM
Analyte						
cDCE	55.9	82.3	49.6	100	57	46
tDCE	9.6	7.7	6.3	9.8	18 U	7.3 U
VC	455	497	471	950	560	700

MLPV-IW0037

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0037 10/11/2023 40.0 - 50.0 NM
Analyte							
cDCE	132	55.4	138	25.1	100	79 Q	49
tDCE	0.67 I	0.52 I	0.71 I	0.47 I	0.73 U	0.73 U	1.5 U
VC	245	208 L	269	99.3	200	170 Q	180

MLPV-IW0011I

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0011I 10/11/2023 35.0 - 40.0 NM
Analyte							
cDCE	0.35 I	0.28 U	0.28 U	0.28 U	0.53 U	0.53 U	0.57 I
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	0.73 U
VC	0.92 I	0.41 U	0.46 I	0.41 U	0.71 U	0.71 U	0.72 I

MLPV-IW0045

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0045 10/23/2023 40.0 - 50.0 NM
Analyte						
cDCE	20.0	6.4	75.8	6.3	11	16
tDCE	5.7	4.2	7.8	0.95 I	1.6	1.6
VC	207	205 L	295	92	59	100

MLPV-IW0039

Location ID / Date / Screen Interval / Sample Type	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 03/16/2022 40.0 - 50.0 NM	MLPV-IW0039 04/26/2023 40.0 - 50.0 NM	MLPV-IW0039 10/23/2023 40.0 - 50.0 NM
Analyte							
cDCE	128	92.1	161	76.9	140	150	3.5
tDCE	4.4	3.9	6.5	3.3	5.4	4.2 I	0.73 U
VC	228	276 L	236	191	160	270	210

MLPV-IW0035

Location ID / Date / Screen Interval / Sample Type	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 04/21/2022 40.0 - 50.0 NM	MLPV-IW0035 03/09/2023 40.0 - 50.0 NM	MLPV-IW0035 10/11/2023 40.0 - 50.0 NM
Analyte						
cDCE	3.2	0.28 U	3.2	0.53 U	2.1	0.96 I
tDCE	4.0	3.0	2.5	0.73 U	0.73 U	1.4
VC	192	205 L	124	0.71 U	78	84

MLPV-IW0034

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0034 10/11/2023 30.0 - 40.0 NM
Analyte							
cDCE	0.28 U	0.28 U	0.41 I	0.28 U	0.62 I	0.54 I	0.55 I
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	0.41 U	0.41 U	0.92 I	0.71 U	0.91 I

MLPV-IW0043

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0043 10/11/2023 40.0 - 50.0 NM
Analyte						
cDCE	193	73.2	249	98	170	92
tDCE	3.0	2.4	3.7 I	2.6	3.7 U	3.7 U
VC	131	146	180	88	280	200

MLPV-IW0041

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0041 10/12/2023 40.0 - 50.0 NM
Analyte							
cDCE	106	4.0	113	1.9 I	26	53	2.5
tDCE	3.3	1.4	3.3	0.92 I	2.2	1.4	1.5 U
VC	183	201 L	259	146	150	130	180

MLPV-SAMW0004I

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0004I 03/18/2020 35.2 - 39.7 NM	MLPV-SAMW0004I 09/15/2020 35.2 - 39.7 NM	MLPV-SAMW0004I 03/15/2021 35.2 - 39.7 NM	MLPV-SAMW0004I 09/14/2021 35.2 - 39.7 NM	MLPV-SAMW0004I 03/15/2022 35.2 - 39.7 NM	MLPV-SAMW0004I 03/13/2023 35.2 - 39.7 NM	MLPV-SAMW0004I 10/11/2023 35.2 - 39.7 NM
Analyte							
cDCE	0.28 U	0.28 U	0.61 I	0.28 U	0.56 I	0.74 I	1.1
tDCE	0.22 U	0.22 U	0.41 I	0.22 U	0.73 U	0.73 U	0.73 U
VC	13.0	11.3	19.4	15.5	15	12	8.4

MLPV-SAMW0004D

Location ID / Date / Screen Interval / Sample Type	MLPV-SAMW0004D 03/18/2020 45.2 - 49.7 NM	MLPV-SAMW0004D 09/15/2020 45.2 - 49.7 NM	MLPV-SAMW0004D 03/15/2021 45.2 - 49.7 NM	MLPV-SAMW0004D 09/14/2021 45.2 - 49.7 NM	MLPV-SAMW0004D 03/16/2022 45.2 - 49.7 NM	MLPV-SAMW0004D 03/13/2023 45.2 - 49.7 NM	MLPV-SAMW0004D 10/11/2023 45.2 - 49.7 NM
Analyte							
cDCE	3.1	0.28 U	2.4	0.65 I	2.3	1.9	0.53 U
tDCE	0.58 I	0.60 I	0.59 I	0.67 I	0.94 I	1.2	0.86 I
VC	22.2	4.2	14.6	5.0	17	18	2.0

MLPV-IW0036

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0036 03/18/2020 40.0 - 45.0 NM	MLPV-IW0036 09/15/2020 40.0 - 45.0 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	MLPV-IW0036 10/11/2023 40.0 - 45.0 NM
Analyte							
cDCE	0.34 I	0.28 U	0.47 I	0.60 I	1.4	0.84 I	1.0
tDCE	0.33 I	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	0.90 I
VC	22.1	5.5	24.9	32.3	44	29	25

Legend

- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well Not Sampled
- Biosparge Expansion Well Location
- Biosparge Piezometer Well Location
- Biosparge Well Location
- 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
- 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. 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. Wells 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. Wells IW0036, IW0038, IW0039, and SAMW0001 were resampled on April 26, 2023. Analytical results from this event are presented in place of the March 2023 data.
16. Well IW0053 was destroyed and replaced with IW0053R in November 2023.
17. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 - 46 ft bls outside of the pond.

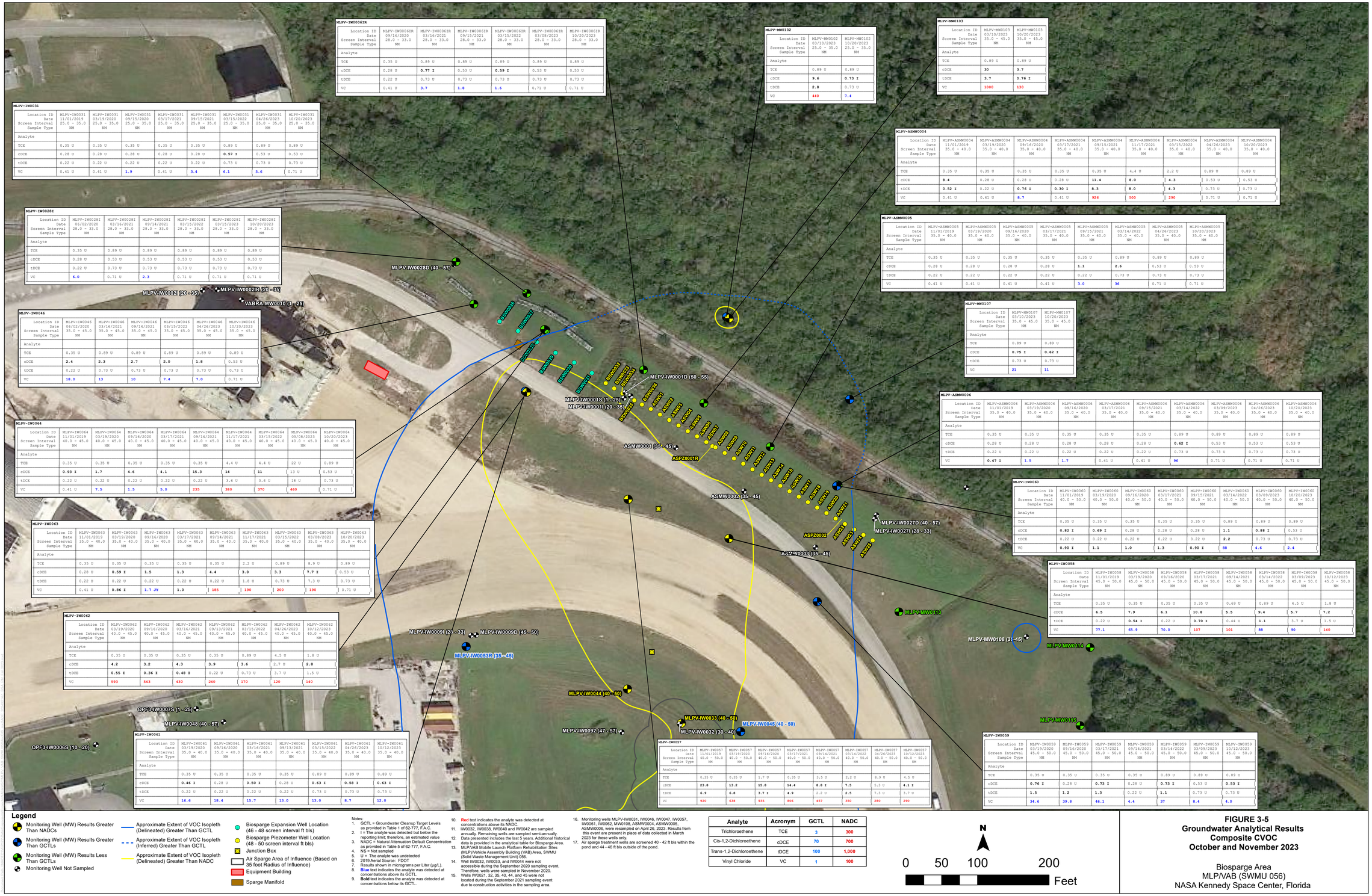
Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

N

0 75 150 300 Feet

Figure 3-4
Groundwater Analytical Results
Composite CVOC
October and November 2023

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



MLPV-IW0061R

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0061R 09/16/2020 28.0 - 33.0 NM	MLPV-IW0061R 03/16/2021 28.0 - 33.0 NM	MLPV-IW0061R 09/15/2021 28.0 - 33.0 NM	MLPV-IW0061R 03/15/2022 28.0 - 33.0 NM	MLPV-IW0061R 03/08/2023 28.0 - 33.0 NM	MLPV-IW0061R 10/20/2023 28.0 - 33.0 NM
Analyte						
TCE	0.35 U	0.89 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	0.53 U
tDCE	0.22 U	0.73 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	0.71 U

MLPV-IW0102

Location ID / Date / Screen Interval / Sample Type	MLPV-IW0102 03/10/2023 25.0 - 35.0 NM	MLPV-IW0102 10/20/2023 25.0 - 35.0 NM
Analyte		
TCE	0.89 U	0.89 U
cDCE	**9.6**	**0.73 I**
tDCE	**2.8**	0.73 U
VC	**440**	**7.4**

MLPV-MW0103

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0103 03/10/2023 35.0 - 45.0 NM	MLPV-MW0103 10/20/2023 35.0 - 45.0 NM
Analyte		
TCE	0.89 U	0.89 U
cDCE	**30**	**3.7**
tDCE	**3.7**	**0.76 I**
VC	**1000**	**130**

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	MLPV-IW0031 10/20/2023 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	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	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	0.73 U
VC	0.41 U	0.41 U	**1.9**	0.41 U	**3.4**	**6.1**	**5.6**	0.71 U

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	MLPV-ASMW0004 10/20/2023 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	0.89 U
cDCE	**8.4**	0.28 U	0.28 U	0.28 U	**11.4**	**8.0**	**4.3**	0.53 U	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	0.73 U
VC	0.41 U	0.41 U	**8.7**	0.41 U	**926**	**500**	**290**	0.71 U	0.71 U

MLPV-IW0028I

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0028I 10/20/2023 28.0 - 33.0 NM
Analyte						
TCE	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	0.28 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U
tDCE	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**6.0**	0.71 U	**2.3**	0.71 U	0.71 U	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	MLPV-ASMW0005 10/20/2023 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	0.89 U
cDCE	0.28 U	0.28 U	0.28 U	0.28 U	**1.1**	**2.6**	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	0.73 U
VC	0.41 U	0.41 U	0.41 U	0.41 U	**3.0**	**36**	0.71 U	0.71 U

MLPV-MW0107

Location ID / Date / Screen Interval / Sample Type	MLPV-MW0107 03/10/2023 35.0 - 45.0 NM	MLPV-MW0107 10/20/2023 35.0 - 45.0 NM
Analyte		
TCE	0.89 U	0.89 U
cDCE	**0.75 I**	**0.62 I**
tDCE	0.73 U	0.73 U
VC	**21**	**11**

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	MLPV-IW0046 10/20/2023 35.0 - 45.0 NM
Analyte						
TCE	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	**2.4**	**2.3**	**2.7**	**2.0**	**1.8**	0.53 U
tDCE	0.22 U	0.73 U	0.73 U	0.73 U	0.73 U	0.73 U
VC	**18.0**	**13**	**10**	**7.4**	**7.0**	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 09/15/2021 35.0 - 40.0 NM	MLPV-ASMW0006 03/14/2022 35.0 - 40.0 NM	MLPV-ASMW0006 03/09/2023 35.0 - 40.0 NM	MLPV-ASMW0006 04/26/2023 35.0 - 40.0 NM	MLPV-ASMW0006 10/20/2023 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	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	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	0.73 U
VC	**0.47 I**	**1.5**	**1.7**	0.41 U	0.41 U	**96**	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	MLPV-IW0064 10/20/2023 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	0.89 U
cDCE	**0.93 I**	**1.7**	**4.6**	**4.1**	**15.3**	**14**	**11**	13 U	0.53 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	0.73 U
VC	0.41 U	**7.5**	**1.5**	**5.0**	**235**	**380**	**370**	**460**	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	MLPV-IW0060 10/20/2023 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	0.89 U
cDCE	**0.82 I**	**0.69 I**	0.28 U	0.28 U	0.28 U	**1.1**	**0.88 I**	0.53 U
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	**2.2**	0.73 U	0.73 U
VC	**0.90 I**	**1.1**	**1.0**	**1.3**	**0.90 I**	**88**	**4.6**	**2.4**

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	MLPV-IW0063 10/20/2023 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	0.89 U
cDCE	0.28 U	**0.59 I**	**1.5**	**1.3**	**4.4**	**3.0**	**3.3**	**7.7 I**	0.53 U
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	0.73 U
VC	0.41 U	**0.86 I**	**1.7 JY**	**1.0**	**185**	**190**	**200**	**190**	0.71 U

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	MLPV-IW0058 10/12/2023 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	1.8 U
cDCE	**6.5**	**7.9**	**6.1**	**10.8**	**5.5**	**9.4**	**5.7**	**7.2**
tDCE	0.22 U	**0.54 I**	0.22 U	**0.70 I**	0.44 U	**1.1**	3.7 U	1.5 U
VC	**77.1**	**65.9**	**70.0**	**107**	**101**	**88**	**90**	**140**

MLPV-IW0062

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0062 10/12/2023 40.0 - 45.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.35 U	0.89 U	4.5 U	1.8 U
cDCE	**4.2**	**3.2**	**4.3**	**3.9**	**3.6**	2.7 U	**2.8**
tDCE	**0.55 I**	**0.36 I**	**0.48 I**	0.22 U	0.73 U	3.7 U	1.5 U
VC	**593**	**543**	**430**	**240**	**170**	**120**	**140**

MLPV-IW0059

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0059 10/12/2023 45.0 - 50.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U	0.89 U	
cDCE	**0.76 I**	0.28 U	**0.73 I**	0.28 U	**0.73 I**	0.53 U	**0.53 I**
tDCE	**1.5**	**1.2**	**1.3**	0.22 U	**1.1**	0.73 U	0.73 U
VC	**34.6**	**39.8**	**46.1**	**4.4**	**37**	**8.4**	**4.0**

MLPV-IW0061

Location ID / Date / Screen Interval / Sample Type	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	MLPV-IW0061 10/12/2023 35.0 - 40.0 NM
Analyte							
TCE	0.35 U	0.35 U	0.35 U	0.89 U	0.89 U	0.89 U	0.89 U
cDCE	**0.46 I**	0.28 U	**0.50 I**	0.28 U	**0.63 I**	**0.58 I**	**0.63 I**
tDCE	0.22 U	0.22 U	0.22 U	0.22 U	0.73 U	0.73 U	0.73 U
VC	**16.6**	**18.4**	**15.7**	**13.0**	**13.0**	**8.7**	**12.0**

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	MLPV-IW0057 10/12/2023 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	4.5 U
cDCE	**23.8**	**13.2**	**15.8**	**14.4**	**8.8 I**	**7.5**	**5.3 U**	**4.1 I**
tDCE	**6.9**	**4.8**	**3.7 I**	**2.2 U**	**2.5**	**7.3 U**	**3.7 U**	
VC	**920**	**638**	**935**	**806**	**457**	**350**	**280**	**290**

Legend

- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Less Than GCTLs
- Monitoring Well Not Sampled
- 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

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 Biosparge Area.
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 - 46 ft bls outside of the pond.

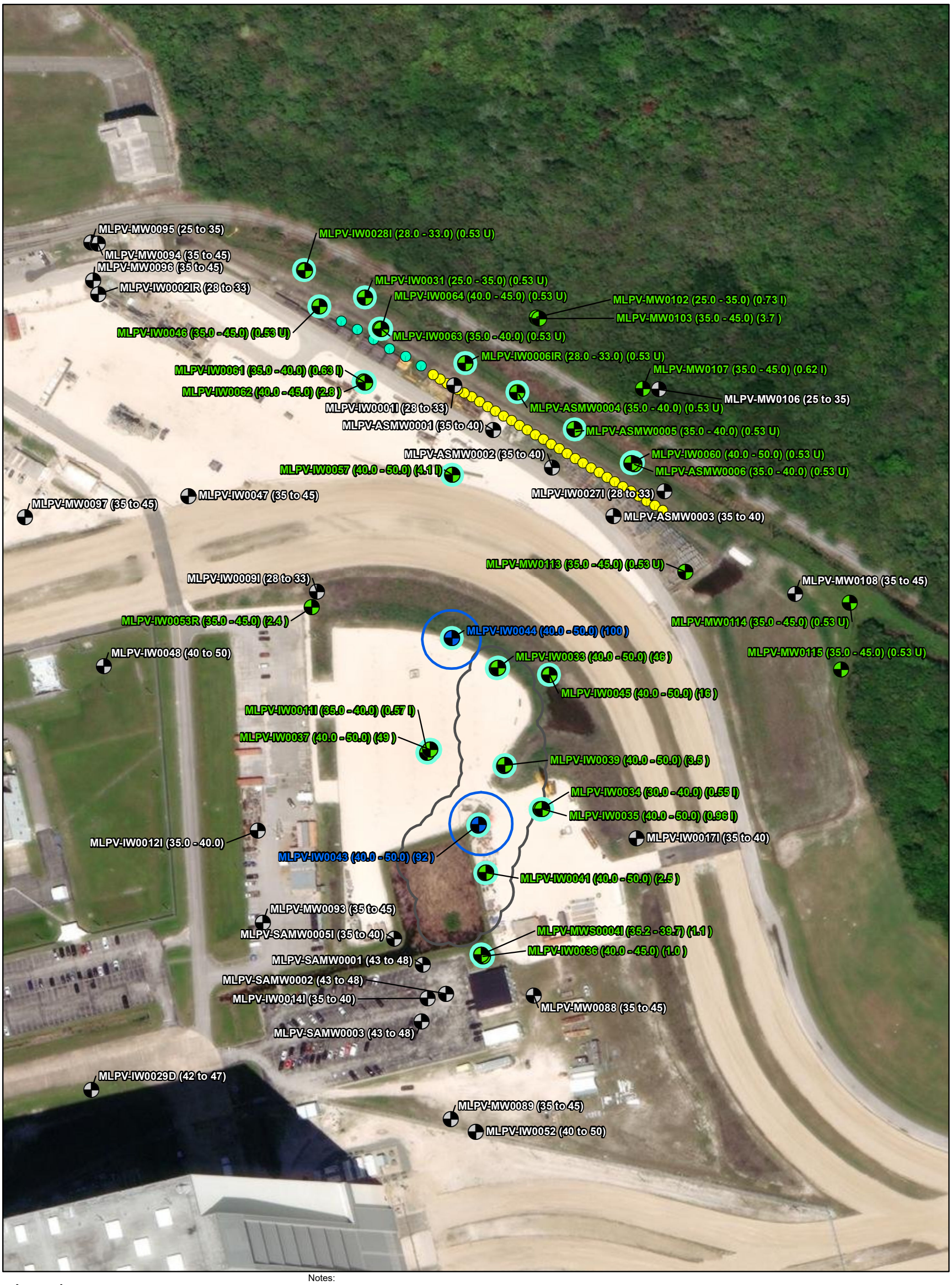
Analyte	Acronym	GCTL	NADC
Trichloroethene	TCE	3	300
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100

N

0 50 100 200 Feet

FIGURE 3-5
Groundwater Analytical Results
Composite CVOC
October and November 2023

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



Legend

- MW Sample Results Greater Than GCTLs (70 µg/L)
- MW Sample Results Less 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. U = Result was below laboratory Method Detection Limit.
4. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
5. bls = feet below land surface.
6. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
7. Monitoring well data is from the most recent sampling event.
8. Only monitoring wells with screens within this sampling interval are presented.
9. Results Shown in Micrograms per Liter (µg/L).
10. SWMU = Solid Waste Management Unit.
11. 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.
12. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
13. Aerial source Florida Department of Transportation, 2018.
14. cDCE plume represents the most recent sampling data from both March-April 2023 and October-November 2023.

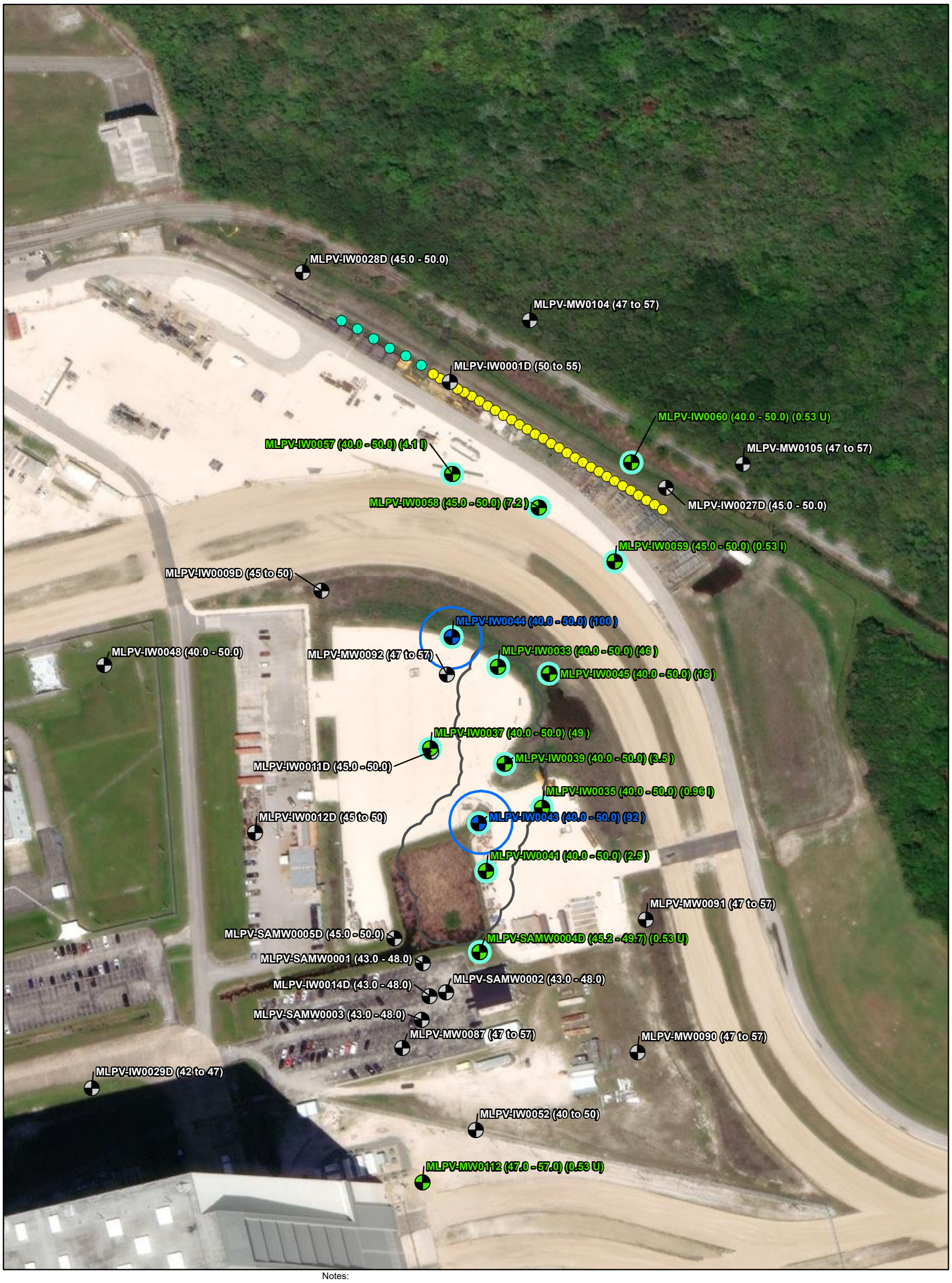
N

0 200 400 Feet

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

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

Document Path: \\NADTC1VFP172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\ADP_20240214\2023_Fall_Composite_cDCE_30to45.mxd



Document Path: \\NADTC1VFP172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\ADP_20240214\2023_Fall_Composite_Plume_cDCE_45to50.mxd

Legend

- MW Sample Results Greater Than GCTLs (70 µg/L)
- MW Sample Results Less 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)

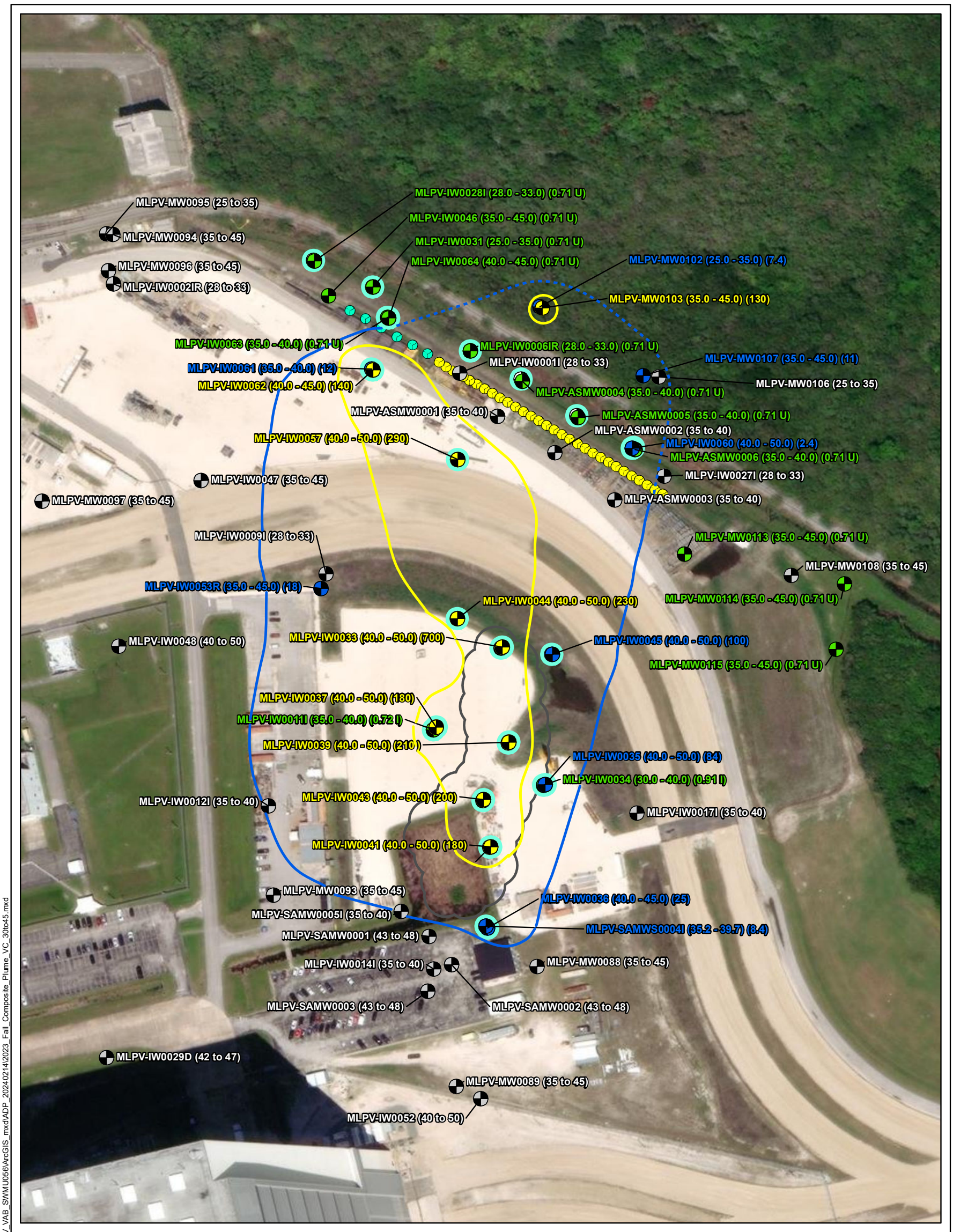
Notes:
1. MW = Monitoring Well.
2. I = The analyte was detected but below the reporting limit; therefore, an estimated value.
3. U = Result was below laboratory Method Detection Limit.
4. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
5. bls = feet below land surface.
6. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
7. Monitoring well data is from the most recent sampling event.
8. Only monitoring wells with screens within this sampling interval are presented.
9. Results Shown in Micrograms per Liter (µg/L).
10. SWMU = Solid Waste Management Unit.
11. 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.
12. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
13. Aerial source Florida Department of Transportation, 2018.
14. cDCE plume represents the most recent sampling data from both March-April 2023 and October-November 2023.

N

0 200 400 Feet

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

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



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. U = Result was below laboratory Method Detection Limit.
4. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
5. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
6. bls = feet below land surface.
7. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
8. Monitoring well data is from the most recent sampling event.
9. Only monitoring wells with screens within this sampling interval are presented.
10. Results Shown in Micrograms per Liter (ug/L).
11. SWMU = Solid Waste Management Unit.
12. 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.
13. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
14. Aerial source Florida Department of Transportation, 2018.

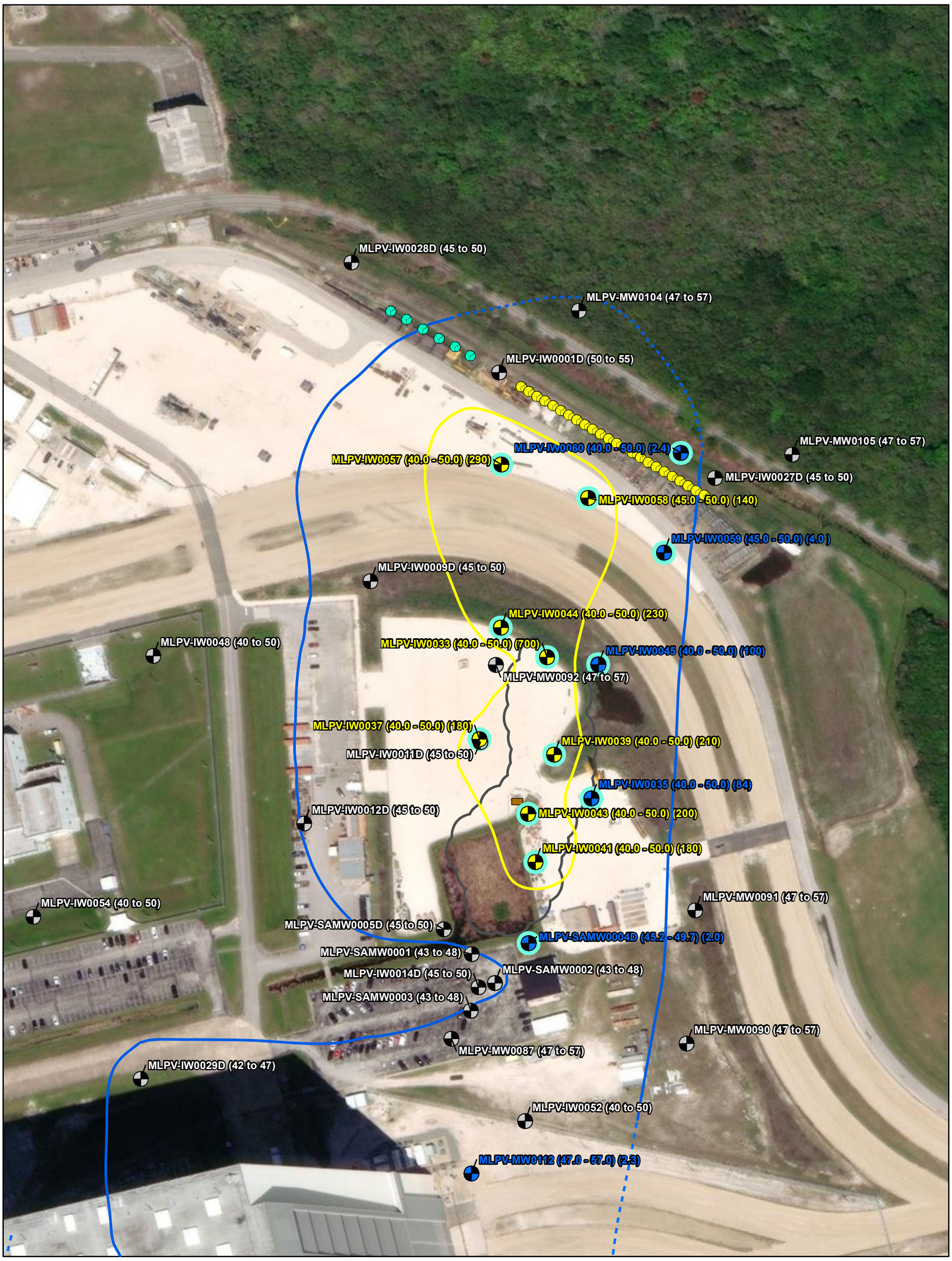
N

0 200 400 Feet

FIGURE 3-8
Vinyl Chloride Plume Map
30 to 45 Feet bls
October and November 2023

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

Document Path: \\NADTC1VFP172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\ADP_20240214\2023_Fall_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. U = Result was below laboratory Method Detection Limit.
4. GCTL = Groundwater Cleanup Target Levels as provided in 62-77, F.A.C.
5. NADC = Natural Attenuation Default Concentrations as provided in 62-777, F.A.C.
6. bls = feet below land surface.
7. MLP/VAB = Mobile Launch Platform Rehabilitation Sites/Vehicle Assembly Building Area.
8. Monitoring well data is from the most recent sampling event.
9. Only monitoring wells with screens within this sampling interval are presented.
10. Results Shown in Micrograms per Liter (ug/L).
11. SWMU = Solid Waste Management Unit.
12. 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.
13. Air sparge treatment wells are screened 40 to 42 feet bls within the pond and 44 to 46 feet bls outside of the pond.
14. Aerial source Florida Department of Transportation, 2018.

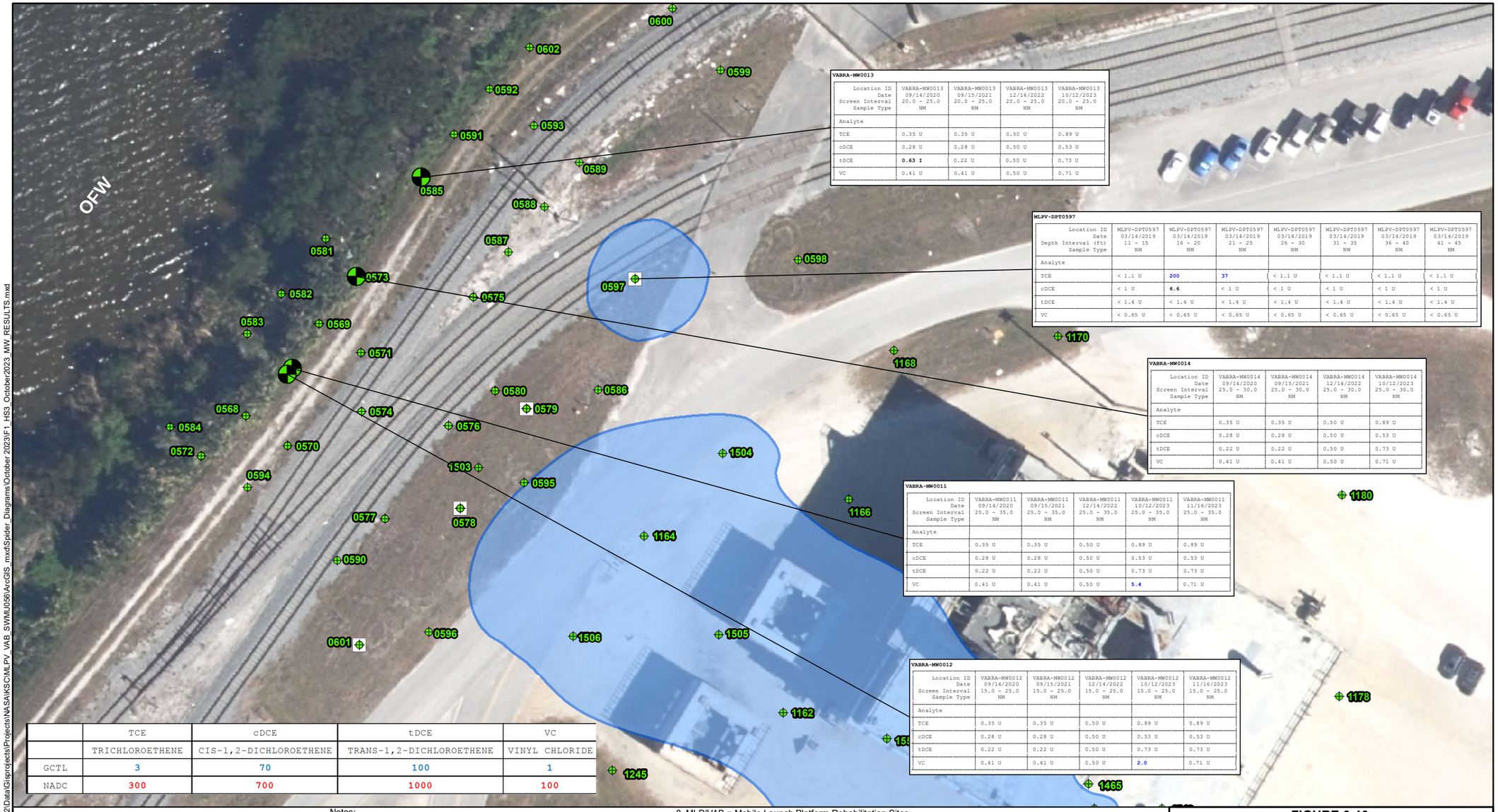
N

0 200 400 Feet

FIGURE 3-9
Vinyl Chloride Plume Map
45 to 50 Feet bls
October and November 2023

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

Document Path: \\NADTC1VFP1172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\ADP_20240214\2023_Fall_Composite_Plume_VC_45to50v2.mxd



VABRA-MW0013

Location ID	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013	VABRA-MW0013
Date	09/14/2020	09/15/2021	12/14/2022	10/12/2023
Screen Interval	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0
Sample Type	NM	NM	NM	NM
Analyte				
TCE	0.35 U	0.35 U	0.50 U	0.89 U
cDCE	0.28 U	0.28 U	0.50 U	0.53 U
tDCE	**0.63 I**	0.22 U	0.50 U	0.73 U
VC	0.41 U	0.41 U	0.50 U	0.71 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
Date	09/14/2020	09/15/2021	12/14/2022	10/12/2023
Screen Interval	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0
Sample Type	NM	NM	NM	NM
Analyte				
TCE	0.35 U	0.35 U	0.50 U	0.89 U
cDCE	0.28 U	0.28 U	0.50 U	0.53 U
tDCE	0.22 U	0.22 U	0.50 U	0.73 U
VC	0.41 U	0.41 U	0.50 U	0.71 U

VABRA-MW0011

Location ID	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011	VABRA-MW0011
Date	09/14/2020	09/15/2021	12/14/2022	10/12/2023	11/16/2023	
Screen Interval	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	
Analyte						
TCE	0.35 U	0.35 U	0.50 U	0.89 U	0.89 U	
cDCE	0.28 U	0.28 U	0.50 U	0.53 U	0.53 U	
tDCE	0.22 U	0.22 U	0.50 U	0.73 U	0.73 U	
VC	0.41 U	0.41 U	0.50 U	**5.4**	0.71 U	

VABRA-MW0012

Location ID	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012	VABRA-MW0012
Date	09/14/2020	09/15/2021	12/14/2022	10/12/2023	11/16/2023
Screen Interval	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
Analyte					
TCE	0.35 U	0.35 U	0.50 U	0.89 U	0.89 U
cDCE	0.28 U	0.28 U	0.50 U	0.53 U	0.53 U
tDCE	0.22 U	0.22 U	0.50 U	0.73 U	0.73 U
VC	0.41 U	0.41 U	0.50 U	**2.0**	0.71 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 (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Less Than GCTLs
- DPT Sampling Locations (2012, 2013, 2016 and 2017)
- DPT Location Sampled in 2019
- Composite GCTL Isocontour (2012-2023 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. MLP/VAB = Mobile Launch Platform Rehabilitation Sites (MLPV) Vehicle Assembly Building (VAB).
9. NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)
10. OFW = Outstanding Florida Water
11. SWMU = Solid Waste Management Unit
12. U = The analyte was not detected
13. µg/L = micrograms per liter
14. VABRA = prefix for Vehicle Assembly Building Reassessment monitoring well

N

0 40 80 Feet

FIGURE 3-10
Groundwater Analytical Results
Composite CVOC
October and November 2023

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

Document Path: \\NADTC1\FP172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\Spider_Diagrams\October 2023\F1_HS3_October2023_MW_RESULTS.mxd

MLPV-IW0053R

Location ID	MLPV-IW0053R
Date	11/16/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
cDCE	**2.4**
tDCE	0.73 U
VC	**18**
TCE	0.89 U

MLPV-MW0113

Location ID	MLPV-MW0113
Date	11/16/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0114

Location ID	MLPV-MW0114
Date	11/16/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0115

Location ID	MLPV-MW0115
Date	11/16/2023
Screen Interval	35.0 - 45.0
Sample Type	NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

Legend

- Monitoring Well (MW) Results Greater Than NADCs
- Monitoring Well (MW) Results Greater Than GCTLs
- Monitoring Well (MW) Results Less Than GCTLs
- 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 (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. Analytical data is only presented for wells sampled in November 2023 under the LCP LTM Plan. The remainder of wells under the LCP LTM plan were sampled in March 2023.
16. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.
17. CVOC plume reflects recent data from March - April 2023 and October - November 2023. Wells screened in the 40 - 50 ft bls interval are not represented in this figure.

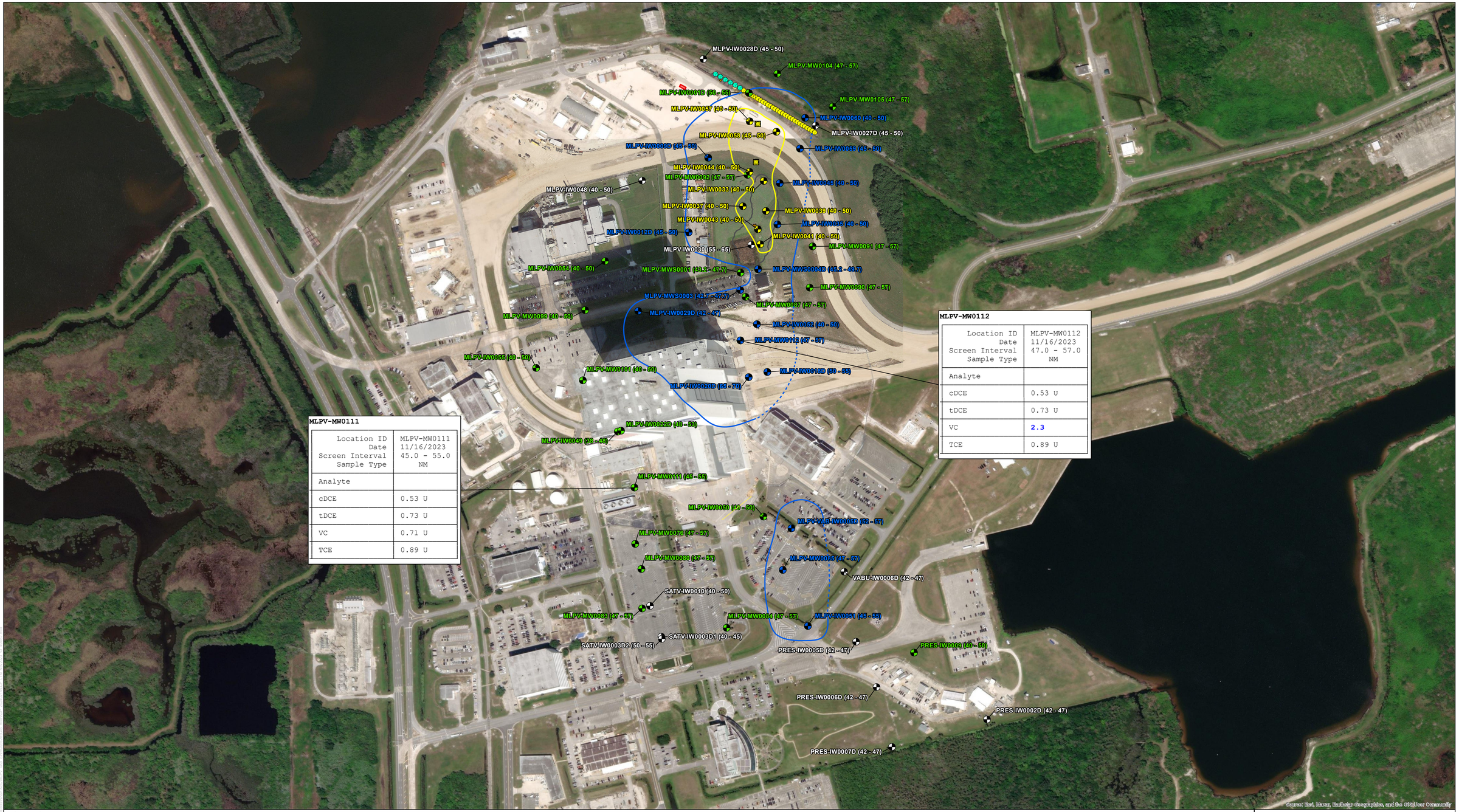
Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

N

0 200 400 800 Feet

Figure 3-11
Groundwater Analytical Results
Composite CVOC - 35 to 45 Foot Screen Depth
October and November 2023

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



MLPV-MW0111

Location ID	MLPV-MW0111
Date	11/16/2023
Screen Interval	45.0 - 55.0
Sample Type	NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	0.71 U
TCE	0.89 U

MLPV-MW0112

Location ID	MLPV-MW0112
Date	11/16/2023
Screen Interval	47.0 - 57.0
Sample Type	NM
Analyte	
cDCE	0.53 U
tDCE	0.73 U
VC	**2.3**
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
- 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. Analytical data is only presented for wells sampled in November 2023 under the LCP LTM Plan. The remainder of wells under the LCP LTM plan were sampled in March 2023.
16. Air sparge treatment wells are screened 40 - 42 ft bls within the pond and 44 to 46 ft bls outside of the pond.
17. CVOC plume reflects recent data from March - April 2023 and October - November 2023.

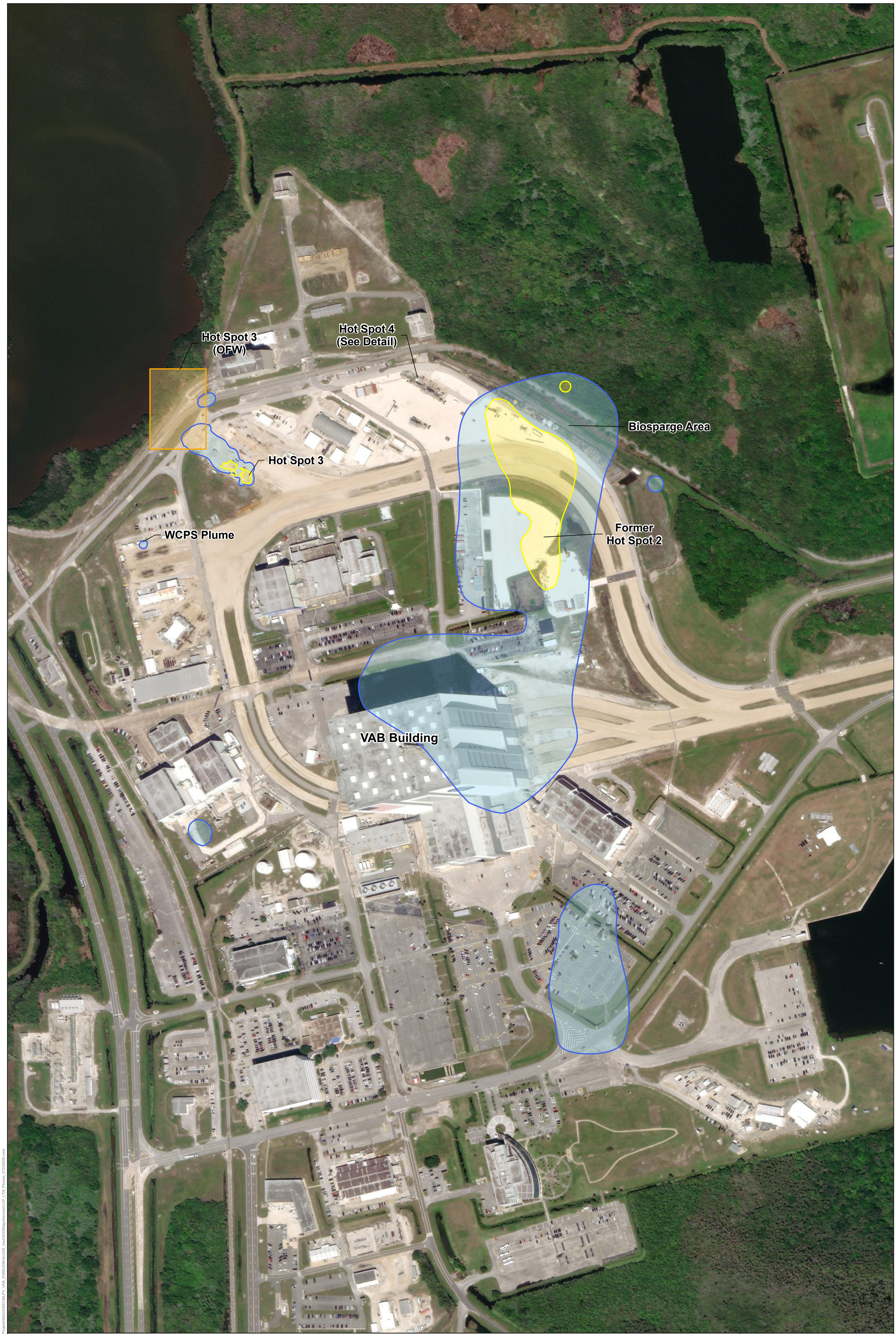
Analyte	Acronym	GCTL	NADC
Cis-1,2-Dichloroethene	cDCE	70	700
Trans-1,2-Dichloroethene	tDCE	100	1,000
Vinyl Chloride	VC	1	100
Trichloroethene	TCE	3	300

N

0 200 400 800 Feet

Figure 3-12
Groundwater Analytical Results
Composite CVOC - Greater Than 45 Feet bls
October and November 2023

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



Legend

- Composite GCTL Isocontour (2012 - 2021 Data)
- Composite NADC Isocontour (2012 - 2021 Data)
- OFW Investigation

Notes:

1. CVOC = Chlorinated volatile organic compound
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

N

0 200 400 800 Feet

Coordinate System: NAD 1983 StatePlane Florida East FIPS 0901

FIGURE 3-13
Composite CVOC Plume

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

Document Path: \\NADTC1VFP172\Data\Gisprojects\Projects\NASA\KSC\MLPV_VAB_SWMU056\ArcGIS_mxd\2023\Maps\General\LCP_LTM_Plumes_01242025.mxd

4 CONCLUSIONS, RECOMMENDATIONS, AND EXIT STRATEGY

Historical and current analytical data from the Former Hot Spot 2 area, Biosparge area, and Hot Spot 3 OFW area have been used to formulate the following conclusions and recommendations.

4.1 HCP INTERIM MEASURES

4.1.1 Former Hot Spot 2

4.1.1.1 Conclusions

The air sparge system has remained off since it was shut down in April 2018. Based on the 2023 interim groundwater monitoring activities:

- VC remains the predominant contaminant, with groundwater data indicating the highest concentrations located north (downgradient) of the former treatment area and upgradient of the biosparge barrier.
- Although the mass of VC in the HCP is attenuating, 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.
- Present data, evaluated with 2021 DPT groundwater data presented in the Former Hot Spot 2 RAE, 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.
- Performance monitoring will continue to provide valuable data under the current sampling plan.

4.1.1.2 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 4-1**) for analysis of cDCE, tDCE, and VC. One year after implementation of the selected technology from the 2022 RAE, evaluate the sampling plan and optimize as needed. Additionally, trends in CVOC concentrations and plume metrics should continue to be evaluated and support estimates of natural attenuation rates (Decision Items 2406-D16 and 2406-D17).

4.1.1.3 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.

4.1.2 Biosparge Barrier for Mitigating the HCP

4.1.2.1 Conclusions

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

- VC remains the predominant contaminant.
- Concentrations in upgradient monitoring 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, as presented in the Former Hot Spot 2 RAE.
- Concentrations in downgradient monitoring wells indicate the recently expanded portion of the biosparge barrier is effectively mitigating HCP migration to the adjacent (downgradient) wetland area.
- The LCP and isolated NADC plumes are present within the wetland area, specifically in the 25 to 35 feet bls and 35 to 45 feet bls intervals. The observed spike in VC concentrations in downgradient monitoring wells correlates with system downtime in 2022 when the LCP migrated east. VC concentrations have reduced since the system was restarted. This is most apparent in monitoring well MLPV-IW0060.
- Monitoring well installation in this area is contingent on access to proposed locations, based on ongoing center operations and surface conditions in the wetland area (Decision Item 2310-D10).

4.1.2.2 Recommendations

Due to CVOC concentration exceedances in groundwater, 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 monthly OM&M activities, including semi-annual sparge well cleanouts, and semi-annual sampling are recommended. The 2024 sampling and analysis plan is provided as **Table 4-1** for monitoring TCE, cDCE, tDCE, and VC (Decision Items 2406-D14 and 2406-D15).

4.1.2.3 Exit Strategy

When operating, the biosparge barrier (original 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.

4.2 HOT SPOT 3

4.2.1 Conclusions

Based on the 2021 DPT groundwater analytical data presented to KSCRT in September 2021, CVOC concentrations exceed both the NADC and GCTL at several depth 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 DEP review at the time of this report submission.

4.2.2 Recommendations

Implementation of the work plan for ISCR is recommended upon approval.

4.2.3 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 CVOC concentrations are reduced to below GCTLs.

4.3 HOT SPOT 3 (OFW)

4.3.1 Conclusions

Based on the annual groundwater analytical data at Hot Spot 3 (OFW), CVOC concentrations less than their respective GCTLs in groundwater collected from the monitoring wells sampled. In response to the anomalous detections in October, the sampling frequency will be evaluated if detections exceed GCTLs in the next annual sampling event.

4.3.2 Recommendations

Continued sampling at Hot Spot 3 (OFW) is recommended annually (**Table 4-1**) for analysis of TCE, cDCE, tDCE, and VC (Decision Item 2406-D18).

4.3.3 Exit Strategy

The source area 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. Upgradient groundwater characteristics will be monitored using monitoring wells installed as part of IM activities in Hot Spot 3.

4.4 LONG-TERM GROUNDWATER MONITORING PROGRAM

4.4.1 Conclusions

A total of six monitoring wells were installed and sampled in November 2023 for biennial LCP LTM, as recommended in the 2022 – April 2023 CMI and IM Annual Report (NASA 2024). Based on analytical results, the following conclusions are provided:

- **35 to 45 feet bls**: Isolated NADC plume southeast of the biosparge barrier and downgradient from the Former Hot Spot 2 has collapsed. It was confirmed that the LCP extends into the wetland area where an isolated plume of VC is also present at concentrations exceeding the NADC. Concentrations have decreased since March 2023, following startup of the expanded biosparge system. Downgradient reduction of VC concentrations indicate expansion of the biosparge system with the installation of the five biosparge wells is effectively treating the CVOC plume.
- **Greater than 45 feet bls**: Data confirms that the extents of the LCP are greatest within this interval, which is consistent with conclusions from the HCP evaluation (**Section 4.1**). The isolated LCP southwest of the VAB has collapsed but the LCP remains east of the VAB in the deeper interval.

4.4.2 Recommendations

Continued biennial sampling is recommended with an amended analyte list to include TCE, cDCE, tDCE, and VC (Decision Item 2406-D19). The modified biennial sampling plan is provided in **Table 4-1**. Previous KSCRT approval concurred that 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).

4.4.3 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.

Table 4-1. Sampling and Analysis Plan for 2024

System Monitored	Location	Screen Interval (feet bls)	Frequency	Month	Analytical Parameters
Biosparge Area	MLPV-IW0006IR	28 to 33	Semi-Annual	March (Spring) & September (Fall) 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 (Spring) 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	March (Spring) & September (Fall) 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	September (Fall) 2024	CVOCs (TCE, cDCE, tDCE, VC)
	VABRA-MW0012	15 to 25			
	VABRA-MW0013	20 to 25			
	VABRA-MW0014	25 to 30			

Table 4-1. Sampling and Analysis Plan for 2024

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 (Summer) 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-IW0002IR	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-IW0053R	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			
	MLPV-MW0113	35 to 45			
	MLPV-MW0114	35 to 45			
	MLPV-MW0115	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 4-1. Sampling and Analysis Plan for 2024

System Monitored	Location	Screen Interval (feet bls)	Frequency	Month	Analytical Parameters
VAB Area/ LCP LTM (continued)	MLPV-IW0050	40 to 50	Biennial	June (Summer) 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			
	MLPV-MW0111	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			
	MLPV-MW0112	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.

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NASA. 2011b. *MLP/VAB Area, SWMU No. 056, Corrective Measures Implementation Report: Summary of Interim Long Term Monitoring, Supplemental Assessment, and Biosparge System Operation and Maintenance (Revision 0).* Prepared by Geosyntec Consultants, Inc., Titusville, Florida. August 2011.

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NASA. 2015d. *Vehicle Assembly Building Re-Assessment Area 2015 Environmental Conditions Assessment Report (Revision 1).* Prepared by Geosyntec Consultants Inc., Clearwater, Florida. June 2015.

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NASA. 2016b. *MLP/VAB Area, SWMU No. 056, CMI and IM Annual Report: Summary of Biosparge and Air Sparge System Operation and Maintenance (Step 4 Engineering Evaluation), Advanced Data Package (Revision 0*). Prepared by Geosyntec Consultants Inc., Titusville, Florida. September 2016.

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NASA. 2018b. *MLP/VAB Area, SWMU No. 056, Hot Spot 3 Bioremediation Annual Interim Measure Report (Revision 0).* Prepared by Geosyntec Consultants Inc., Titusville, Florida. December 2018.

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

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APPENDIX A

KENNEDY SPACE CENTER REMEDIATION TEAM MEETING MINUTES AND ADP FOR JUNE 2024

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Revision 2 Meeting Minutes for June 12 & 13, 2024

Attendees:

1. TJ Touran/FDEP
2. Natasha Darre/NASA
3. Deda Johansen/NASA
4. Anne Chrest/NASA
5. Chris Adkison/NASA
6. Mike Deliz/NASA
7. Tammy Clark/NASA
8. Georgina Salazar/US Army
9. Michelle Moore/NEMCON
10. Mark Jonnet/Tetra Tech
11. Mark Speranza/Tetra Tech
12. Debbie Wilson/Tetra Tech
13. Jen Buel/Tetra Tech
14. Chris Hook/Tetra Tech
15. Andrew Walters/Tetra Tech
16. Sarah Damphousse/Tetra Tech
17. Jennifer Gootee/AECOM
18. Chad Lee/AECOM
19. Matthew Zenker/AECOM
20. Megan Garcia/AECOM
21. Richard Smith/HGL
22. Bruce Moore/HGL
23. Scott Anderson/
24. Brad Sperry/HGL
25. Jason Bublitz/HGL
26. Megan Matteazzi/HGL
27. Theresa Thompson/HGL

June 12, 2024

2406-M01 Michelle Moore/NEMCON

Meeting Minutes and Miscellaneous Items

Objective:

Test consensus on the Kennedy Space Center (KSC) Remediation Team (KSCRT) April 2024 meeting minutes and discuss miscellaneous items.

Discussion:

Team consensus was reached that Revision 1 of the meeting minutes and action/decision items for the April 2024 KSCRT meeting will become final. Team members acknowledged and did not object to the fact that these meeting minutes may become public record as part of a final report at a later date **(2406-D01).**

The Team reached consensus to collect water level measurements at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004 through LC39OGA-MW0012 **(2406-D12).**

The Team reached consensus that the next sampling event is scheduled for November 2024 **(2406-D13).**

Results: Decision Items 2406-D08 through D13

2406-M06 Linnea King Clark/AECOM

Mobile Launch Platform (MLP) Rehabilitation Sites and the Vehicle Assembly Building (VAB) Area, (Solid Waste Management Unit [SWMU] 056), May through December 2023 Corrective Measures Implementation (CMI) and Interim Measures (IM) Update

Objective: The objective of this ADP is to present existing groundwater quality and provide an evaluation of the best path forward within each monitored area.

Discussion:
Field efforts summarized in the ADP include Operation and maintenance activities (O&M) and 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 sampling of the new monitoring wells.

Site-wide water level gauging event was performed in July 2023 from 135 monitoring wells. In 2023 the average depth to water in the wet season (May through October) ranged from top-of-casing to 6 feet below land surface (bls). Water level gauging during the dry season (November through April) is scheduled for 2024. Groundwater generally flows to N, NW, and NE on the north side of the VAB and E and SE to the south of the VAB, which is consistent with previous groundwater flow observations.

Biosparge Area

The Biosparge Area System was installed in 2005 and expanded in 2016 to address areas of VC HCP (concentrations greater than 100

µg/L). The system was further expanded in February 2023 with five biosparge wells installed to bridge gap between existing sparge walls and aid in mitigating plume behavior downgradient of Former Hot Spot 2 (Zone/Leg 1: BSW35 and BSW36 screened 48-50 ft bls, and Zone/Leg 2: BSW32 through BSW34 screened 48-50 ft bls). The system objective is to create a zone of elevated dissolved oxygen (DO) to promote aerobic biooxidation of VC and operate until plume collapse is observed.

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 **(2406-D14).**

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) **(2406-D15).**

Former Hot Spot 2

The AS system operated from 2012 to 2018 at this location. 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.

Remedial Alternatives Evaluation (RAE) completed in 2023 to treat the HCP within the Former Hot Spot 2 area. Recommended In-situ Chemical Reduction (SCR) via Permeable Reactive Barrier (PRB), which is currently pending FDEP approval.

NASA will complete more data collection at this location. AECOM wants to do a CSM here.

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 Spring of 2024 **(2406-D16).**

The Team reached consensus to evaluate the sampling plan one year after implementation of the selected technology from the RAE (presented RAE in October 2023) **(2406-D17).**

Hot Spot 3

Hot Spot 3 is located adjacent and underneath western MLP structure. The HCP contains CVOC (TCE, cDCE, and VC). Bioremediation was previously implemented as an IM in 2017 at this location.

2019 DPT groundwater sampling indicated ~80% to ~100% mass reduction for shallow intervals and ~94% mass reduction for deep intervals. The site was leased to a commercial partner and site access was restricted, therefore delaying further monitoring and remediation. In 2020, the lease was terminated, and site access was reinstated.

In 2021, DPT groundwater sampling was performed to evaluate current site conditions within the previously treated area and need for bioremediation IMWP Addendum for additional injections. A total of 188 samples were collected from 62 locations and analyzed for CVOCs. Forty-three samples were analyzed for geochemistry parameters: sulfate, sulfide, total organic content (TOC), ethane, ethene, and methane.

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; and
- High methane indicates non-optimal use of TOC by methanogens that limit ERD.

Recommendation was made 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:

1. Enhances biotic and abiotic reduction of CVOCs for a long period (5 or more years), and,
2. Maintains optimal conditions by limiting methanogenesis and managing sulfate reduction and sulfide accumulation.

Hot Spot 3 results were 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. The IMWP for this location is currently undergoing Florida Department of Environmental Protection review.

NASA added that with the property lease at this location previously, NASA abandoned the monitoring wells in the area to eliminate potential conduits where the leasee would be using heavy equipment in and around the location.

Hot Spot 3 OFW Area

Annual Performance Monitoring Well Sampling was conducted on October 12, 2023, at MW0011, MW0012, MW0013, and MW0014. CVOC analysis were conducted for TCE, cDCE, tDCE, VC.

All CVOCs were below GCTL except for VC in MW0011 and MW0012. This is the first time VC exceeded the GCTL in these monitoring wells since August 2017. Both monitoring wells were resampled November 16, 2023, and results indicated VC was below laboratory detection limits. Additional monitoring wells will be installed as part of the HS3 IM to both evaluate the LCP and monitor substrate performance administered to upgradient HS3.

Based on evaluation of analytical results from 2017 to present, 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 **(2406-D18).**

LCP monitoring
In November 2023, two monitoring wells were installed within the VAB perimeter (originally proposed in 2022) to confirm historical GCTL plume footprint indicated during 2015 DPT sampling.

- MLPV-MW0112 (47 to 57 ft bls): VC exceeds GCTL (2.5 µg/L),
- MLPV-MW0111 (45 to 55 ft bls): CVOCs were nondetect.

Sampling results from November 16, 2023, indicate collapse of the LCP southwest of the VAB and confirm GCTL presence in the deep interval east of the VAB.

The Team reached consensus to continue LTM on a biennial basis for select CVOCs with the addition of TCE (TCE, cDCE, tDCE, and VC) **(2406-D19).**

FDEP inquired about the history of SWMU 056, as it is complex. Given the plume sizes you have, the groundwater contamination isn't from one site, is it? You have this fragmentation of multiple plumes. At one point, was this a larger plume?

NASA confirmed that this used to be a 60-acre plume. What remains are the plumes that remain in the . Do you consider this one or more source zones? NASA knows it is a multiple source zone. NE area associated with one type of release. Other sites we closed out and deferred to SWM 056 to manage under one plume. The reason asking is because of 108 and 41. If multiple sources this creates a challenge to close out and place NFA on a site.

SWMU 108 will be removed from under SWMU 056 and a SRCO will be requested for SWMU 108. The West Crawler Park Site (SWMU 044) falls within the greater SWMU 056 footprint. We don't have concerns with keeping it open. It will just be associated with SWMU 056.

NASA conducted site recharacterization/reassessment about a decade ago of SWMU 056. Slide 8 shows the recharacterization and plume extent at that time.

NASA has two documents in the FDEP queue for review for this site.

Anne will send Natasha a transmittal letter that included the figure showing the three SWMU boundaries (SWMU 044, SWMU 108, SWMU 056).

Results: Decision Items 2406-D14 through D19

2406-M07 Alex Murphy/Tetra Tech

<u>Components Refurbishment and Chemical Analysis Facility (SWMU 41) PFAS Site Assessment</u>

Objective: The purpose of this ADP is to present the PFAS site assessment sampling program, analytical results, and path forward. The ADP documents groundwater PFAS sampling events from June

AECOM
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June 12, 2024

Ms. Natasha Darre
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), May through December 2023 Corrective Measures Implementation (CMI) and Interim Measures (IM) Update, Advanced Data Package (ADP) for the June 2024 Kennedy Space Center Remediation Team (KSCRT) Meeting**

Reference: **Indefinite Delivery Indefinite Quantity (IDIQ) Contract 80KSC019D0010**

Dear Ms. Darre:

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 May through December of 2023.

Field efforts summarized in the ADP include Operation and maintenance activities (O&M) and 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 sampling of the new monitoring wells. The objective of this ADP is to present existing groundwater quality and provide an evaluation of the best path forward within each monitored area.

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).
- Former Hot Spot 2
    - Continue interim groundwater monitoring for select CVOCs (cDCE, tDCE, and VC). The next semi-annual event will be scheduled for Spring of 2024.
    - Evaluate the sampling plan one year after implementation of the selected technology from the RAE (presented RAE in October 2023).
- Hot Spot 3
    - No consensus. Interim Measure Work Plan is currently undergoing Florida Department of Environmental Protection review.
- Hot Spot 3 OFW Area
    - Based on evaluation of analytical results from 2017 to present, 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
    - Continue LTM on a biennial basis for select CVOCs with the addition of TCE (TCE, cDCE, tDCE, and VC)

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

May through December 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

June 2024

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
   - Operation, Maintenance and Monitoring (OM&M)
   - Performance Monitoring (PM) 2023

3. HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area
   - Interim Groundwater Monitoring (IGM) 2023

4. Hot Spot 3 Overview

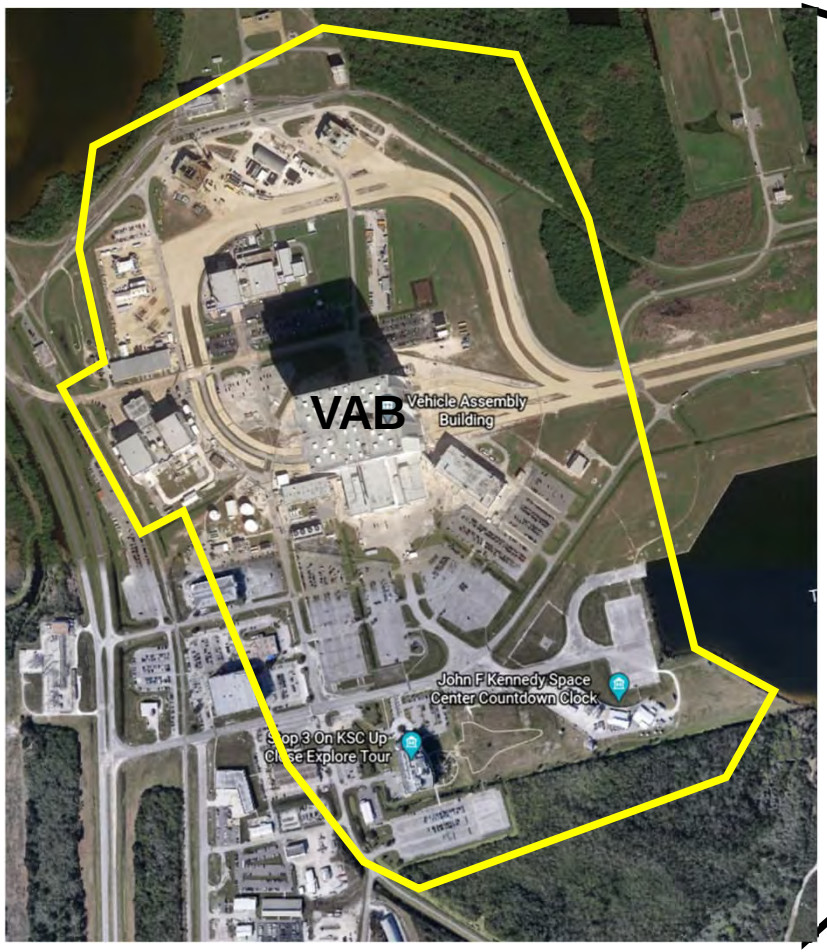
5. Hot Spot 3 Outstanding Florida Waters (OFW) Area
   - Historical Site Assessment
   - Performance Monitoring 2023

6. Low Concentration Plume (LCP) Long Term Monitoring (LTM)
   - Previous Activities
   - 2023 Monitoring Well Installation and Analytical Results

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

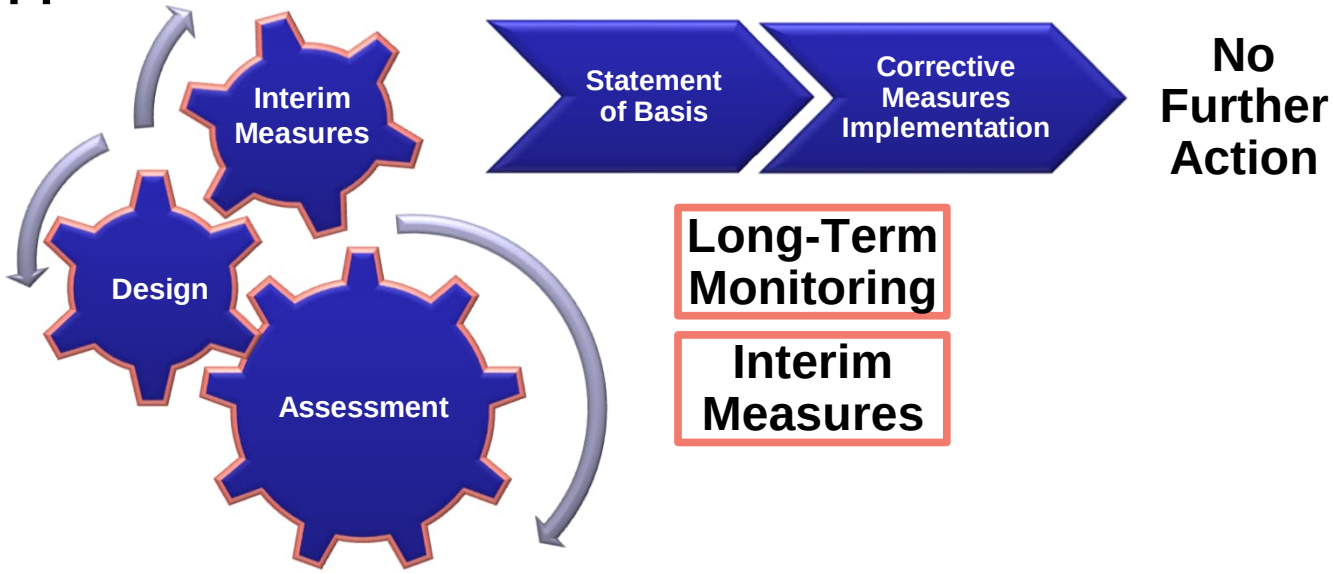
Where are we in the RCRA process?

- 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

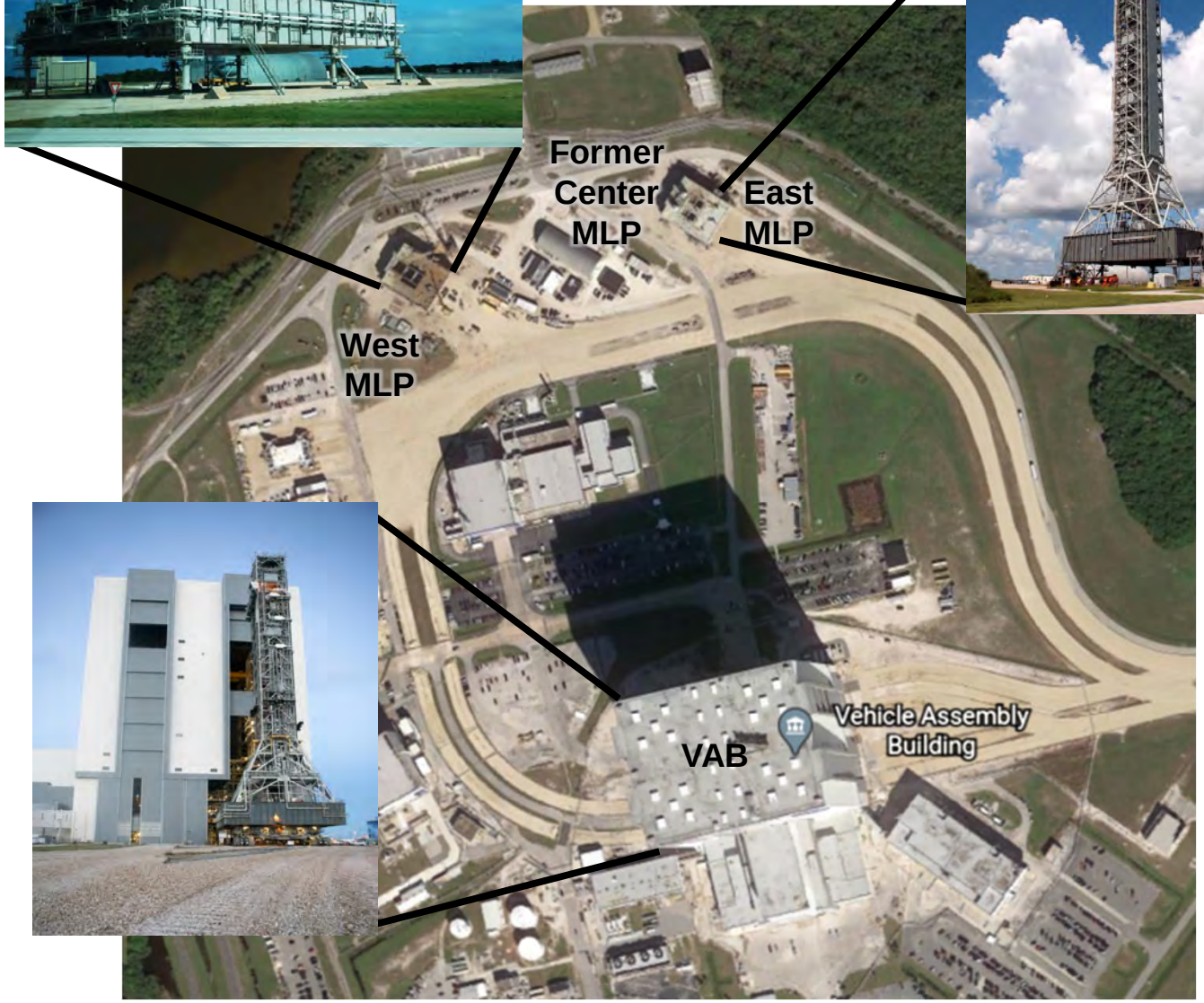
MLP/VAB, SWMU 056 Overview

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

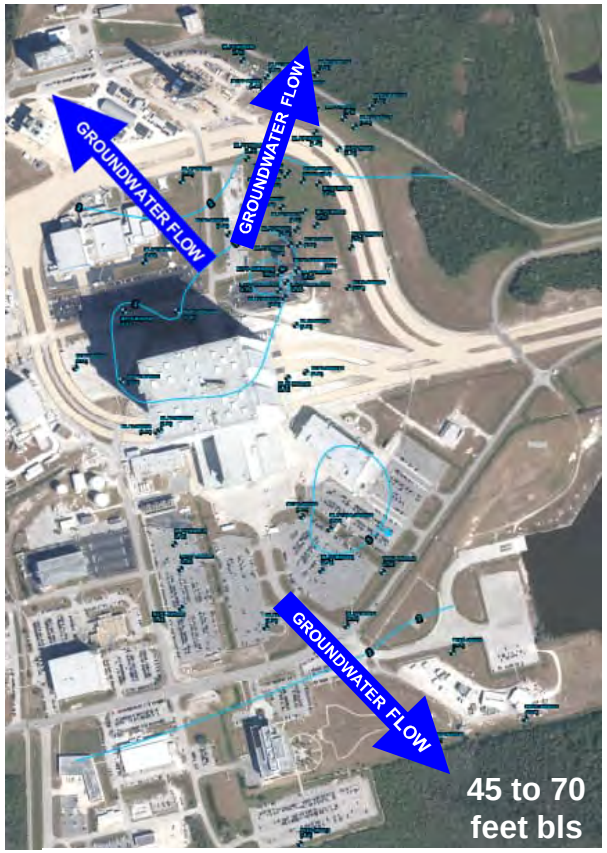
- Site-wide water level gauging event was performed in July 2023 from 135 monitoring wells.
- 2023 Average depth to water in the wet season (May through October) ranged from top-of-casing to 6 feet below land surface (bls)
- Water level gauging during the dry season (November through April) is scheduled for 2024
- Groundwater generally flows to N, NW, and NE on the north side of the VAB and E and SE to the south of the VAB, which is consistent with previous groundwater flow observations.



SHALLOW – 2 to 20 feet bls



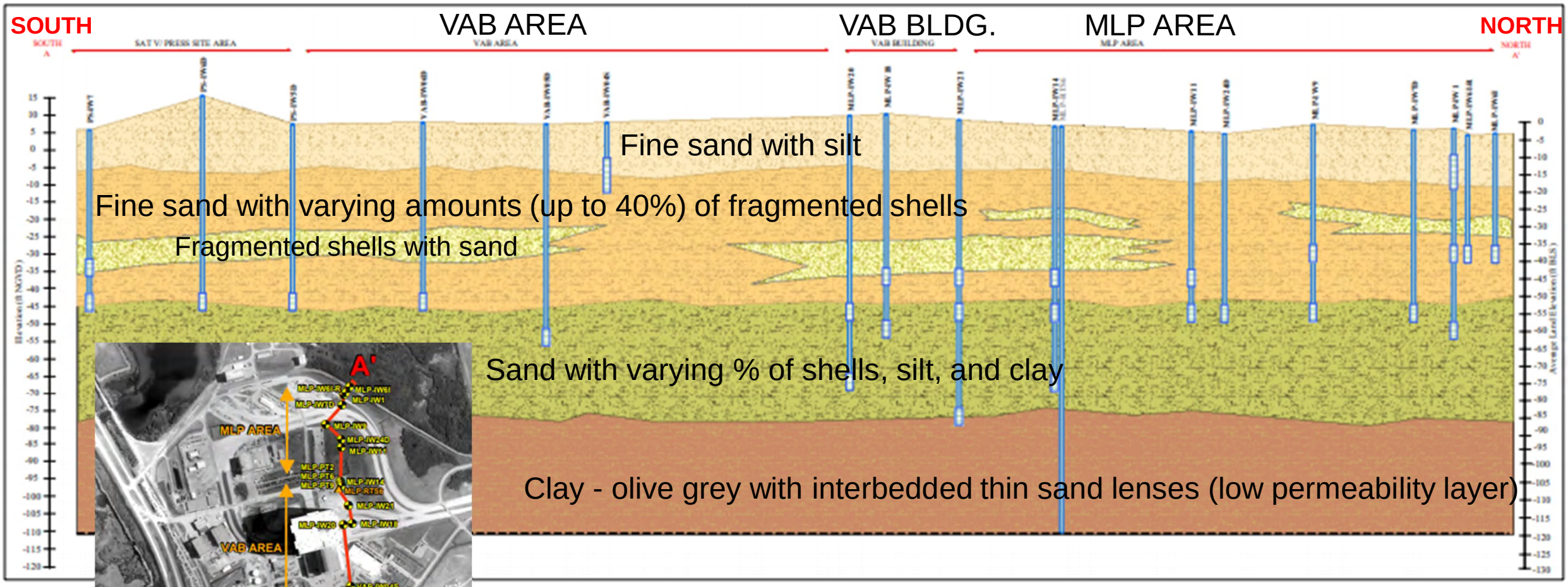
INTERMEDIATE – 20 to 45 feet bls

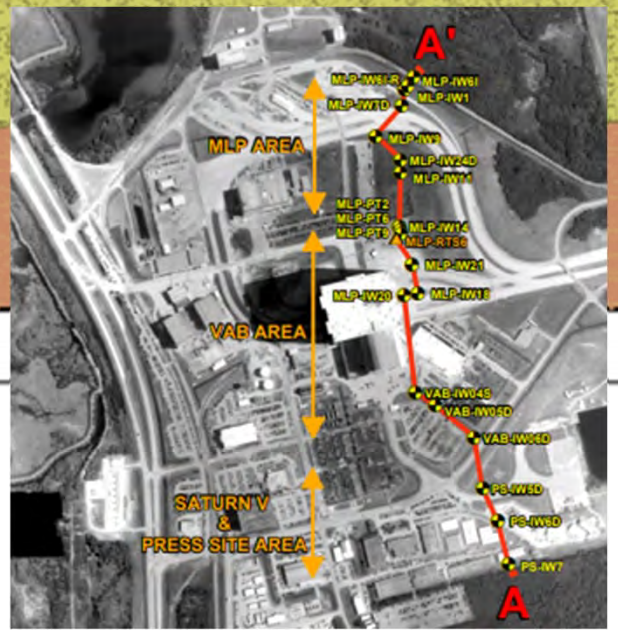


DEEP – 45 to 70 feet bls

MLP/VAB, SWMU 056 Overview

Site-wide Lithology



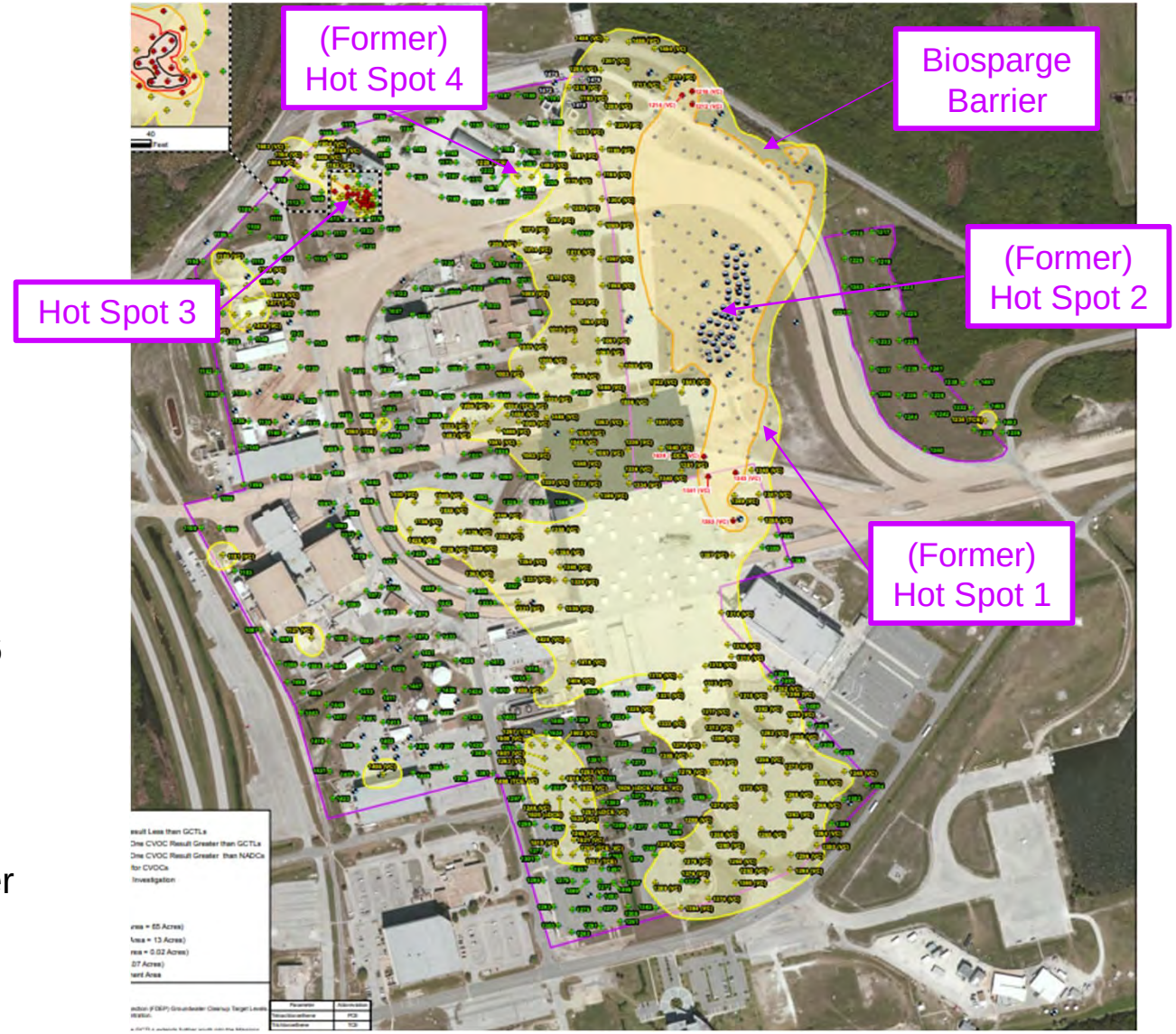


Lithology: sandy silts with shell fragments to 46 feet below land surface (bls), followed by low permeability layer from 50 to 85 feet bls

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 polychlorinated biphenyl (PCB) and zinc impacted soil 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)

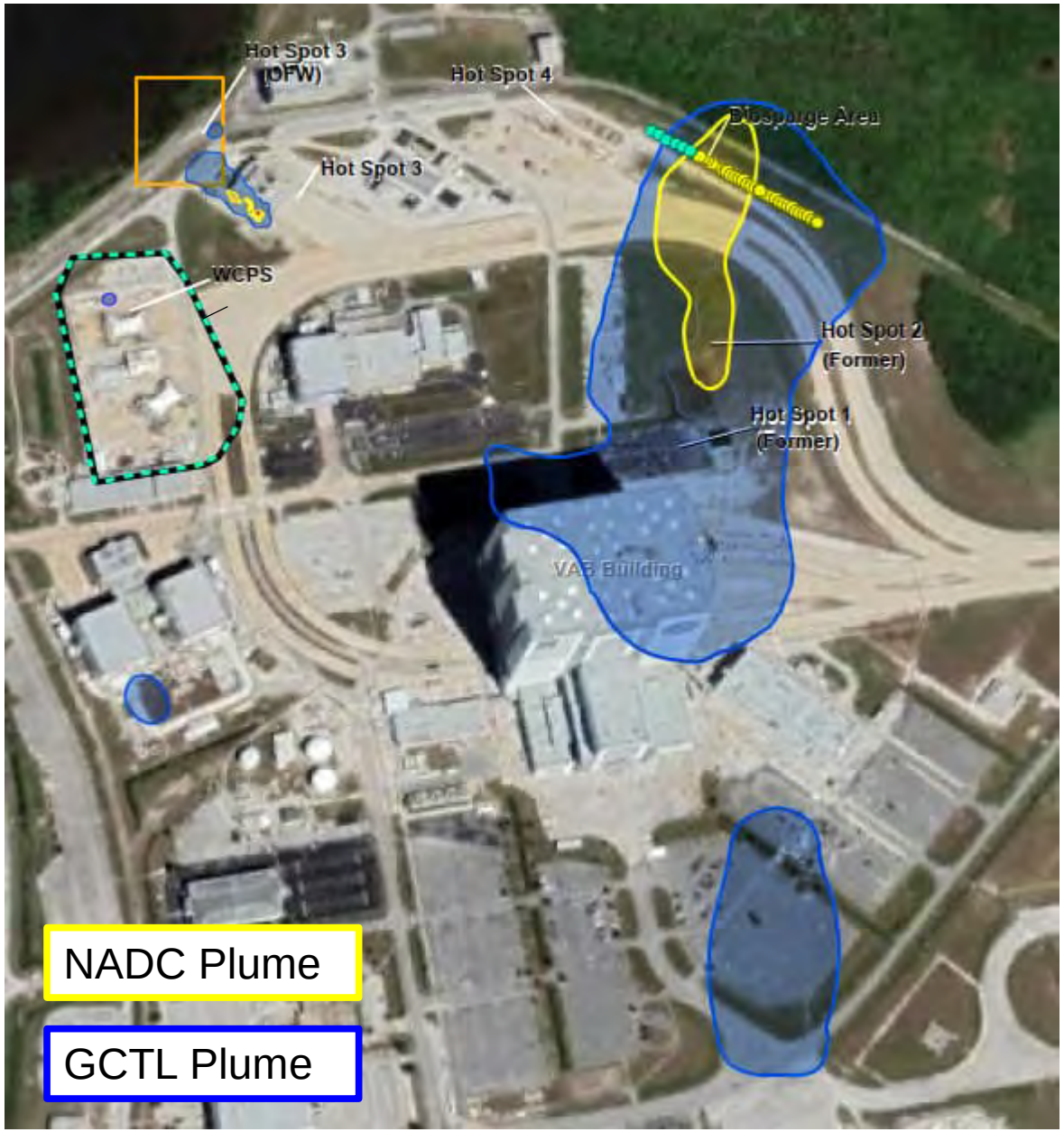


Isopleths based on 2012 & 2013 groundwater data

MLP/VAB, SWMU 056 Overview

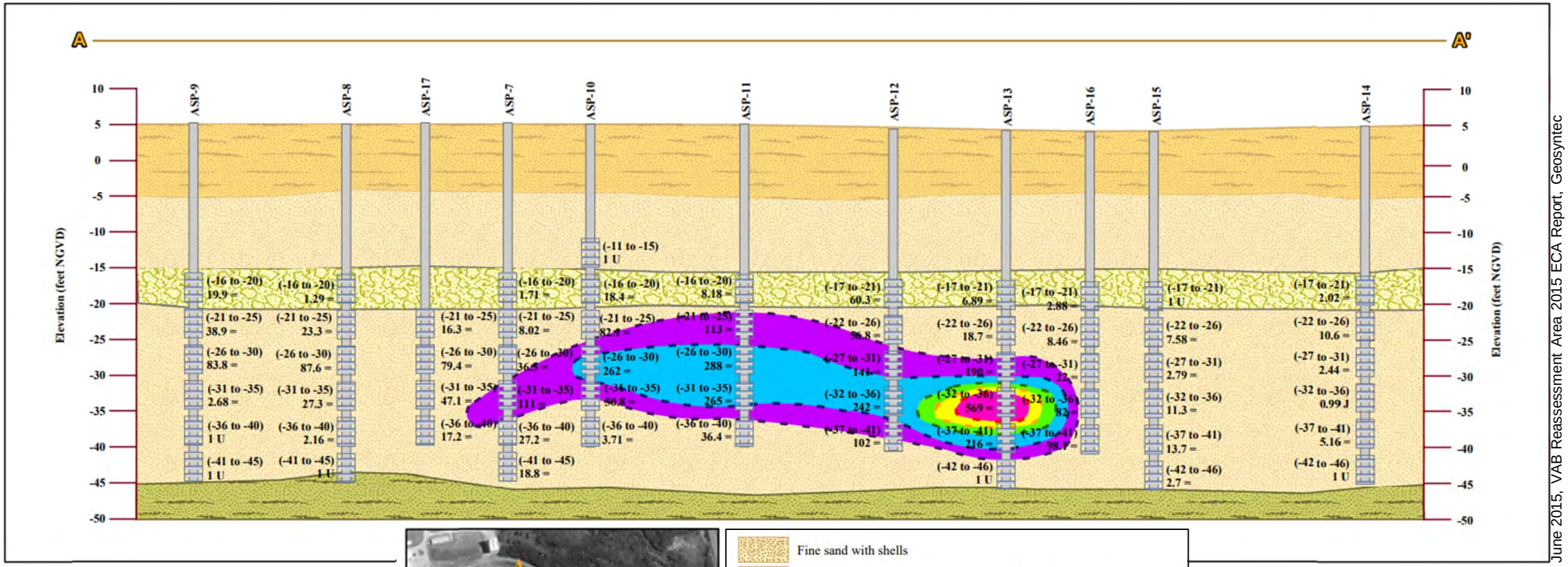
Current Site Conditions

- **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:**
  - ~32 acres groundwater plume (previously 40 acres) with COC concentrations greater than Groundwater Cleanup Target Levels (GCTLs); also referred to as the low concentration plume (LCP)
  - ~3.9 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)
- **Groundwater Land Use Control:** In place to prohibit use of groundwater. Remains in effect until land use changes or concerns are mitigated, or evidence that contaminants are no longer a concern.



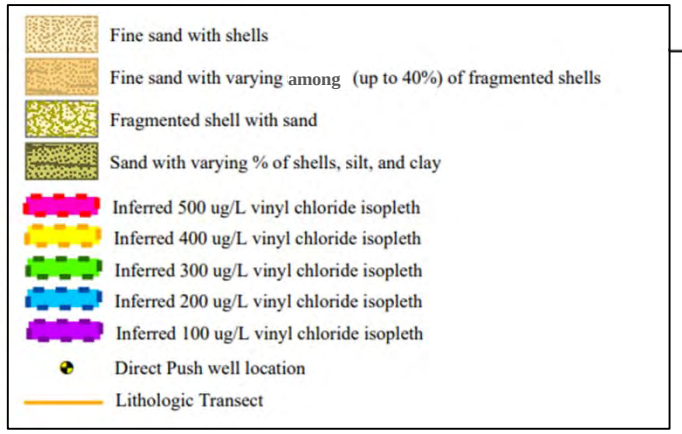
MLP/VAB, SWMU 056 Overview

Biosparge Barrier Lithology



June 2015, VAB Reassessment Area 2015 ECA Report, Geosyntec

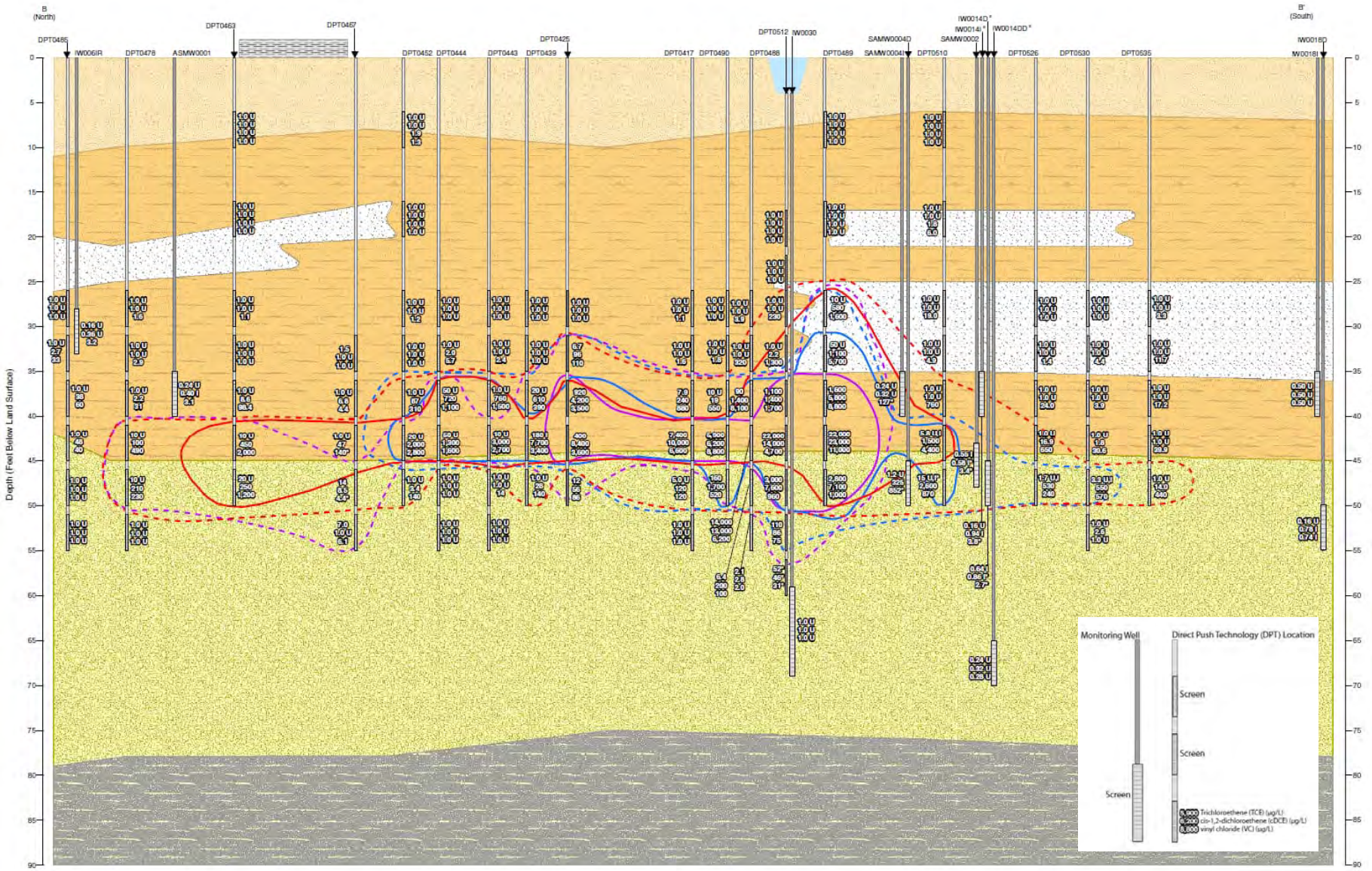




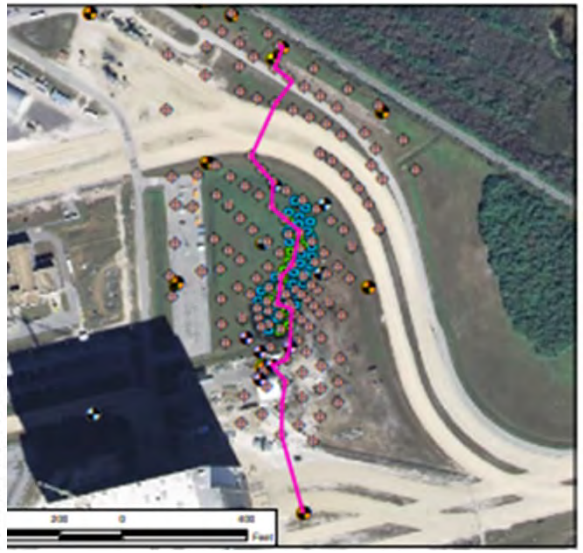
- Delineation Results from VAB Reassessment (2012)
- Vinyl chloride was not detected below the 51 to 55 ft bls direct push drilling sampling interval

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

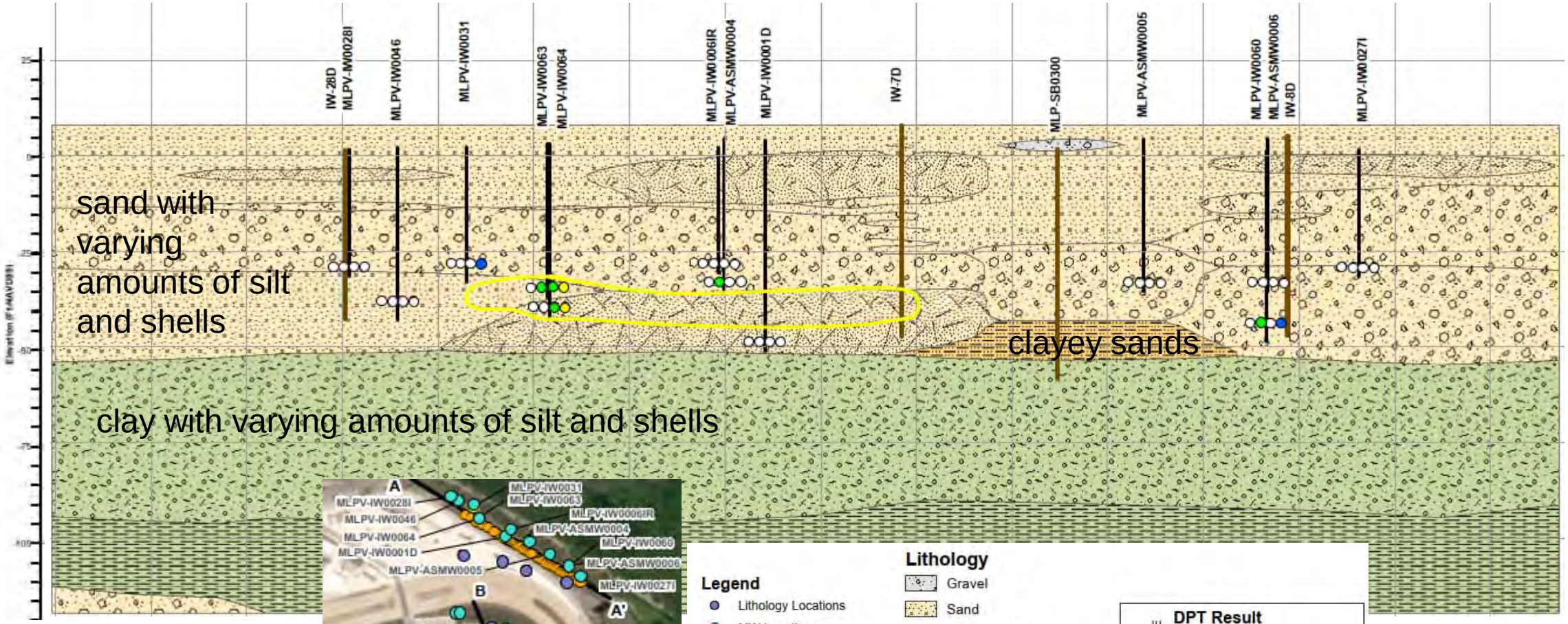
- Fine SAND with silt
- Fragmented SHELLS with sand
- Fine SAND with shell fragments
- SAND with varying % shells, silt with clay
- CLAY with interbedded thin sand lenses
- Retention Pond (approximate location)
- Crawlerway (approximate location)
- 3 µg/L TCE Isopleth
- 300 µg/L TCE Isopleth
- 70 µg/L 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

Former Hot Spot 2 Area Lithology 2022

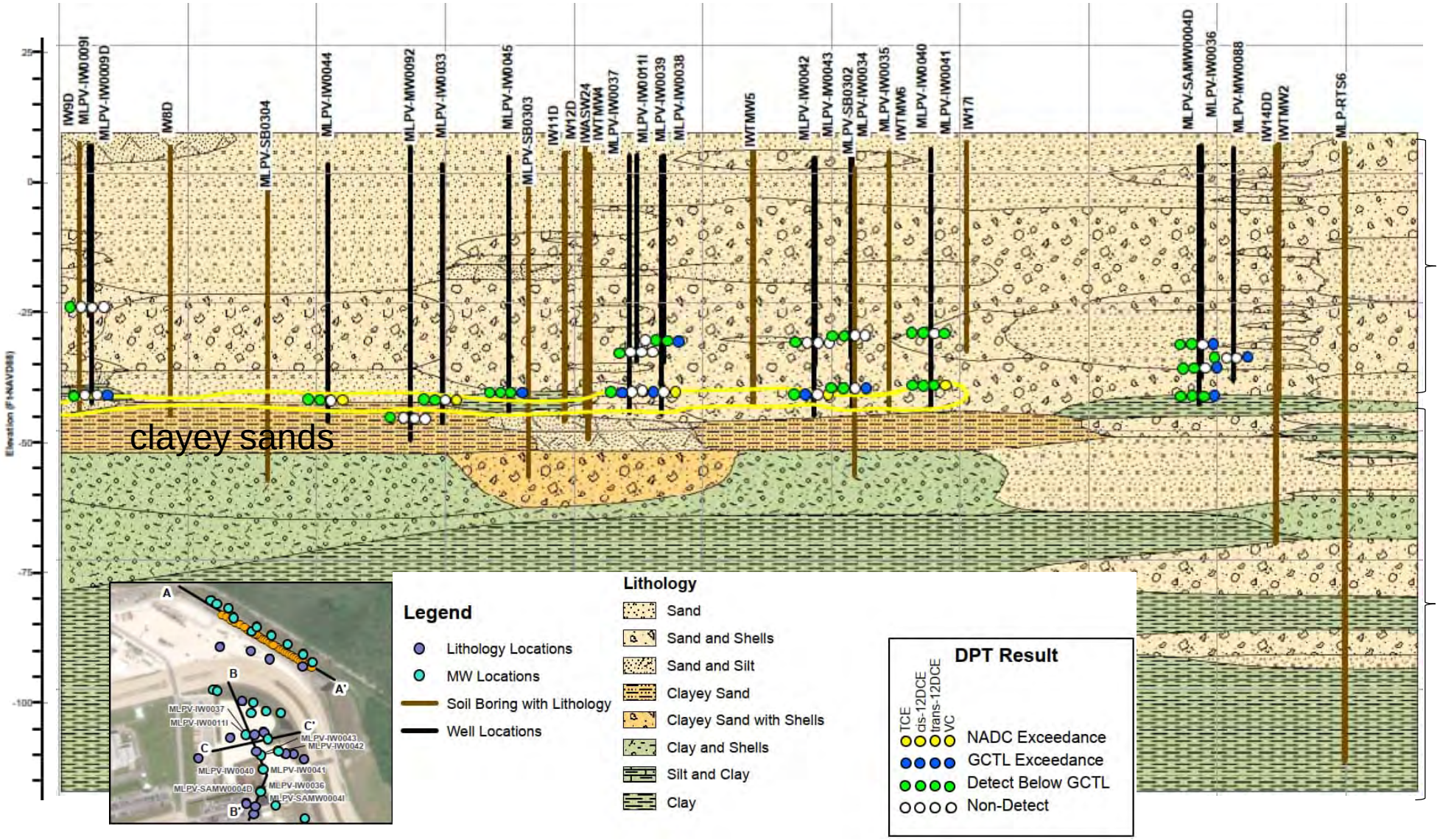
Cross section
A – A’



MLP/VAB, SWMU 056 Overview

Former Hot Spot 2 Area Lithology 2022

Cross section
B – B’



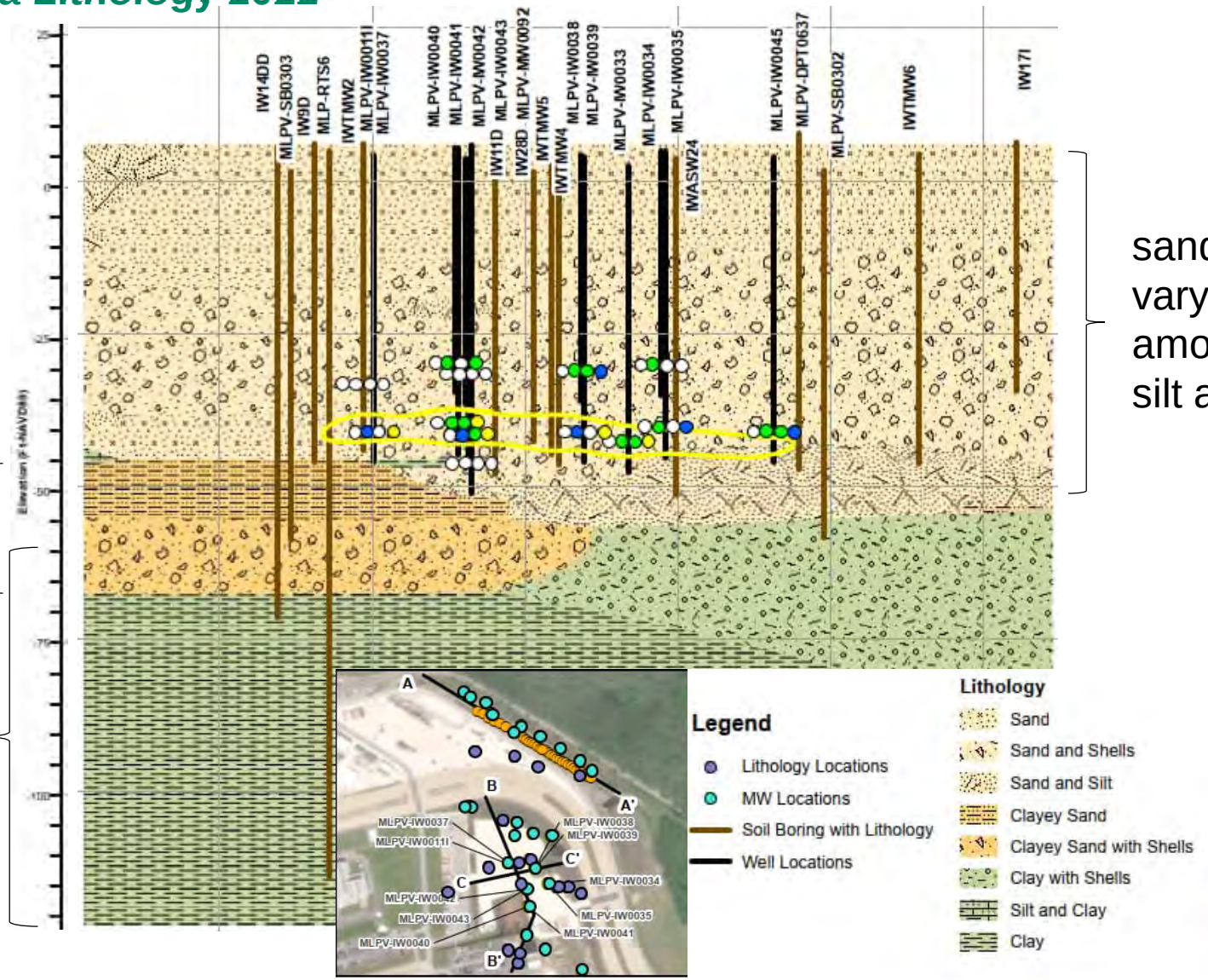
sand with varying amounts of shells

Clay with varying amounts of silt and shells and intermittent lenses of sand and shells

MLP/VAB, SWMU 056 Overview

Former Hot Spot 2 Area Lithology 2022

Cross section
C – C’



sand with varying amounts of silt and shells

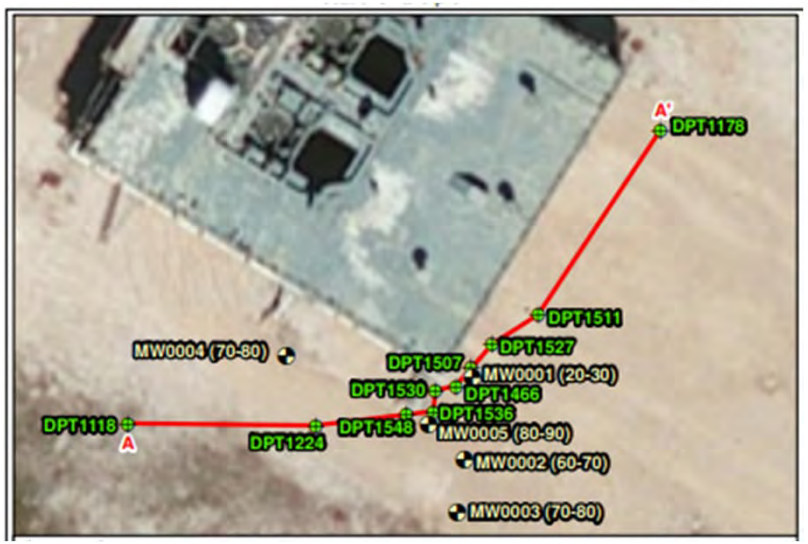
clayey sands

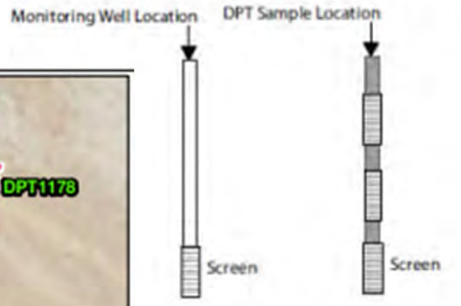
Clay with varying amounts of silt and shells

MLP/VAB, SWMU 056 Overview

Hot Spot 3 Area Lithology – SW Corner of West MLP

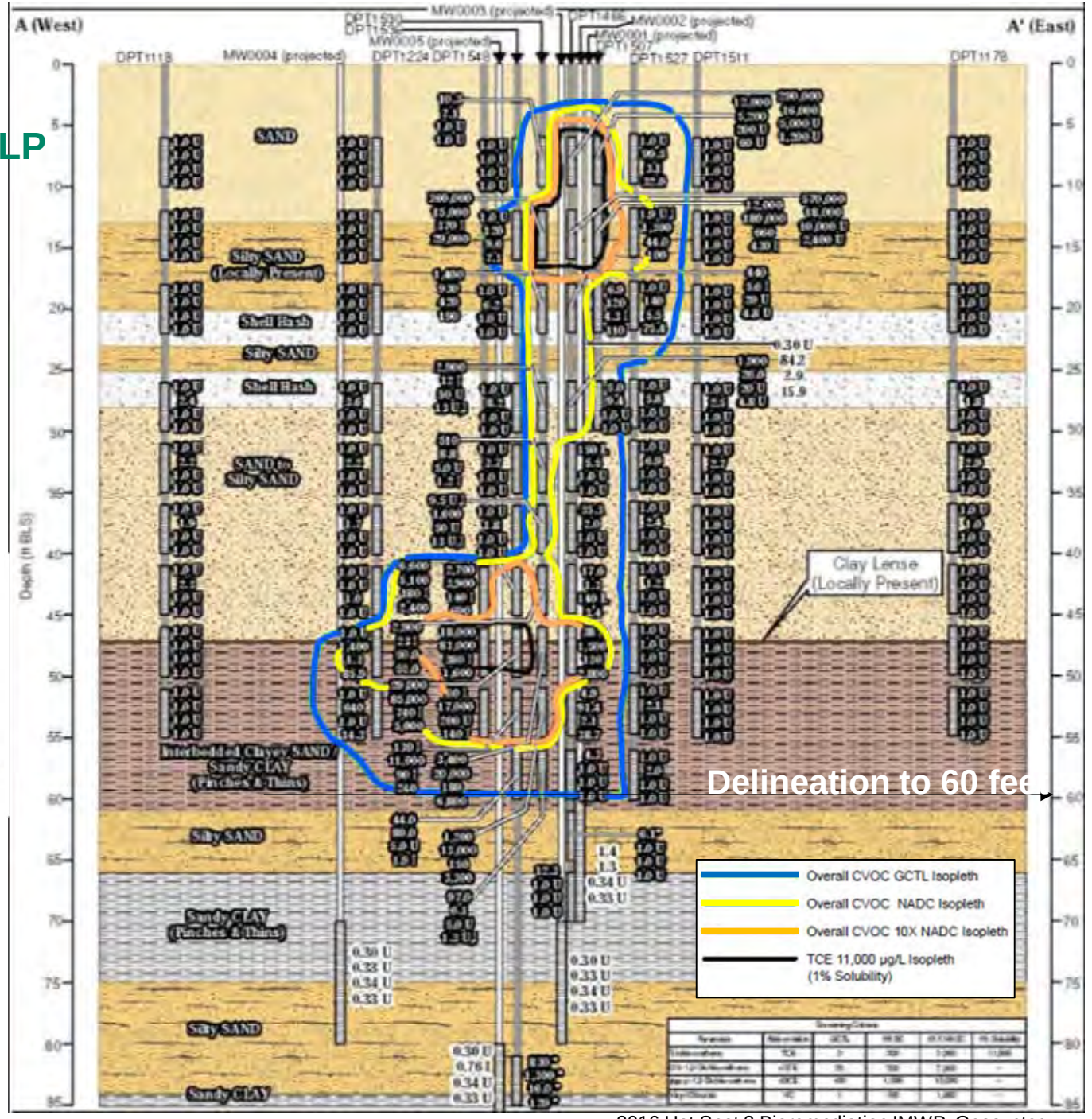
- Overall CVOC delineation following RFI and VAB Reassessment (2012) and Site Characterization (2015)
  - Delineated TCE, cDCE, tDCE, VC both horizontally and vertically
  - GCTLs, NADC, 10xNADC, including TCE Source Zone (SZ) area (1% solubility for TCE [11,000 µg/L])





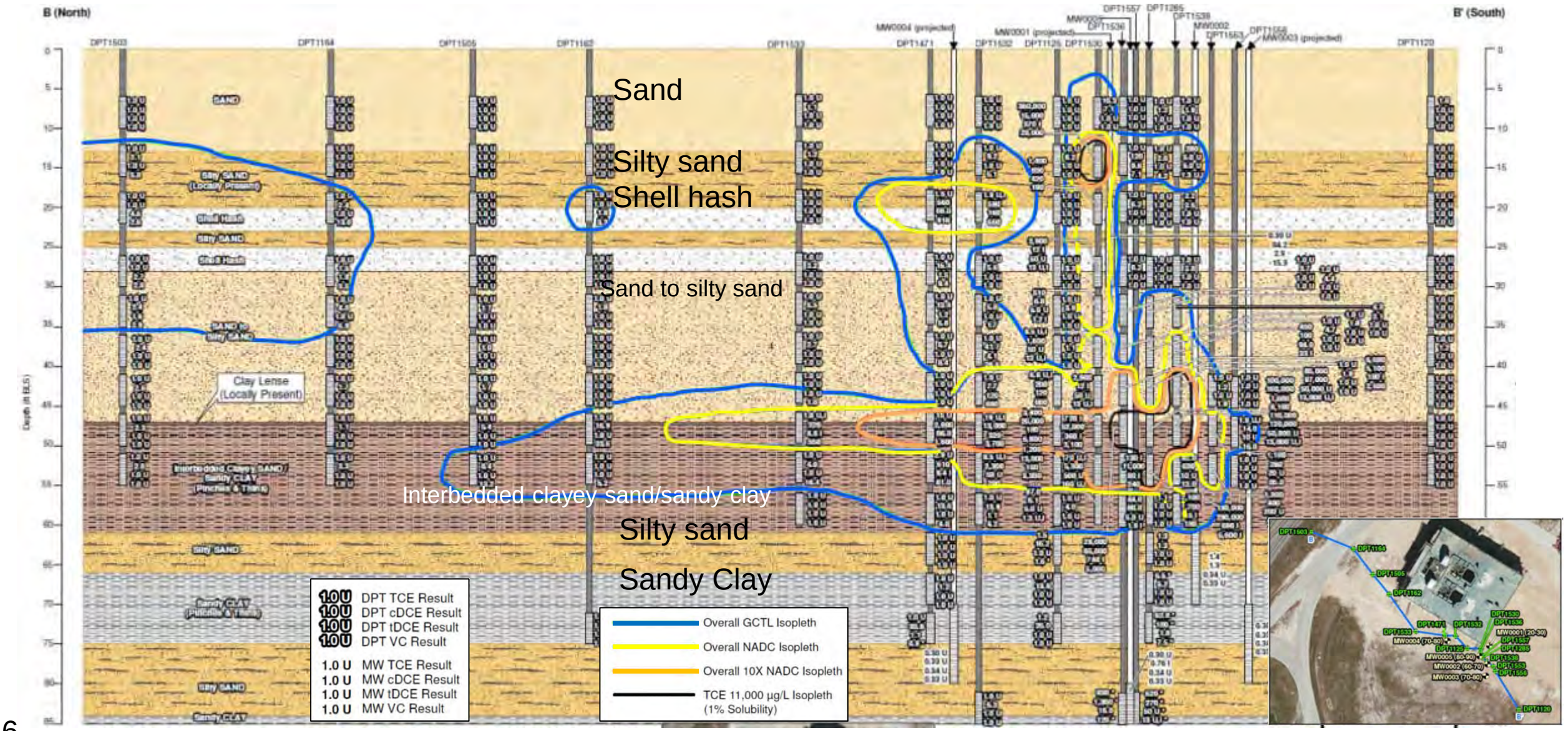
1.0 U DPT TCE Result
1.0 U DPT cDCE Result
1.0 U DPT tDCE Result
1.0 U DPT VC Result

1.0 U MW TCE Result
1.0 U MW cDCE Result
1.0 U MW tDCE Result
1.0 U MW VC Result



MLP/VAB, SWMU 056 Overview

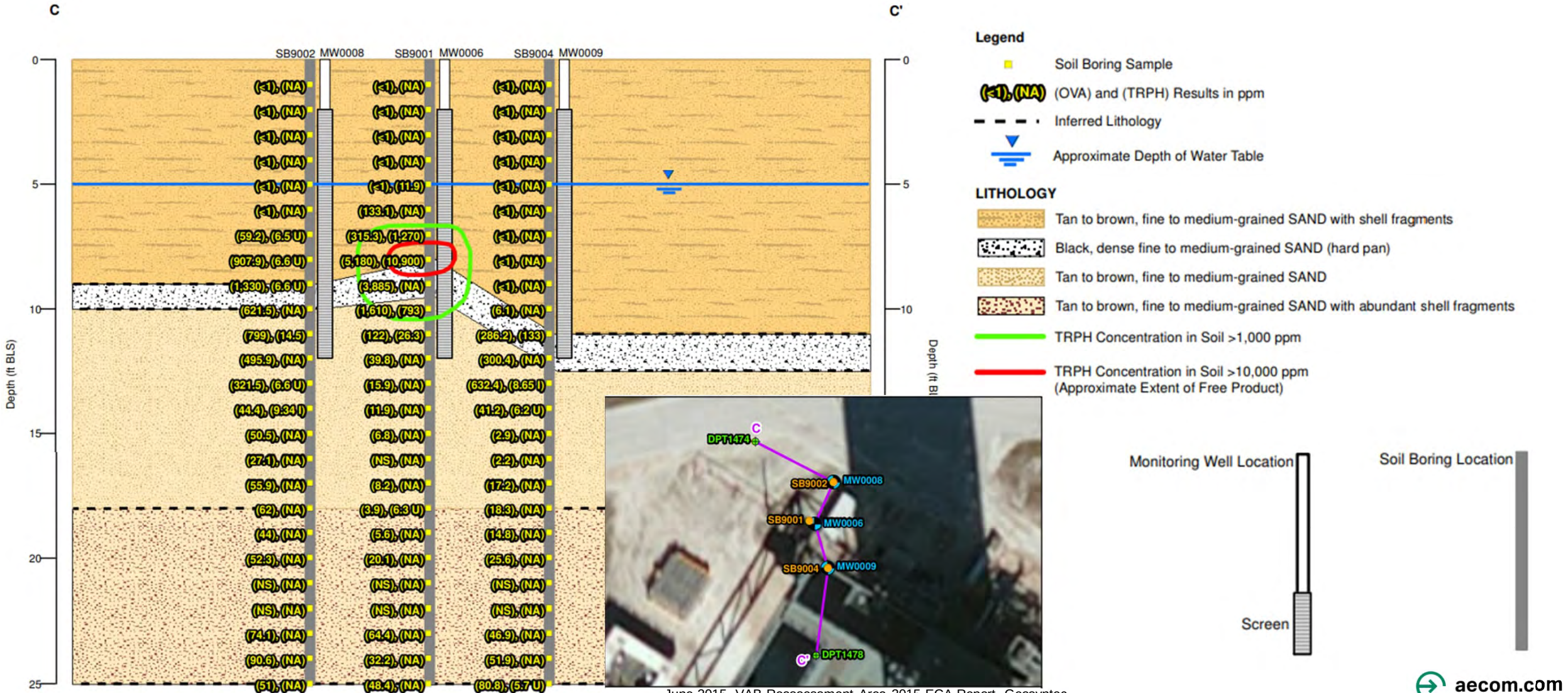
Hot Spot 3 Area Lithology – Across Site



MLP/VAB, SWMU 056 Overview

Hot Spot 4 Lithology

- Delineation Results from VAB Reassessment (2012) – Soil Boring Screening Results

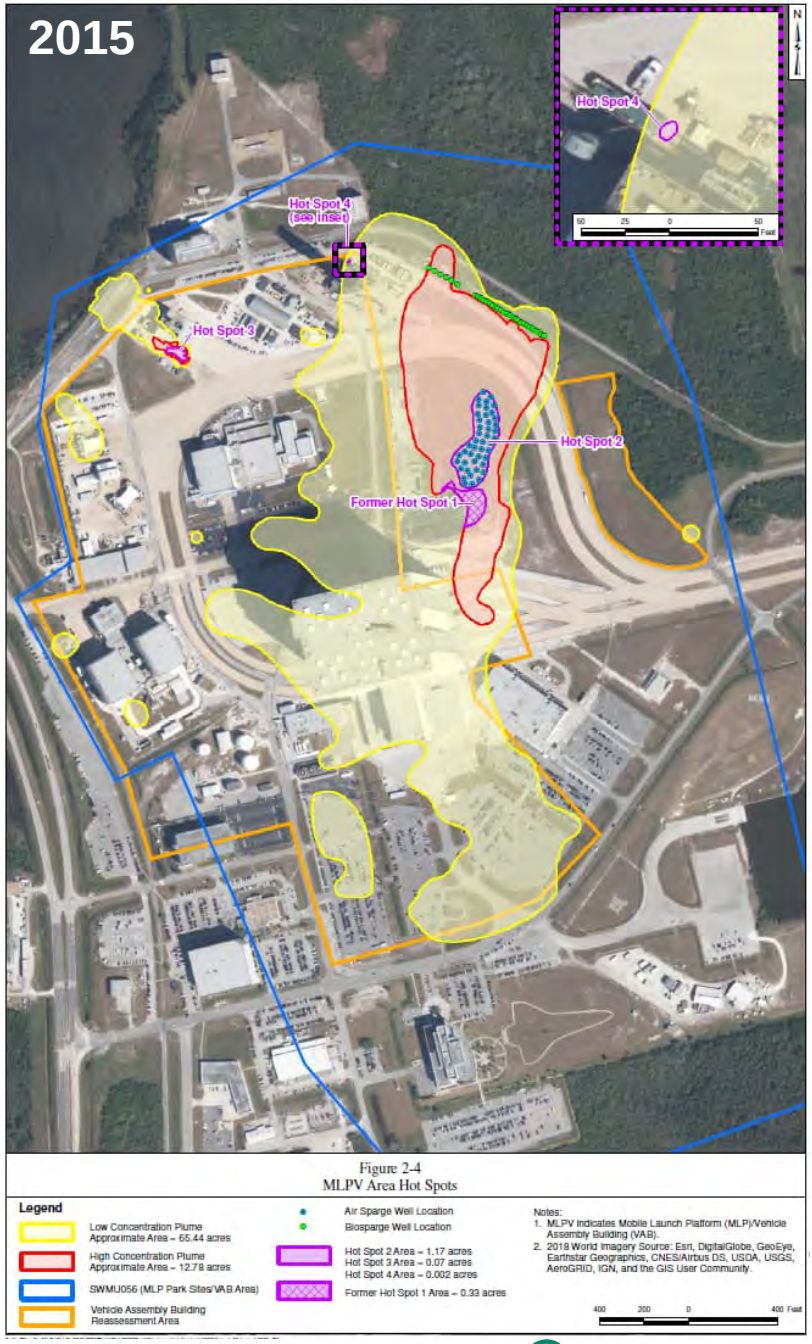


June 2015, VAB Reassessment Area 2015 ECA Report, Geosyntec

MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

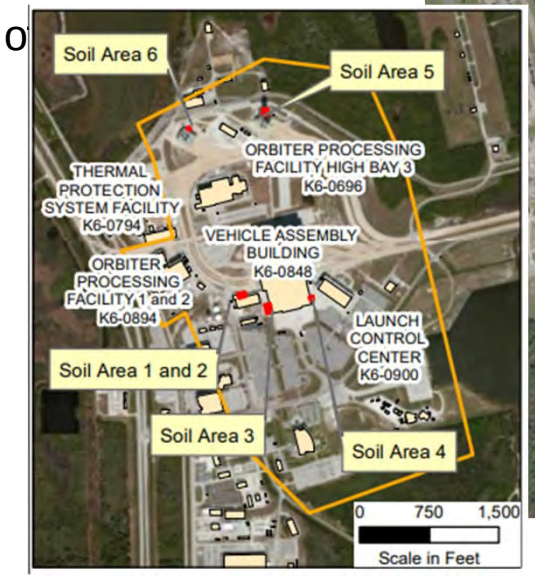
- **2005:** Long-term groundwater monitoring (LTM) of the low concentration dissolved plume was initiated under the VAB LTM Program and data was provided under separate cover than MLP/VAB reports. Sampling and reporting were later combined with MLP/VAB site activities in 2020. The most recent results 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

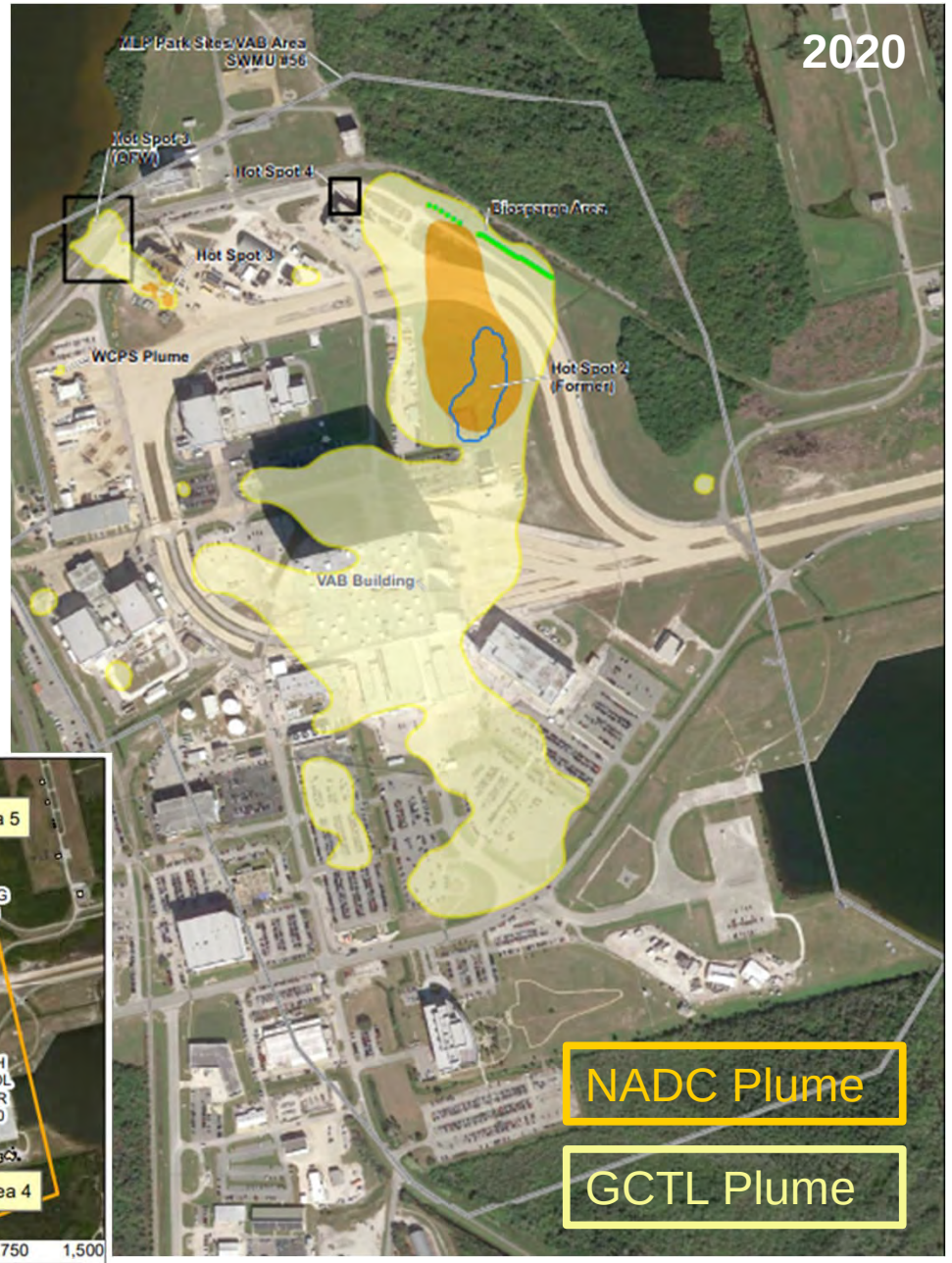


MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

- **2015 – 2020:** A passive light non-aqueous phase liquid (LNAPL) skimmer installed at Hot Spot 4 to recover a weathered mixture of fuel oil and lubricants.
  - LNAPL detected in MW006 during VAB reassessment in 2014
  - Polynuclear aromatic hydrocarbon and total recoverable petroleum hydrocarbon 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 o greater than their respective FDEP 10XNADC
  - Performance monitoring suspended in 2019 in support of mission operations
- **2017 - 2018:** Excavated soils from six areas identified during reassessment of the VAB area.

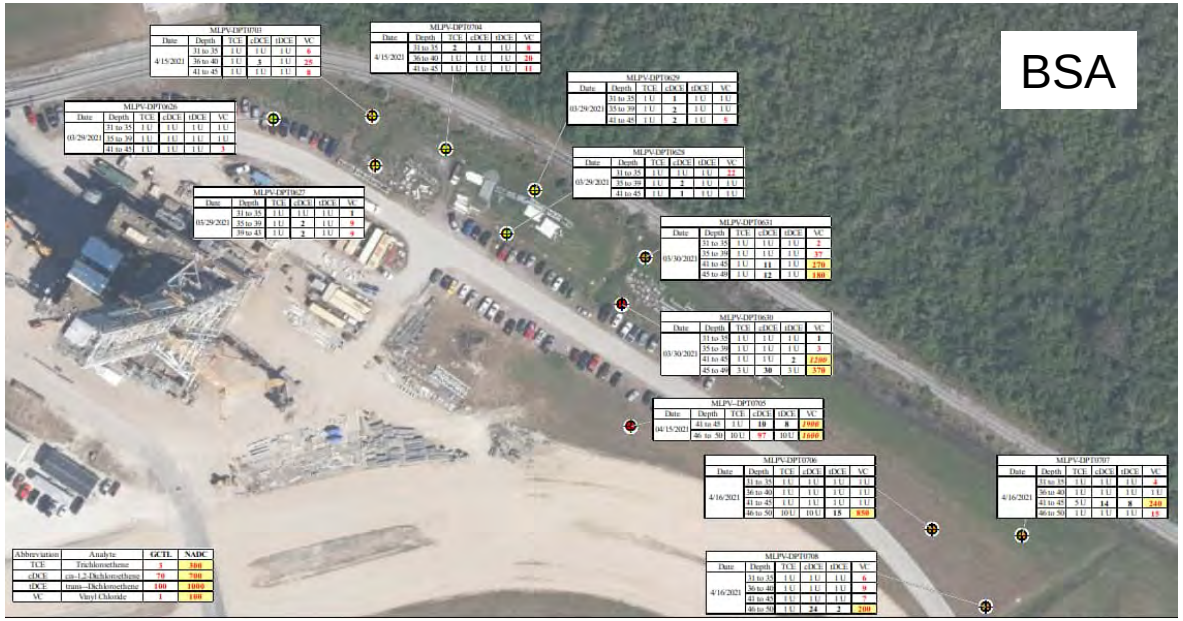


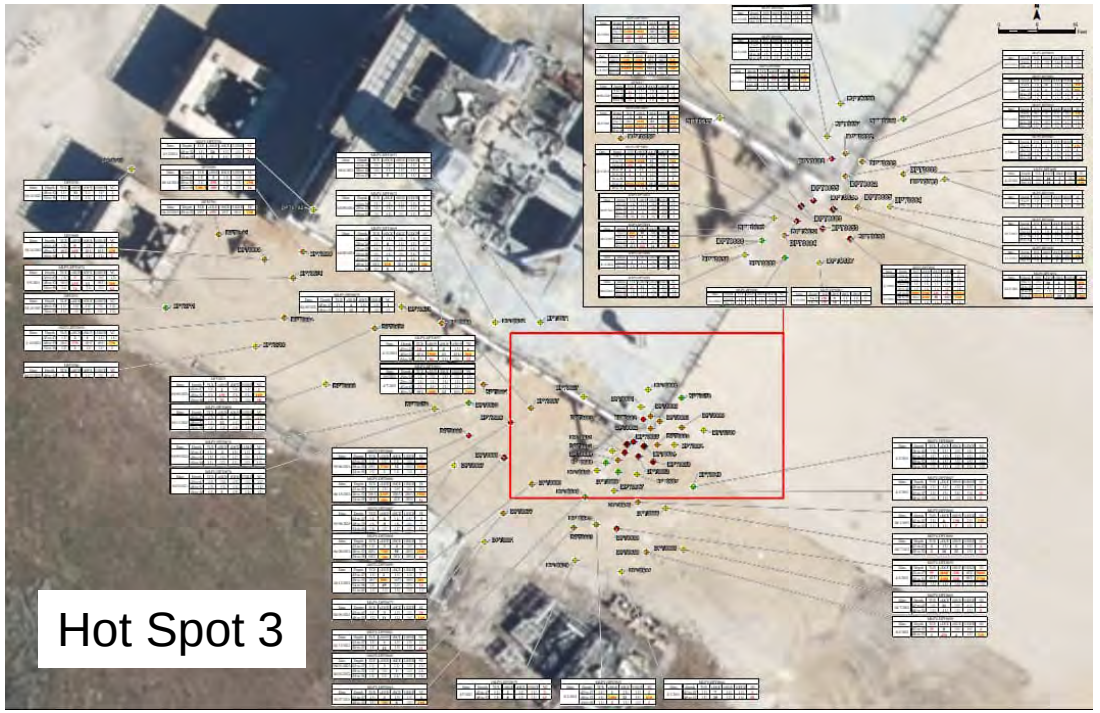


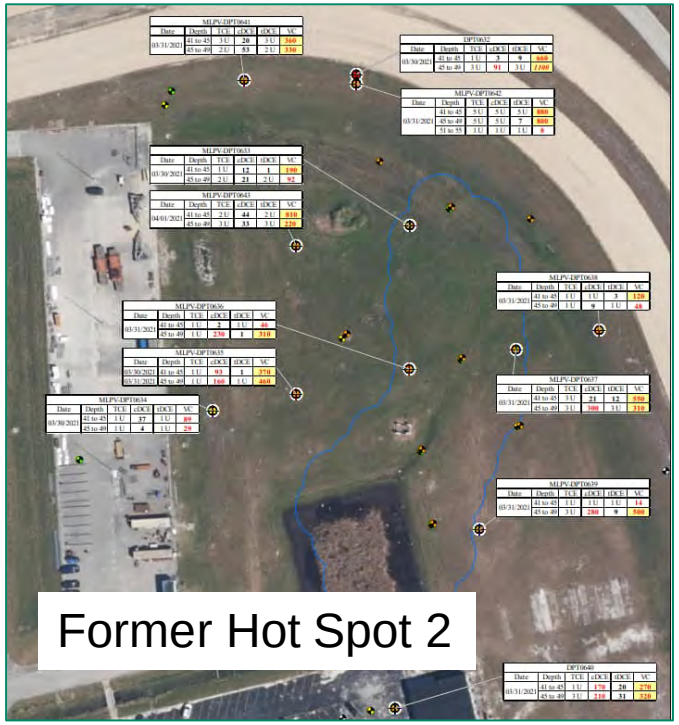
MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

- **2021:** DPT Groundwater Sampling to evaluate current site conditions within the previously treated area
  - In Hot Spot 3, DPT data indicated groundwater CVOCs delineated to NADCs in previously treated areas and confirmed need for Interim Measures Work Plan (IMWP) for additional bioremediation, currently pending FDEP approval.
  - In Former Hot Spot 2, DPT data indicated groundwater HCP continues migrating toward treatment barrier and confirmed need for additional remediation efforts, presented as the Remedial Alternatives Evaluation (RAE).







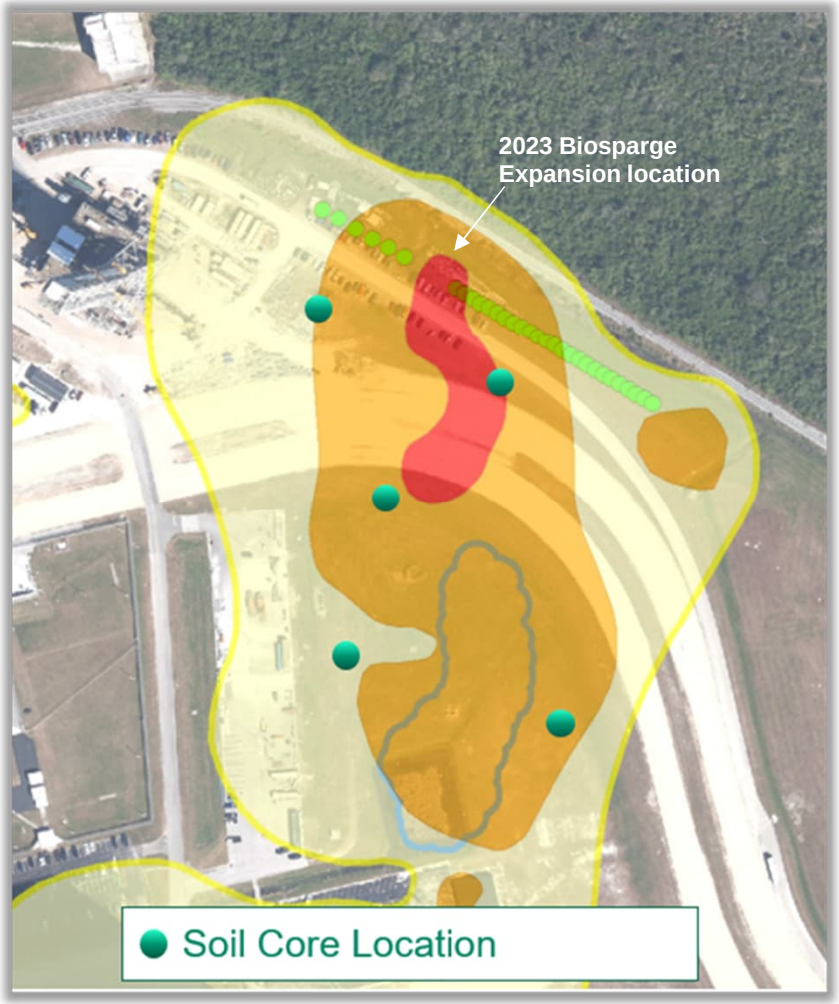
Source: 2021 CMI and IM Update ADP, slide 12, 37. and 2021 HS3 PM ADP

MLP/VAB, SWMU 056 Overview

Historical Interim Measures/Remedial Actions

- **2022**: Soil Cores
  - Performed soil cores at five locations in Former Hot Spot 2 for lithologic descriptions to 60 feet bls for soil permeability analyses to gain an understanding of current soil characteristics in the low permeability soil layer to aid in the RAE
- **February 2023**: Biosparge System Expansion
  - Installed five biosparge wells to bridge gap between existing sparge walls and aid in mitigating plume behavior downgradient of Former Hot Spot 2

Figure represents plume in 2021, following DPT and groundwater monitoring results in Former Hot Spot 2



Source: 2021 CMI and IM Update ADP, slide 44

MLP/VAB, SWMU 056 Overview

Current Site Conditions

- **Surface Water or Sediment:** No impacts
- **Soil Land Use Control:** 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.

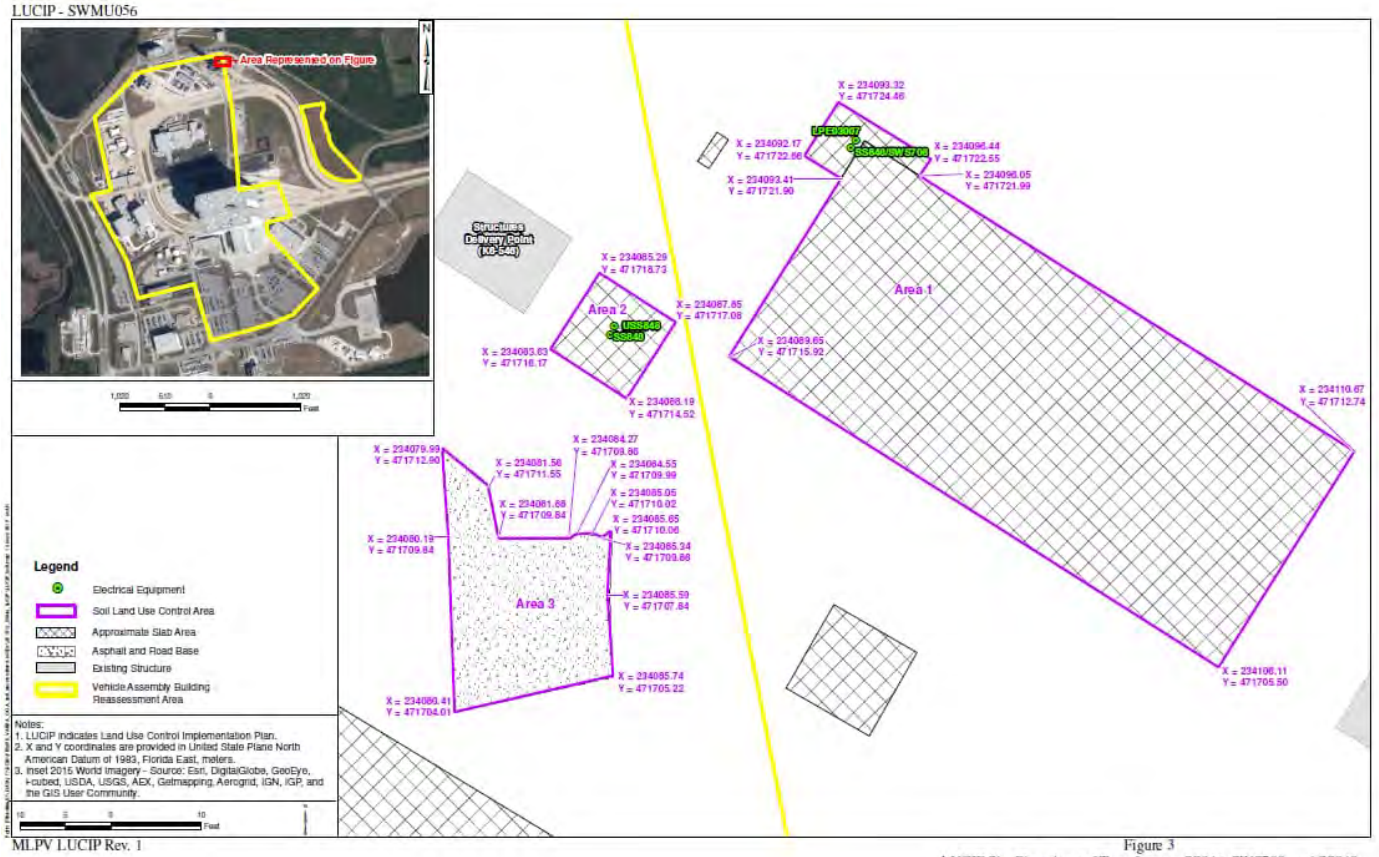


Figure 3
LUCIP Site Plan- Area of Transformers SS846, SWS708, and SS848

MLP/VAB, SWMU 056 Overview

Monitoring Well Assessment

- Performed a site-wide monitoring well assessment throughout 2022 and 2023 to determine condition of existing site monitoring wells
  - List comprised of 253 monitoring wells extracted from the NASA Environmental Geographic Information System (EGIS) database of all active/abandoned monitoring wells under the MLP/VAB, SWMU 056
  - Assessment included multiple site visits to determine location and condition of monitoring wells
  - A historical records search was conducted for monitoring wells not located in the field and status was updated based off abandonment records or documentation of destroyed monitoring wells in historical reports.
  - The assessment was completed in December 2023 and resulted in:
    - Replacement of four monitoring wells (MLPV-IW0001SR, MLPV-IW0002IR, WCPS-IW0002SRR, and MLPV-IW0053R)
    - Retrofit of 32 monitoring wells throughout the Biosparge and Former Hot Spot 2 areas
    - Three monitoring wells recommended for abandonment (MLPV-IW0001S, MLPV-IW0016 and OPF3-IW0007S)



Biosparge Barrier for Mitigation of the HCP

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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)
  - System further expanded in February 2023 with five biosparge wells installed to bridge gap between existing sparge walls and aid in mitigating plume behavior downgradient of Former Hot Spot 2
    - Zone/Leg 1: BSW35 and BSW36 (Screened 48-50 ft bls)
    - Zone/Leg 2: BSW32 through BSW34 (Screened 48-50 ft bls)
  - 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
  - November 2021 – New equipment trailer on site
  - April 2022 – Electrical connections completed
  - June 20, 2022 - System started
- July 2022 through February 2023 – Zone 5 transfer pipe investigation and repair
- February 2023 System expansion by adding biosparge wells between the barriers.
- Legs 1 and 5 operational since June 2022 startup
- Leg 5 operational since February 2023 repair



Target Operation for Compressor

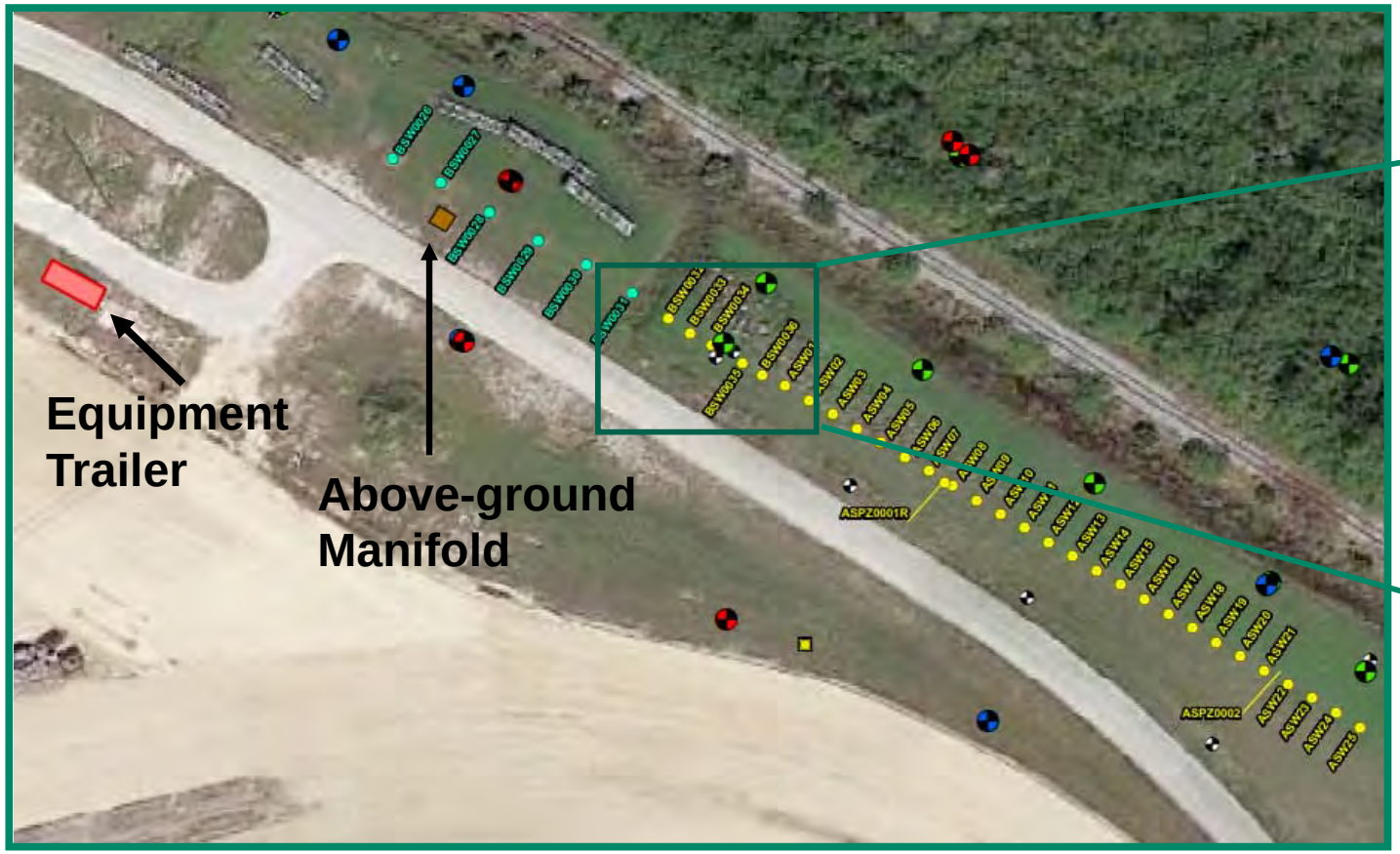
- Legs 1, Leg 2, and Leg 5 alternate every 4 or 8 hours, each leg operating a total of 8 hrs. per day, for a total of 24 hours/day
  (Leg 3 and Leg 4 are connected to the air sparge system in former Hot Spot 2 area and has been inactive since April 25, 2018)
- Maintain operation air flow rate of 3 to 5 standard cubic feet per minute (SCFM) per well

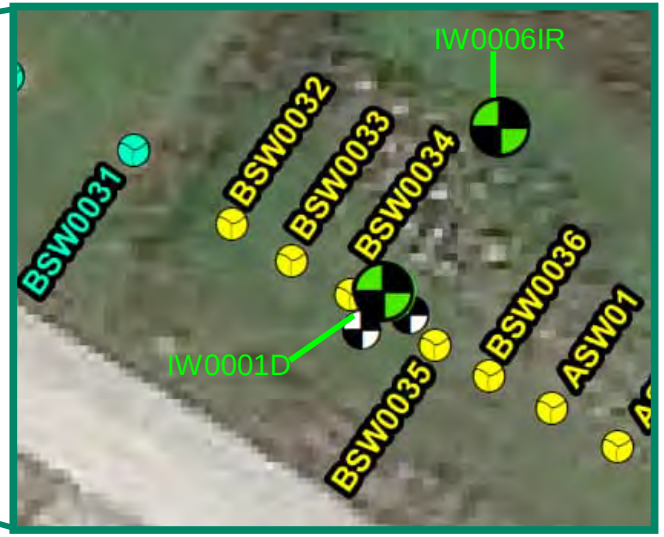
Zone Number	Leg Number	Total Runtime (daily)	Runtime Start	Runtime Stop
1	1	8 hours each	04:00	12:00
2	2		12:00	21:00
5	5		24:00/20:00	04:00/24:00

Biosparge Barrier for Mitigating the HCP

Biosparge System Overview – OM&M

- System Layout: 36 biosparge wells (BSW)/air sparge wells (ASW) over 510 linear feet
  - Zone/Leg 1: ASW01 through ASW13, and new biosparge wells BSW35 and BSW36 (Screened 48-50 ft bls)
  - Zone/Leg 2: ASW14 through ASW25 and new biosparge 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 May 16, 2023 through December 23, 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 treatment wells
  - DO, temperature, and oxidation-reduction potential (ORP) measurements from selected piezometers and monitoring wells
- Non-routine Maintenance and Repairs Performed:
  - Zone 3 and Zone 5 flow meter replacement
  - Performed 2,000-hour service on air compressor July 18, 2023: cleaned inlet filters, changed oil, replaced oil filters, and tightened compressor belts.
  - Performed 4,000-hour service on air compressor October 20 and 23, 2023: changed oil, oil filter, air filter, and air-oil separator; replaced compressor belts
  - Repaired Zone 2 exhaust stack October 23, 2023

Biosparge Barrier for Mitigating the HCP

Biosparge System Performance Summary May through December 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 monitoring wells ASMW0001 through ASMW0003: 5.31 mg/L
    - Limited data was obtained. From July through December of 2023, ASMW0001 was buried under a large pile of crushed rock staged by Bechtel Construction and used for ongoing construction activities in the area of the treatment trailer.
  - Average DO in downgradient monitoring wells ASMW0004 through ASMW0006: 3.63 mg/L
    - Due to rain events in July and December of 2023, ASMW0004 through ASMW0006 were submerged and could not be accessed for DO readings.
- System Manifold Readings
  - System Design Air Flowrate: 3 to 5 SCFM range
  - Total flow range (Legs 1 & 2): 1.20 to 11.10 SCFM. Biosparge wells balanced to within design flows after initial readings.
    - Flows reported in July 2023 ranged from 1.70 to 34.90 SCFM due to the use of a manometer, rather than the pressure differential gauge, to record the flows. During manometer readings, water became trapped in the manometer tubing resulting in elevated flow readings.
  - Total flow range (Leg 5): 2.90 to 4.20 SCFM
- System Pressure Readings:
  - System Design Pressure rate: 18 to 23 pressure per square inch (psi)
  - Pressure range (Legs 1 & 2): 19.30 to 23.00 psi
  - Pressure range (Leg 5): 19.00 to 23.00 psi

Biosparge Barrier for Mitigating the HCP

Biosparge System Performance Summary May through December 2023

- System Operational Time
  - Intentional Operational Time this Reporting Period: 257 days (Excludes Intentional Shutoffs)
  - Total actual run time: 231 days / 90% run time
  - Downtime: Site-wide water level gauging, groundwater sampling event, and general maintenance

- Eight O&M visits performed this Reporting Period:
  - 2023: May 16, June 16, July 18, August 16, September 22, October 23, November 20, December 20
  - Previous reporting period ended in April 2023.

- Unplanned site visits performed this Reporting Period:
  - June 15, 2023: Site visit to investigate connectivity issues with telemetry. Reset modem. System back online
  - June 26, 2023: Site visit to investigate high temperature alarm. Telemetry stopped working and reset modem and system. Tightened screws on PLC board and system back online
  - October 5, 2023: Site visit to investigate high temperature alarm and loss of telemetry. Replaced loose screws on PLC board and reset modem. System back online

Biosparge Barrier for Mitigating the HCP

Performance Monitoring Fall 2023

Semi-annual sampling performed October 11-12 and October 20, 2023

- The October 2023 sampling event was completed in two mobilizations due to a storm event resulting in submerged terrain throughout the biosparge area. Several monitoring wells were inaccessible until groundwater receded.
- 18 monitoring sampled in October 2023
  - Monitoring wells MW0102, MW0103, and MW0107, located downgradient of the biosparge barrier, were transferred from the biennial LCP LTM plan due to CVOC exceedances indicated by the March 2023 LTM event (KSCRT Decision 2310-D04).
- Select CVOC analysis: TCE, cDCE, tDCE, and VC

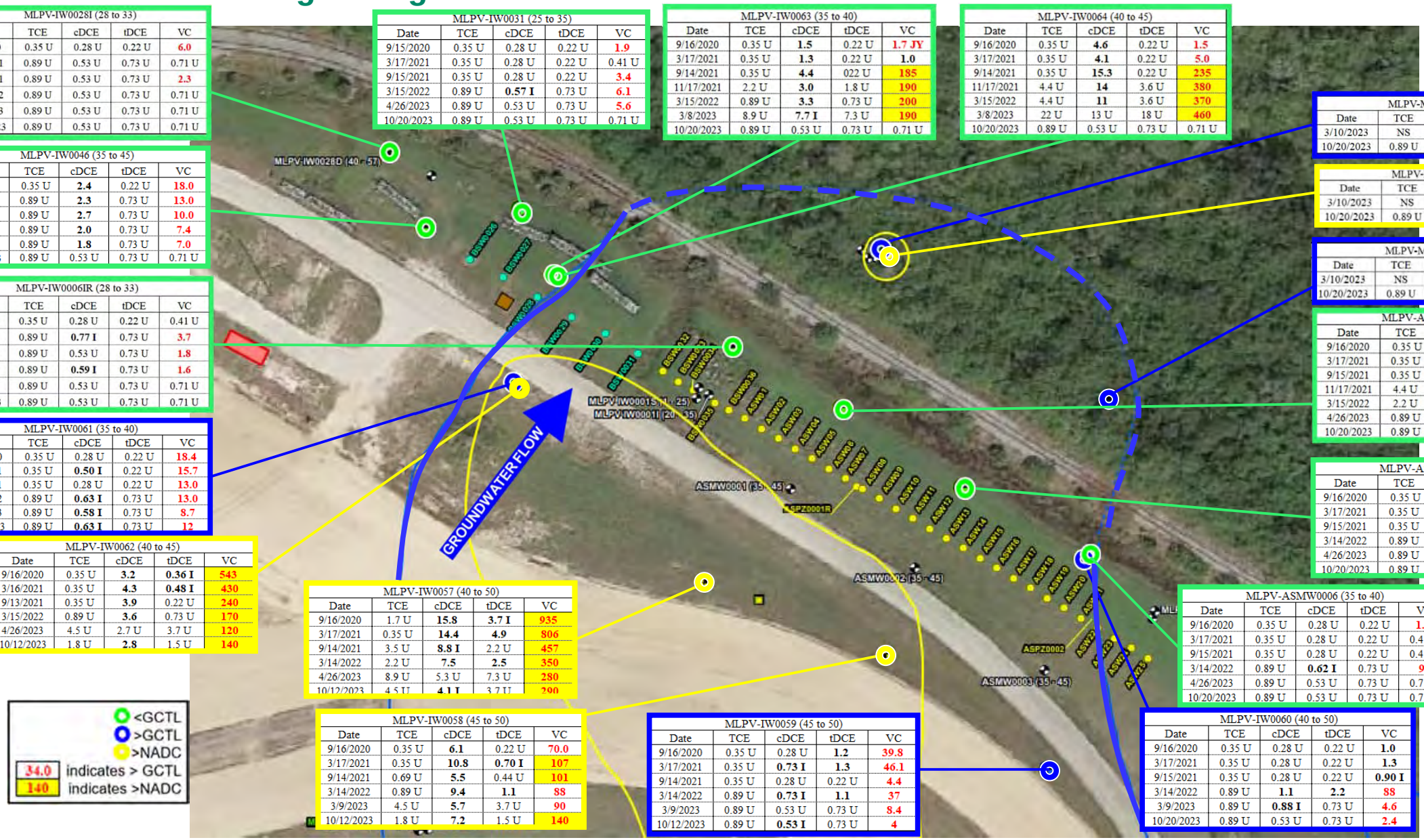
2023 Sampling and Analysis Plan

Area Monitored	Location	Screen interval (ft bls)	Frequency	Analytical Parameters
Biosparge Area (18 monitoring wells)	IW0006IR	28 to 33	Semi-Annual October 2023	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		
	MW0102	25 to 35		
	MW0103	35 to 45		
	MW0107	35 to 45		

Biosparge Barrier for Mitigating the HCP

Performance Monitoring through Fall 2023

Eastern plume boundary reflects data from LCP monitoring wells installed after this PM event. Data from these monitoring wells was used in the plume evaluation for completeness. Details are provided in the LCP discussion (slide 65).



MLPV-IW0028I (28 to 33)

Date	TCE	cDCE	tDCE	VC
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
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0031 (25 to 35)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	0.89 U	0.53 U	0.73 U	5.6
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0063 (35 to 40)

Date	TCE	cDCE	tDCE	VC
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
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0064 (40 to 45)

Date	TCE	cDCE	tDCE	VC
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
10/20/2023	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	NS	9.6	2.8	440
10/20/2023	0.89 U	0.73 I	0.73 U	7.4

MLPV-MW0103 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/10/2023	NS	30.0	3.7	1000
10/20/2023	0.89 U	3.7	0.76 I	130

MLPV-MW0107 (35 to 45)

Date	TCE	cDCE	tDCE	VC
3/10/2023	NS	0.75 I	0.73 U	21
10/20/2023	0.89 U	0.62 I	0.73 U	11

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
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0006IR (28 to 33)

Date	TCE	cDCE	tDCE	VC
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
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-ASMW0004 (35 to 40)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0061 (35 to 40)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	0.89 U	0.58 I	0.73 U	8.7
10/12/2023	0.89 U	0.63 I	0.73 U	12

MLPV-ASMW0005 (35 to 40)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0062 (40 to 45)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	4.5 U	2.7 U	3.7 U	120
10/12/2023	1.8 U	2.8	1.5 U	140

MLPV-ASMW0006 (35 to 40)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	0.89 U	0.53 U	0.73 U	0.71 U
10/20/2023	0.89 U	0.53 U	0.73 U	0.71 U

MLPV-IW0057 (40 to 50)

Date	TCE	cDCE	tDCE	VC
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
4/26/2023	8.9 U	5.3 U	7.3 U	280
10/12/2023	4.5 U	4.1 I	3.7 U	290

MLPV-IW0058 (45 to 50)

Date	TCE	cDCE	tDCE	VC
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
10/12/2023	1.8 U	7.2	1.5 U	140

MLPV-IW0059 (45 to 50)

Date	TCE	cDCE	tDCE	VC
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
10/12/2023	0.89 U	0.53 I	0.73 U	4

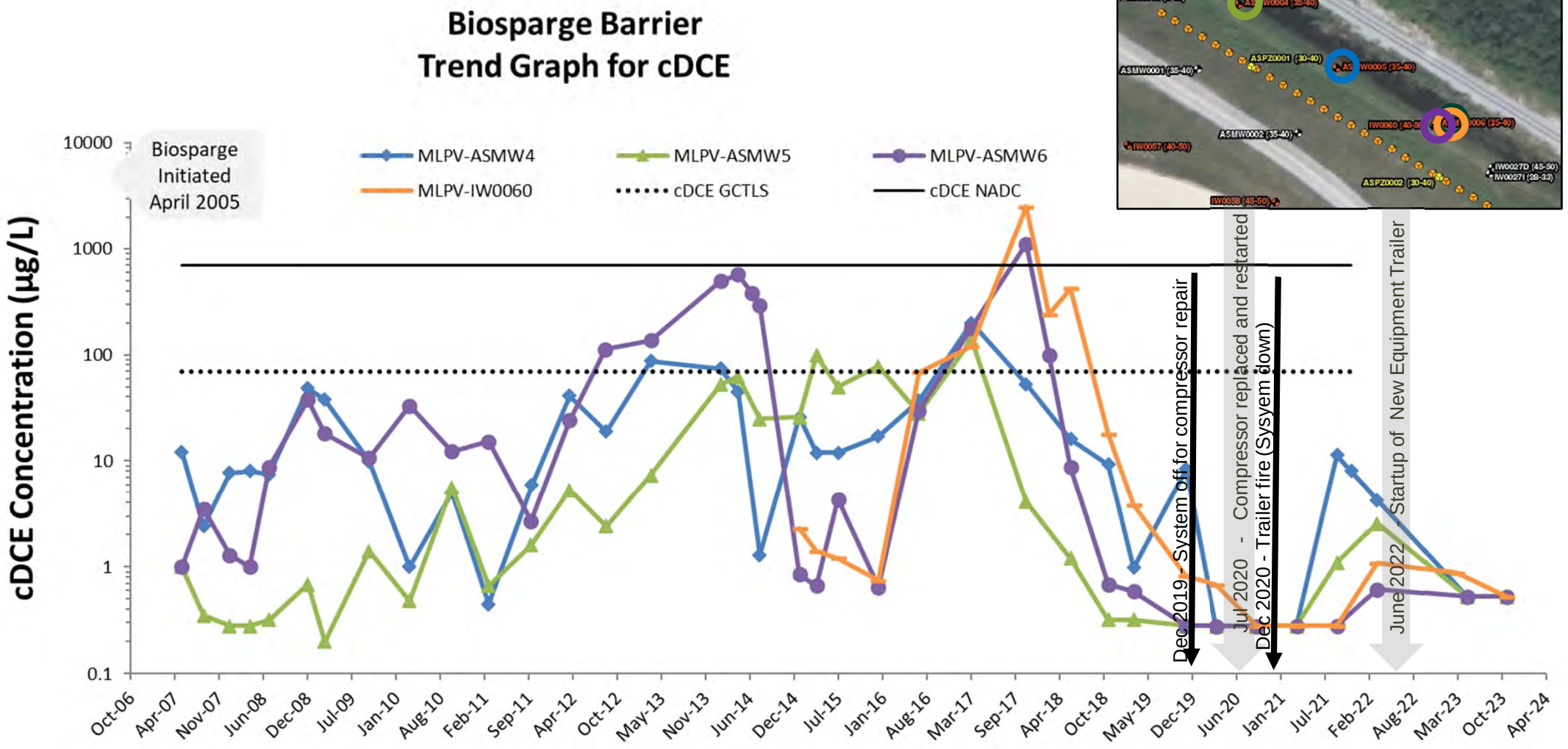
MLPV-IW0060 (40 to 50)

Date	TCE	cDCE	tDCE	VC
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
10/20/2023	0.89 U	0.53 U	0.73 U	2.4

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Biosparge Barrier for Mitigating the HCP

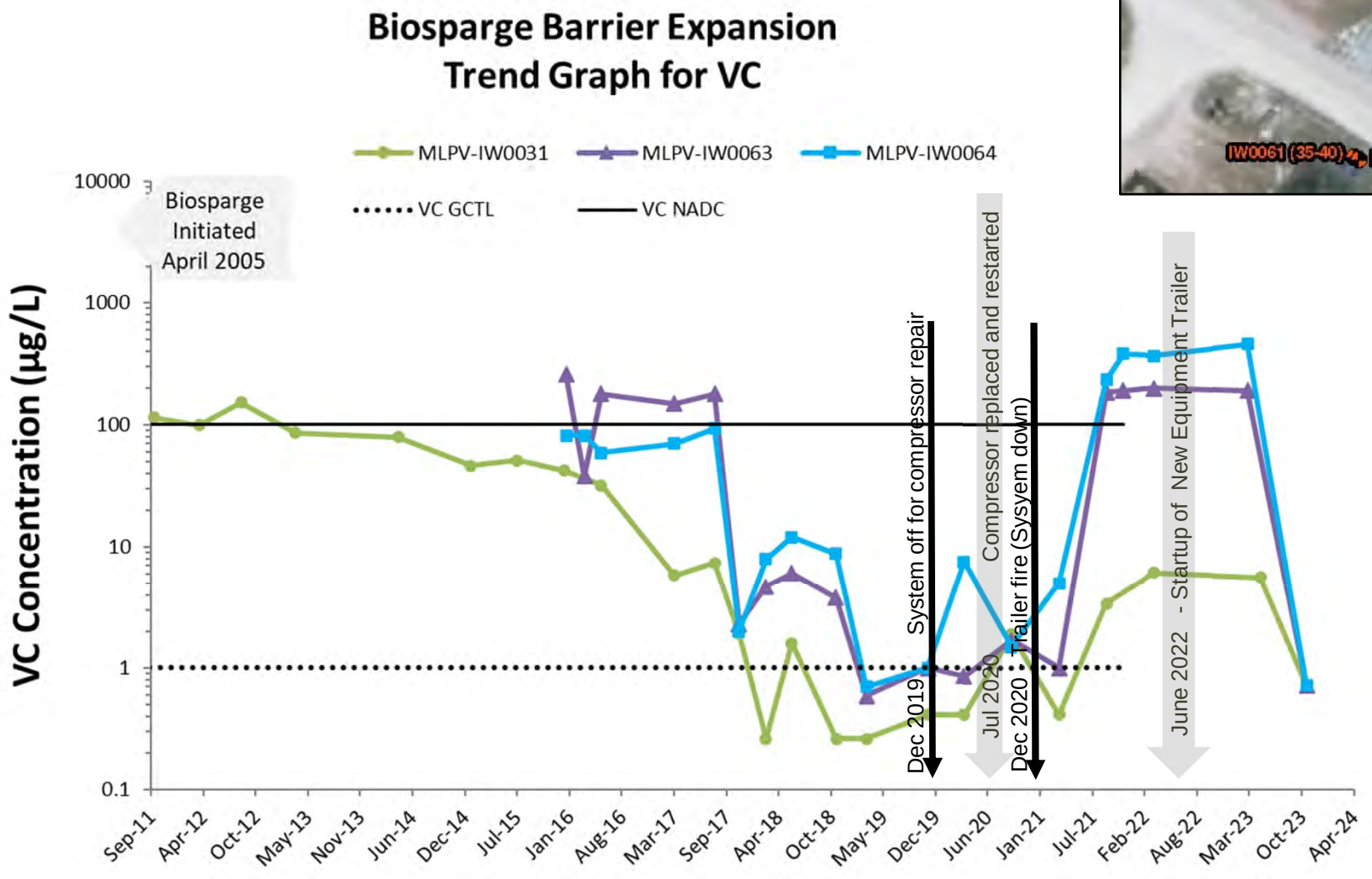
Performance Monitoring through Fall 2023



Biosparge Barrier for Mitigating the HCP

Performance Monitoring through Fall 2023





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, MW0102, MW0103, and MW0107

- **Previously (March and April 2023)**
  - VC concentrations less than NADC in performance monitoring wells, except one monitoring well upgradient of barrier: IW0057 (280 µg/L)
  - VC concentrations exceed GCTL in performance monitoring wells upgradient of barrier: IW0058 (90 µg/L) and IW0059 (8.4 µg/L)
  - VC concentrations decreased to below GCTL in monitoring 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
- **Current (October 2023)**
  - VC concentrations exceed NADC in two performance monitoring wells upgradient of barrier: IW0057 (290 µg/L) and IW0058 (140 µg/L); and one performance monitoring well downgradient of barrier: MW0103 (130 µg/L)
  - VC concentrations exceed GCTL in one performance monitoring wells upgradient of barrier: IW0059 (4 µg/L)
  - VC concentrations remained below GCTL in monitoring wells downgradient of barrier, except IW0060 (2.4 µg/L), MW0102 (7.4 µg/L), and MW0107 (11 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 (March and April 2023):**
  - VC concentrations exceeded GCTL at a reduced concentration in one monitoring well upgradient of barrier: IW0061 (8.4 µg/L)
  - VC concentrations exceeded GCTL in monitoring wells downgradient of barrier: IW0031 (5.6 µg/L) and IW0046 (7.0 µg/L)
  - VC concentrations exceeded NADC upgradient in one performance monitoring well IW0062 (120 µg/L)
  - VC concentrations exceeded NADC in monitoring 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.
  - Remaining contaminant concentrations are less than GCTLs
- **Current (October 2023)**
  - VC concentrations exceeded GCTL at an increased concentration in one monitoring well upgradient of barrier: IW0061 (12 µg/L)
  - VC concentrations exceeded NADC upgradient in one performance monitoring well IW0062 (140 µg/L)
  - VC concentrations decreased below NADC in two monitoring wells downgradient of barrier (IW0063 and IW0064)
  - VC concentrations decreased below GCTL in two monitoring wells downgradient of barrier (IW0031 and IW0046)
  - VC concentrations in IW0028I remain below GCTLs
  - 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

2024 Sampling and Analysis Plan

Area Monitored	Location	Screen interval (ft bls)	Frequency	Analytical Parameters
Biosparge Area (18 monitoring wells)	IW0006IR	28 to 33	Semi-Annual March 2024 and September 2024	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		

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.

- Remedial Alternatives Evaluation (RAE) completed in 2023 to treat the HCP withing the Former Hot Spot 2 area
  - Recommended In-situ Chemical Reduction (SCR) via Permeable Reactive Barrier (PRB)
  - Currently pending FDEP approval

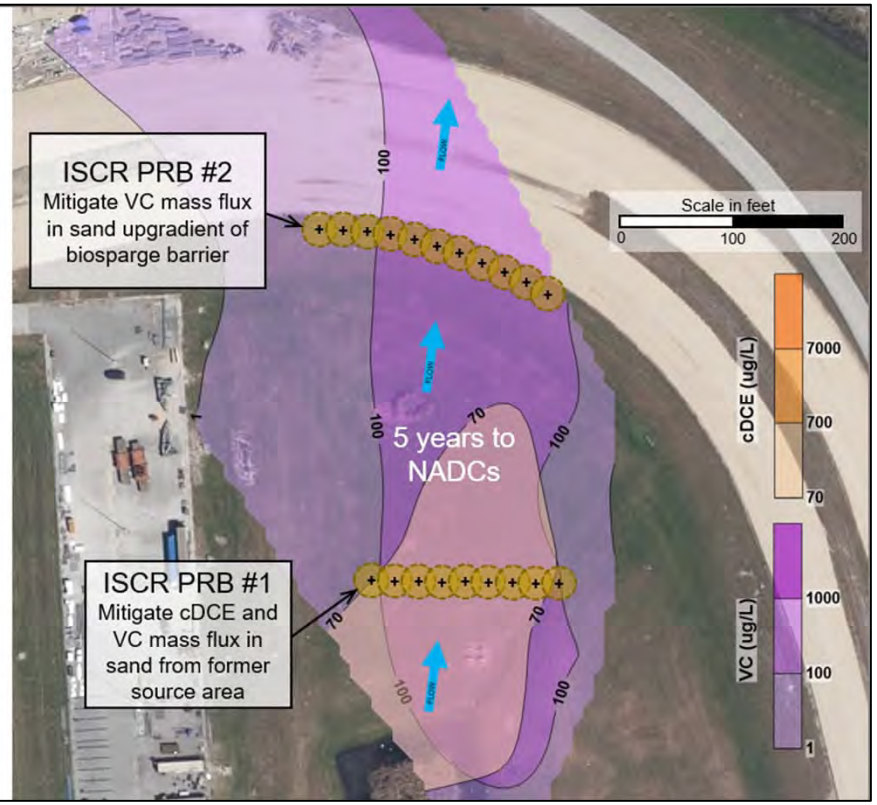
Option 2 – ISCR PRBs

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

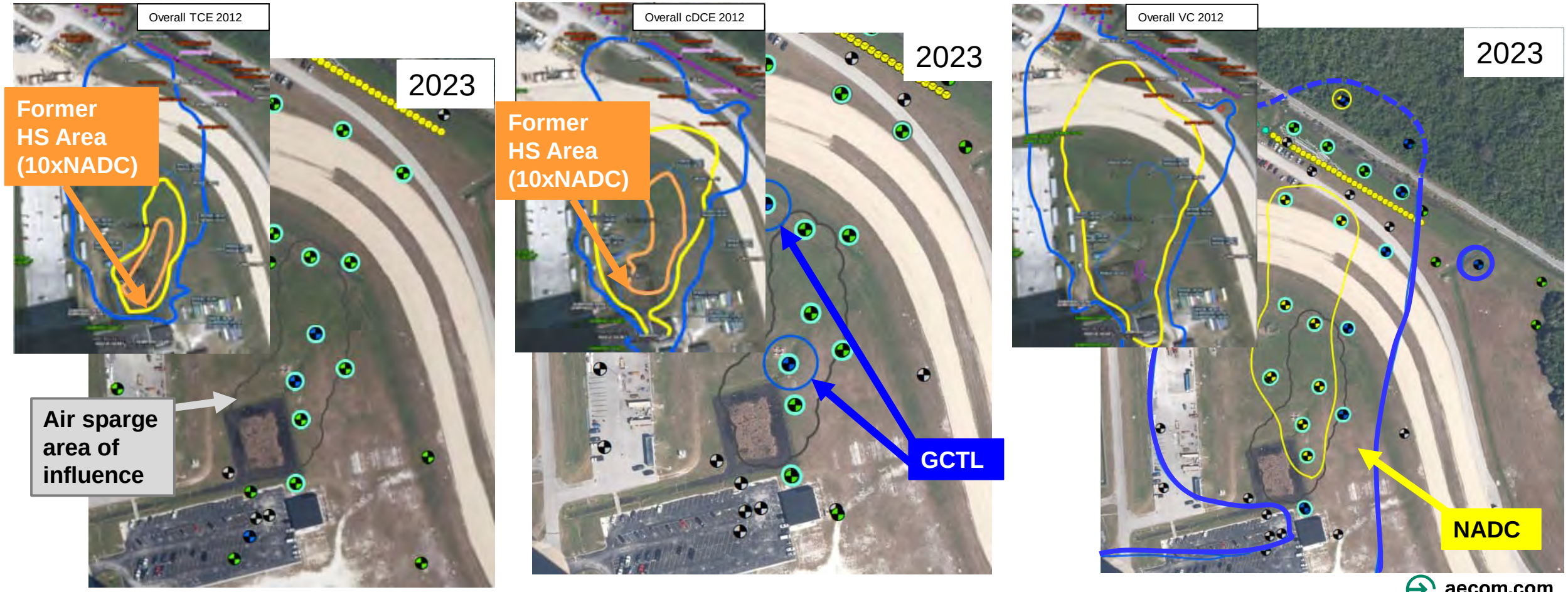


Historical Figures: AECOM Former Hot Spot 2 RAE ADP, October 2023, slide 49

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Current Site Conditions

- 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

IGM Fall 2023

- 2023 sampling performed October 11, 12, and 23, 2023
  - 14 monitoring wells were accessible and sampled October 11 and 12, 2023
  - Due to a storm event, four monitoring wells located in the swale of Former Hot Spot 2 were submerged and not accessible for sampling.
    - Three monitoring wells were sampled October 23, 2023
    - Monitoring well IW033 remained submerged frequently and was therefore retrofitted in November 2023 to raise the top-of-casing. Sampling was performed November 20, 2023 after re-development due to historically high turbidity.
- Sampled for select CVOC analysis: cDCE, tDCE, and VC

2023 Sampling and Analysis Plan

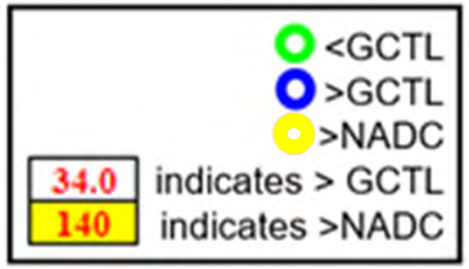
Area Monitored	Location	Screen Interval (feet bls)	Frequency	Analytical Parameters
Air Sparge Area (17 monitoring wells)	MLPV-IW0011I	35 – 40	Semi-Annual	cDCE tDCE VC
	MLPV-IW0032	30 – 40	Annual	
	MLPV-IW0033	40 – 50	Semi-Annual	
	MLPV-IW0034	30 – 40	Semi-Annual	
	MLPV-IW0035	40 – 50	Semi-Annual	
	MLPV-IW0036	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 October

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Wells

- Centerline –
- Periphery –
- Monitoring 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 monitoring wells not illustrated.

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Wells through Fall 2023

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
11/20/2023	46	7.3 U	700

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
10/23/2023	100	4.8	230

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
10/23/2023	16	1.6	100

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
10/23/2023	3.5	0.73 U	210

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
10/11/2023	49	1.5 U	180

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
10/11/2023	0.96 I	1.4	84

MLPV-IW0011I (35 to 40)			
Date	cDCE	tDCE	VC
9/15/2020	0.28 U	0.22 U	0.41 U
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
10/11/2023	0.57 I	0.73 U	0.72 I

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
10/11/2023	0.55 I	0.73 U	0.91 I

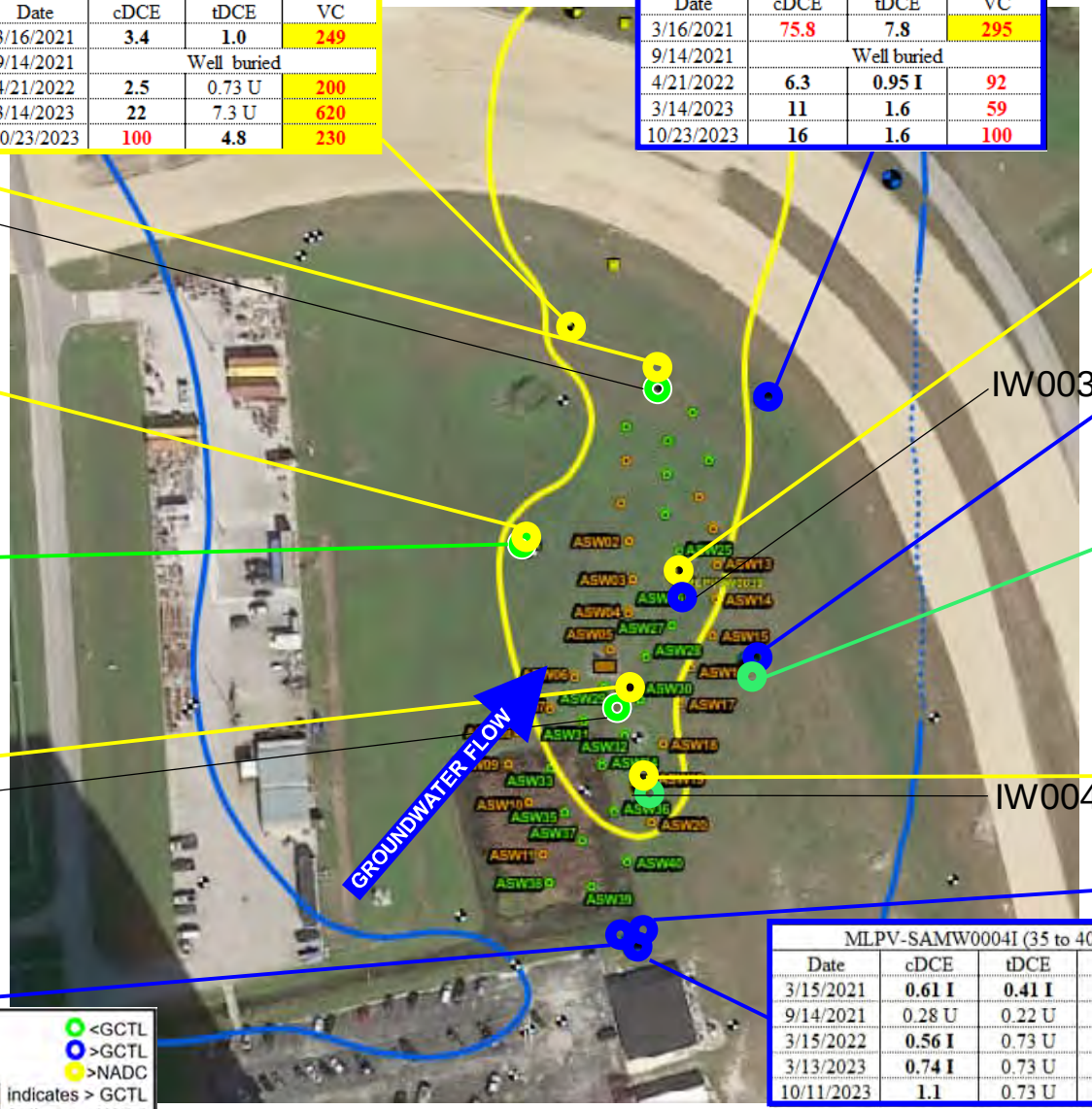
MLPV-IW0043 (40 to 50)			
Date	cDCE	tDCE	VC
3/16/2021	249	3.7 I	180
9/14/2021	Well submerged		
3/16/2022	98	2.6	88
3/14/2023	170	3.7 U	280
10/11/2023	92	3.7 U	200

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
10/12/2023	2.5	1.5 U	180

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
10/11/2023	1	0.90 I	25

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
10/11/2023	1.1	0.73 U	8.4

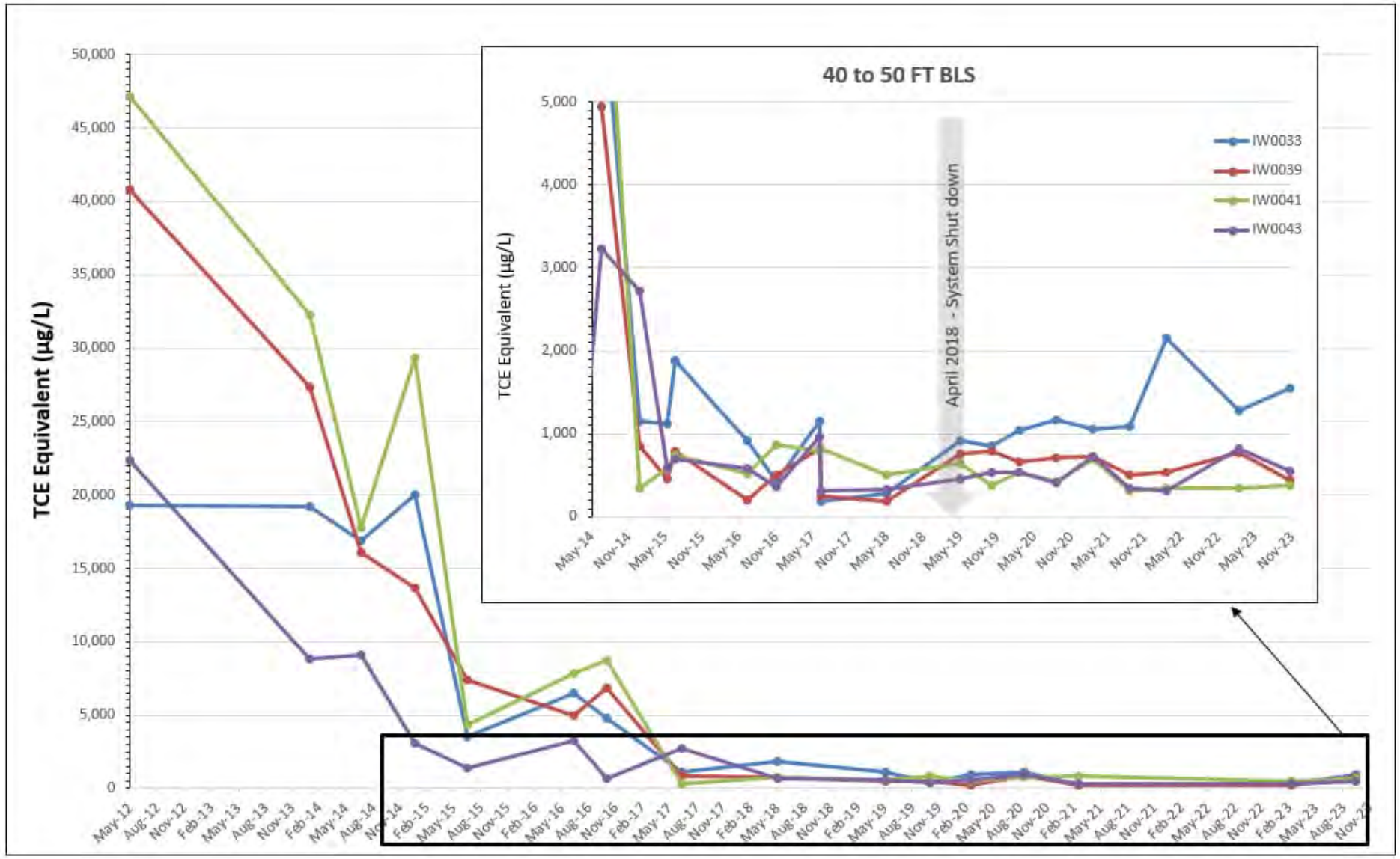
MLPV-SAMW0004D (45 to 50)			
Date	cDCE	tDCE	VC
3/15/2021	2.4	0.59	14.6
9/14/2021	0.65 I	0.67 I	5.0
3/16/2022	2.3	0.94 I	17
3/13/2023	1.9	1.2	18
10/11/2023	0.53 U	0.86 I	2

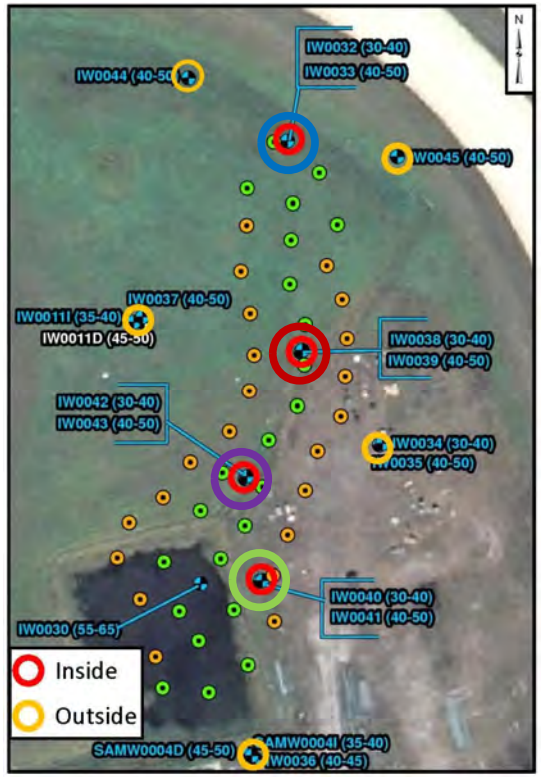


Monitoring wells MLPV-IW0032, MLPV-IW0038, MLPV-IW0040, and MLPV-IW0042 are sampled annually only (Spring). Color reflects highest detection from last annual sampling event.

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM through Fall 2023





- Except for down-gradient monitoring well IW0033, reduction exhibited in IW0039 and IW0043 during Fall 2023 sampling
- Overall decreasing or stable trend since 2018

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

IGM Fall 2023 - Summary

- **30-40 ft bls:**
  - cDCE: remains less than GCTL in all monitoring wells sampled (IW0011I, IW0034, and SAMW0004I)
  - tDCE: remains less than GCTL all monitoring wells sampled
  - VC: SAMW0004I (8.4 µg/L) exceeded GCTL, consistent with previous sampling results and exhibiting a reducing trend
- **40-50 ft bls:**
  - cDCE: IW0043 (92 µg/L) and IW0044 (100 µg/L) exceeded GCTL;
    - IW0044 increased above GCTL for the first time since July 2014. This monitoring well is located down-gradient of the former air sparge treatment area.
    - IW0039 (3.5 µg/L) decreased below GCTL for the first time since May 2018
    - IW0033 and IW0037 continue to fluctuate, with recent results below GCTL but maintaining an overall increasing (IW0033) or stable (IW0037) trend.
  - tDCE: remains less than GCTL in all monitoring wells sampled
  - VC: IW0033 (700 µg/L), IW0037 (180 µg/L), IW0039 (210 µg/L), IW0041 (180 µg/L), IW0043 (200 µg/L), IW0044 (230 µg/L), exceeded NADC;
    - IW0035 (84 µg/L), IW0036 (25 µg/L), IW0045 (100 µg/L), and SAMW004D (2 µg/L) exceeded GCTL only, which is relatively unchanged compared to 2022 and March 2023 results
    - A decreasing trend is observed in IW0036 and SAMW0004D
    - IW0045 (100 µg/L) has almost doubled since previous sampling event in March 2023 (59 µg/L). This monitoring well is also located down-gradient of the former air sparge treatment area.

HCP Interim Measures within the Former Hot Spot 2 Air Sparge Area

Test Consensus

- Continue interim groundwater monitoring. The next semi-annual event will be scheduled for Spring of 2024
- Evaluate the sampling plan one year after implementation of the selected technology from the RAE

2024 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

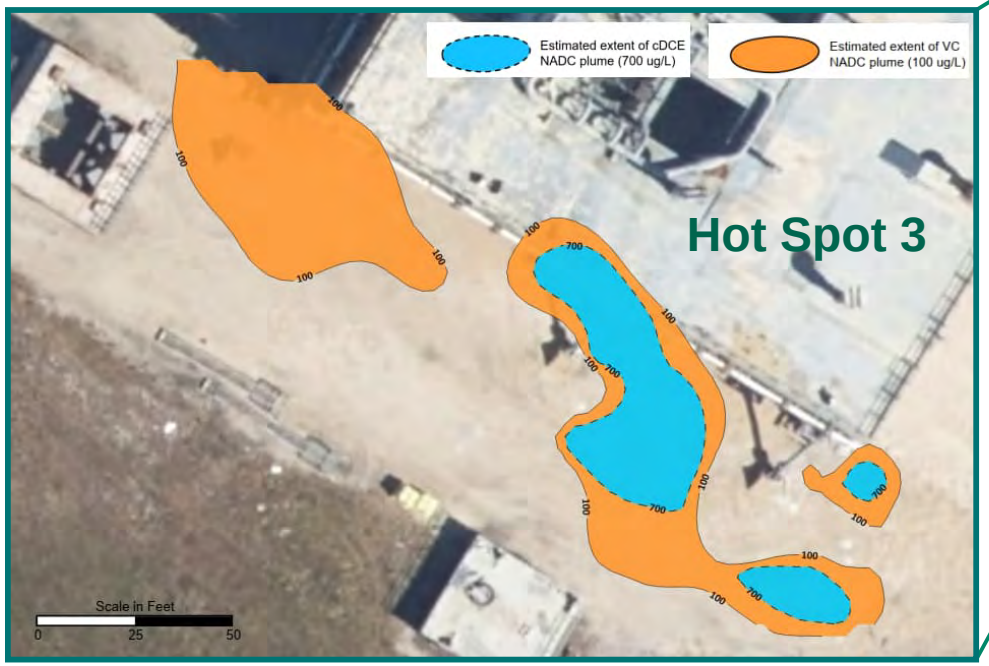


Figure: AECOM In Situ Chemical Reduction Interim Measures Work Plan, Hot Spot 3 MLP/VAB (SWMU 056)



Figure: AECOM MLP/VAB SWMU 056, 2022-2023 CMI and IM Annual Report

Hot Spot 3

Historical Site Conditions

- **2017:** Delineated CVOC Plumes

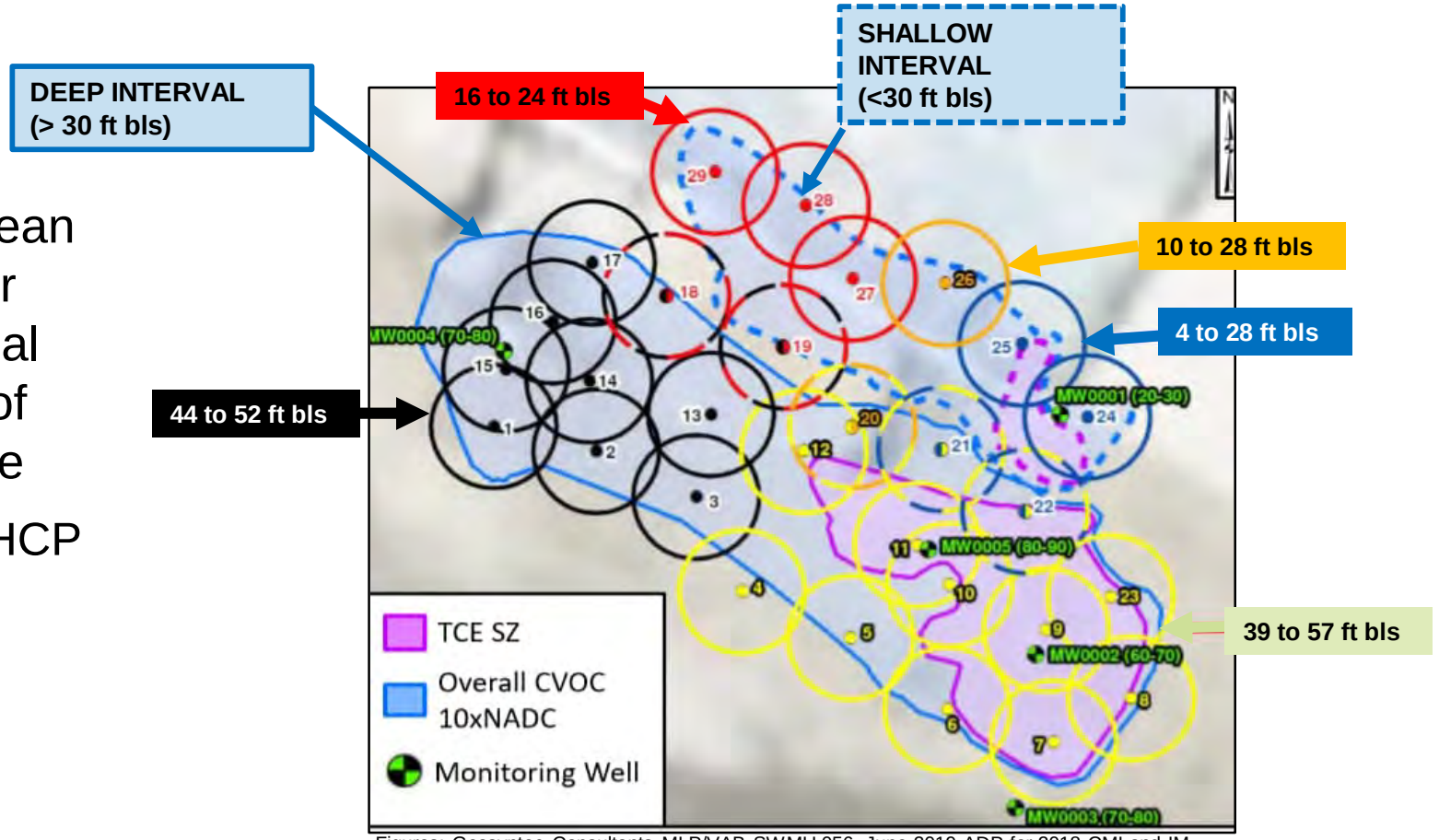


Hot Spot 3

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. Site was leased to a commercial partner and site access was restricted, therefore delaying further monitoring and remediation.
- **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 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, total organic content (TOC), ethane, ethene, and methane

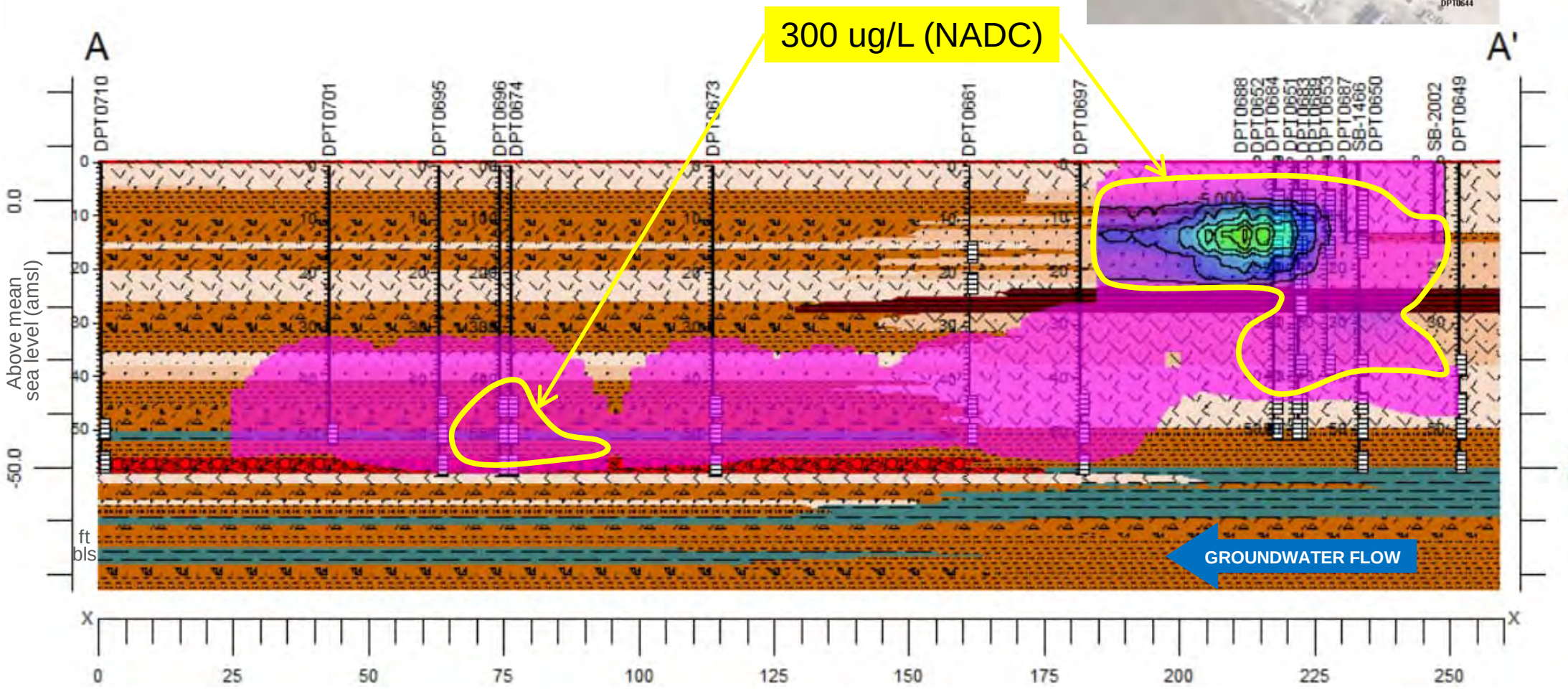
2021 DPT Sampling Locations

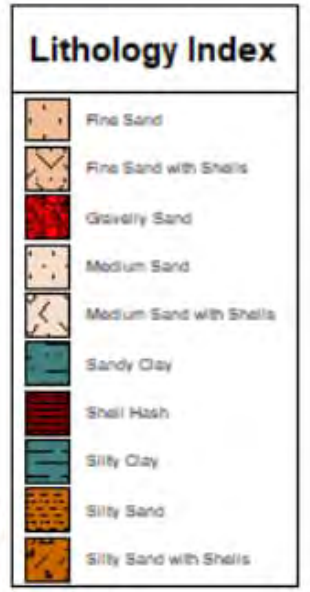


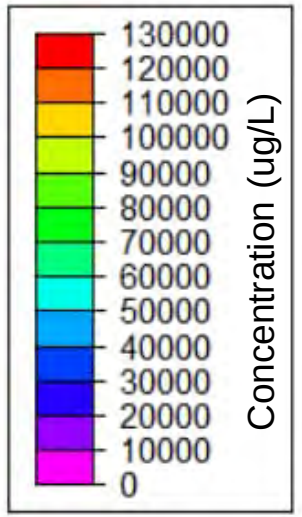
DPT Assessment Results – TCE (>3 ug/L)

- 11 samples >300 micrograms per liter (ug/L)
- Max=129,000 ug/L at DPT0683 between 9 – 13 ft bls





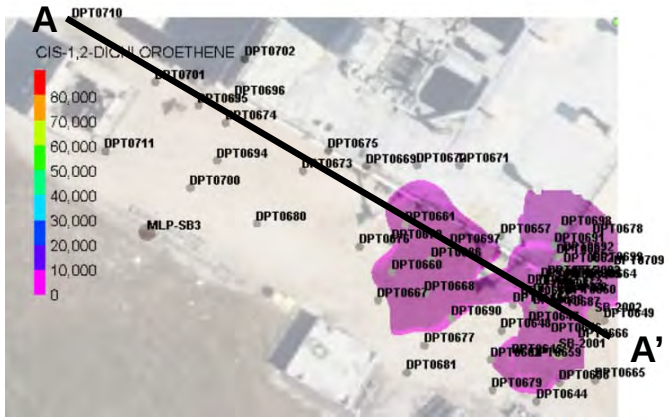


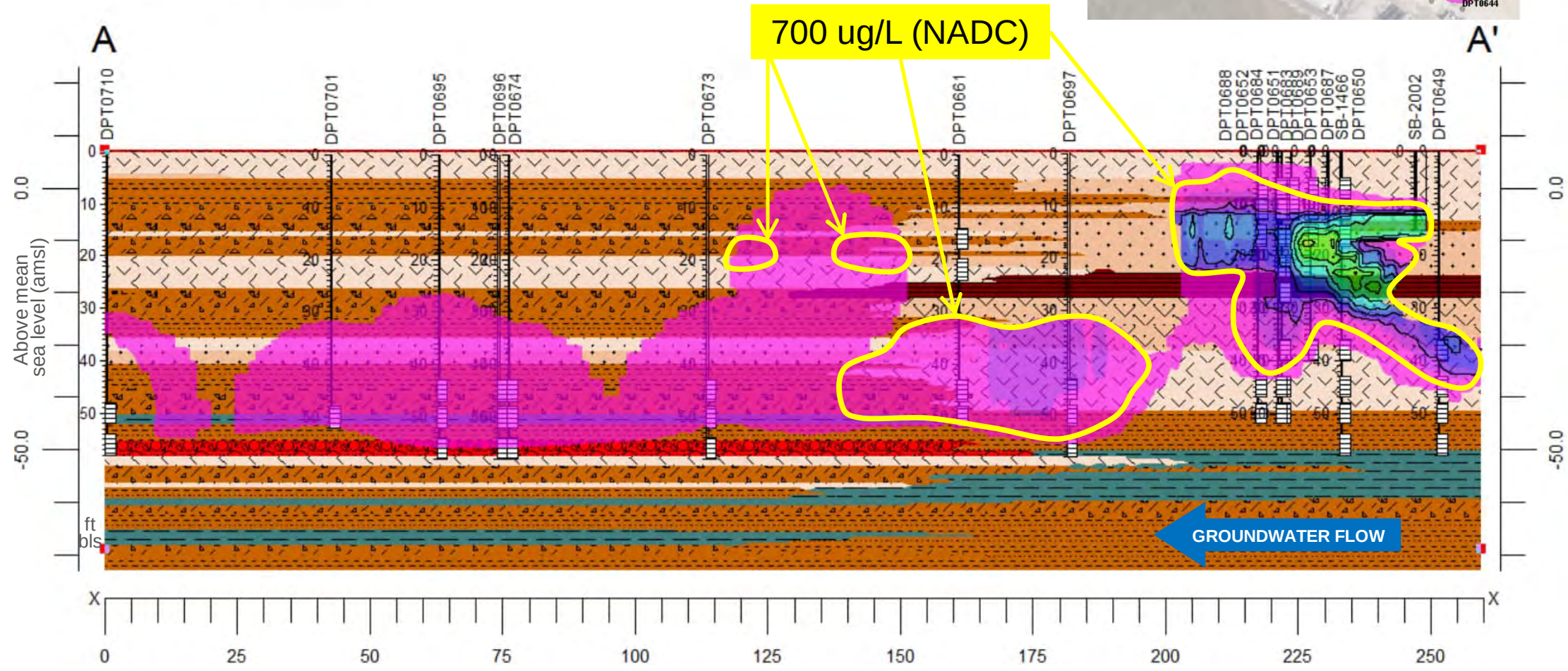


Note: Reporting Limits are included in the interpolated plume extents for all 3D models

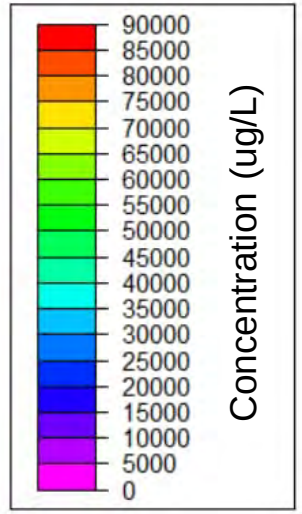
DPT Assessment Results – cDCE (>70 ug/L)

- 24 samples >700 ug/L
- Max=88,000 ug/L at DPT0653 between 14-18 ft bls





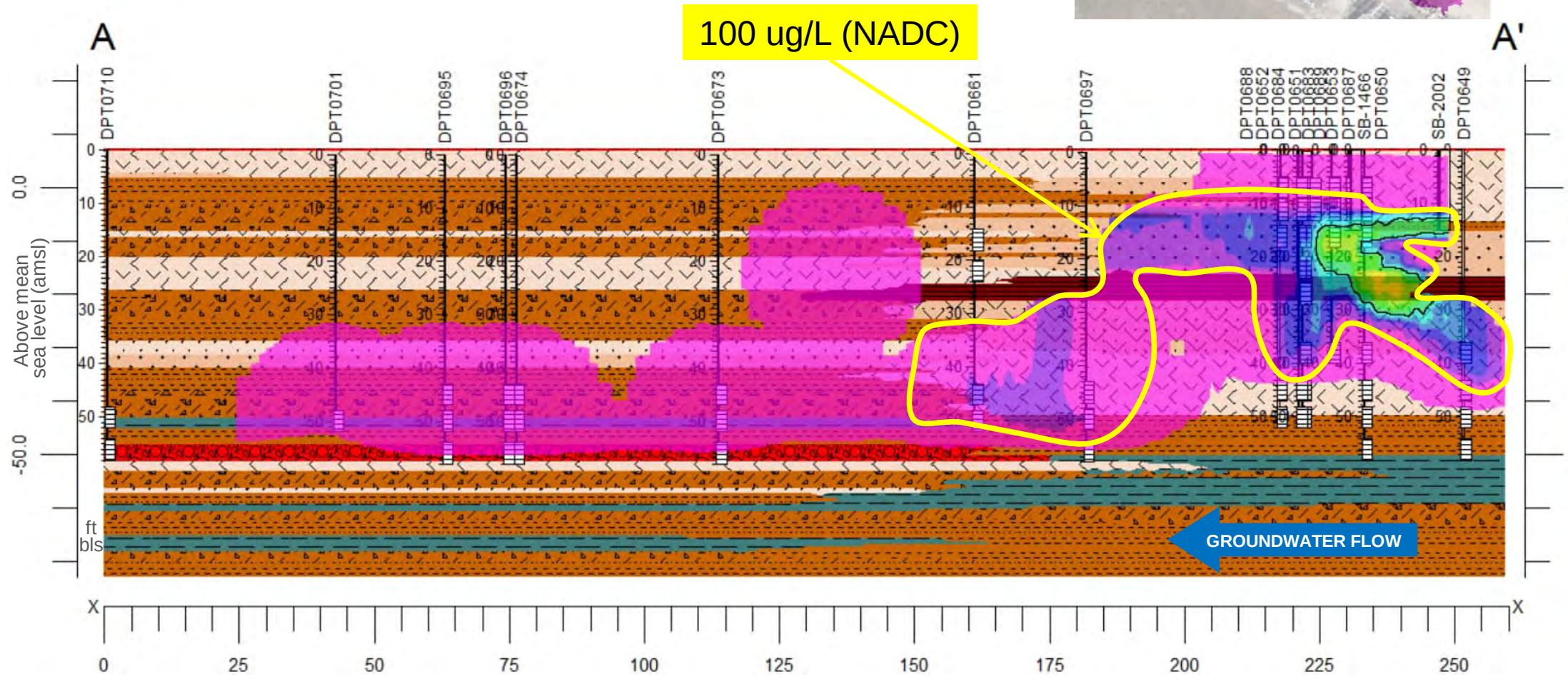




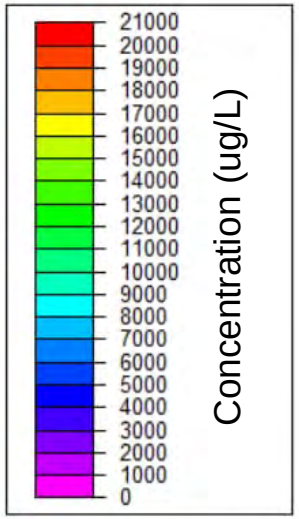
DPT Assessment Results – VC (>1 ug/L)

- 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

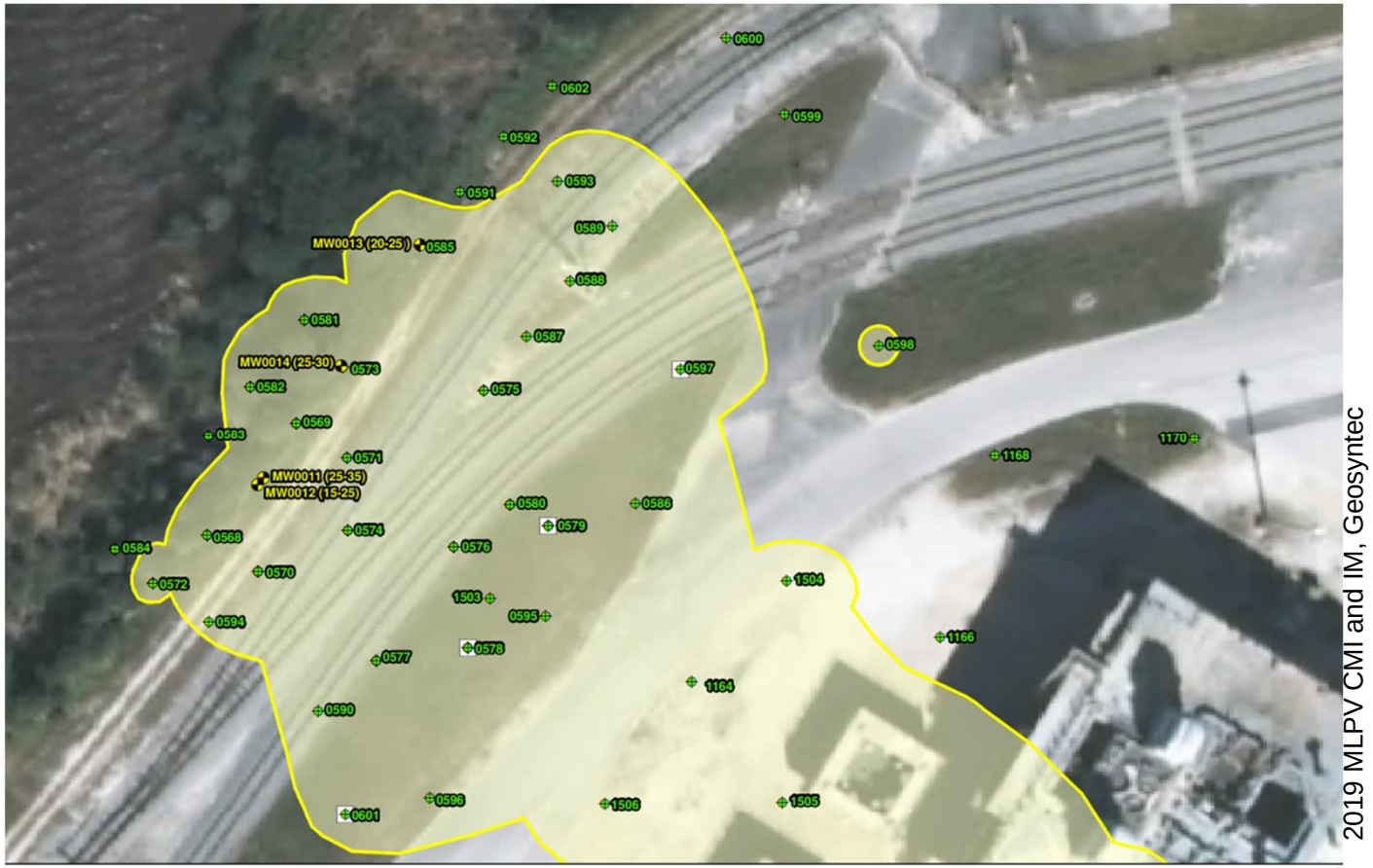
- IMWP is pending FDEP review
- DPT groundwater sampling is scheduled for the Summer of 2024 to obtain updated data for evaluating current groundwater conditions to prepare the Implementation Work Plan and to verify whether the ISCR design is still sufficient or requires modification.

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

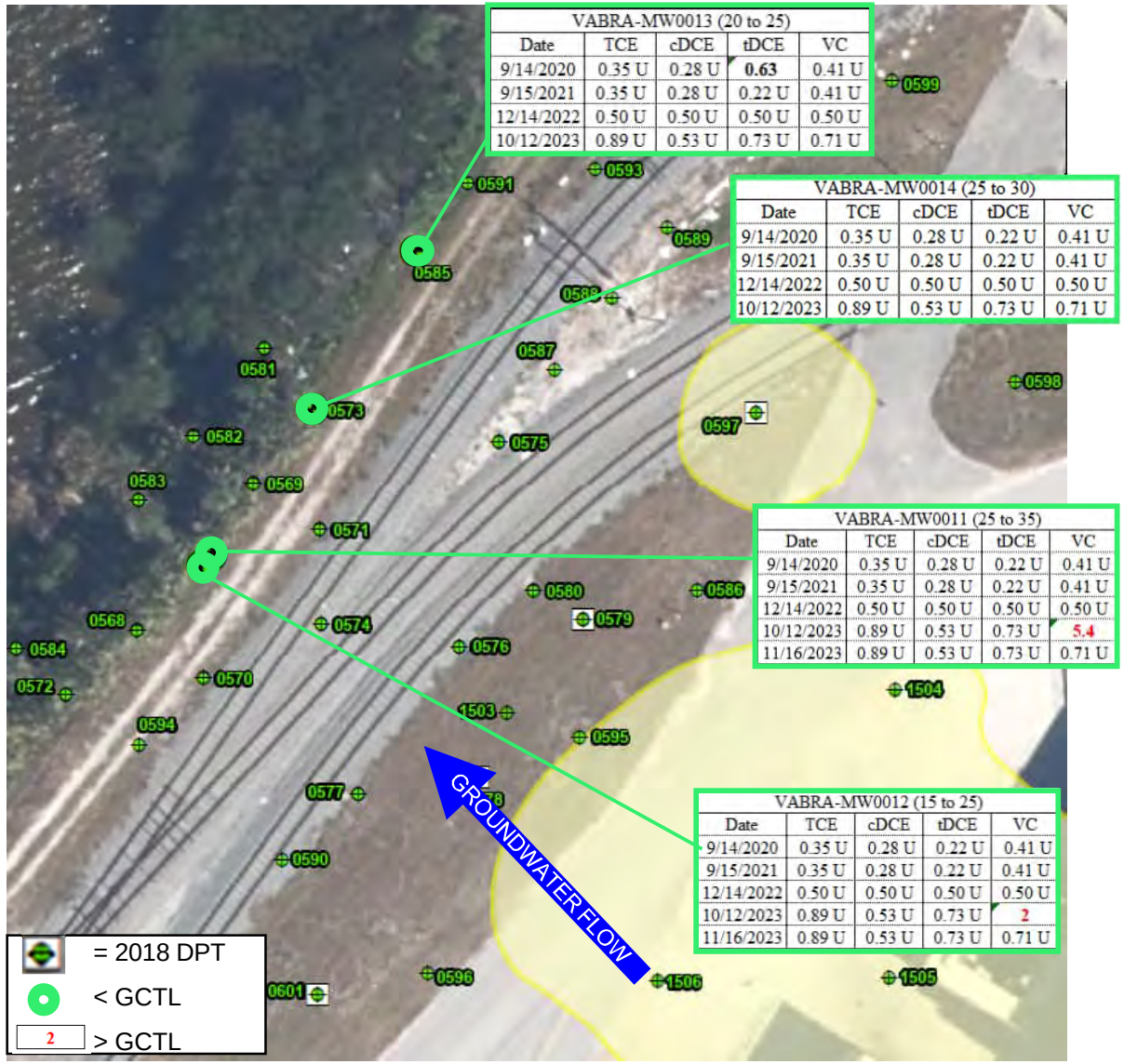
Summary of Annual Analytical Results

- Annual Performance Monitoring Well Sampling
  - October 12, 2023
  - MW0011, MW0012, MW0013, MW0014
  - CVOC analysis: TCE, cDCE, tDCE, VC

2023 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		

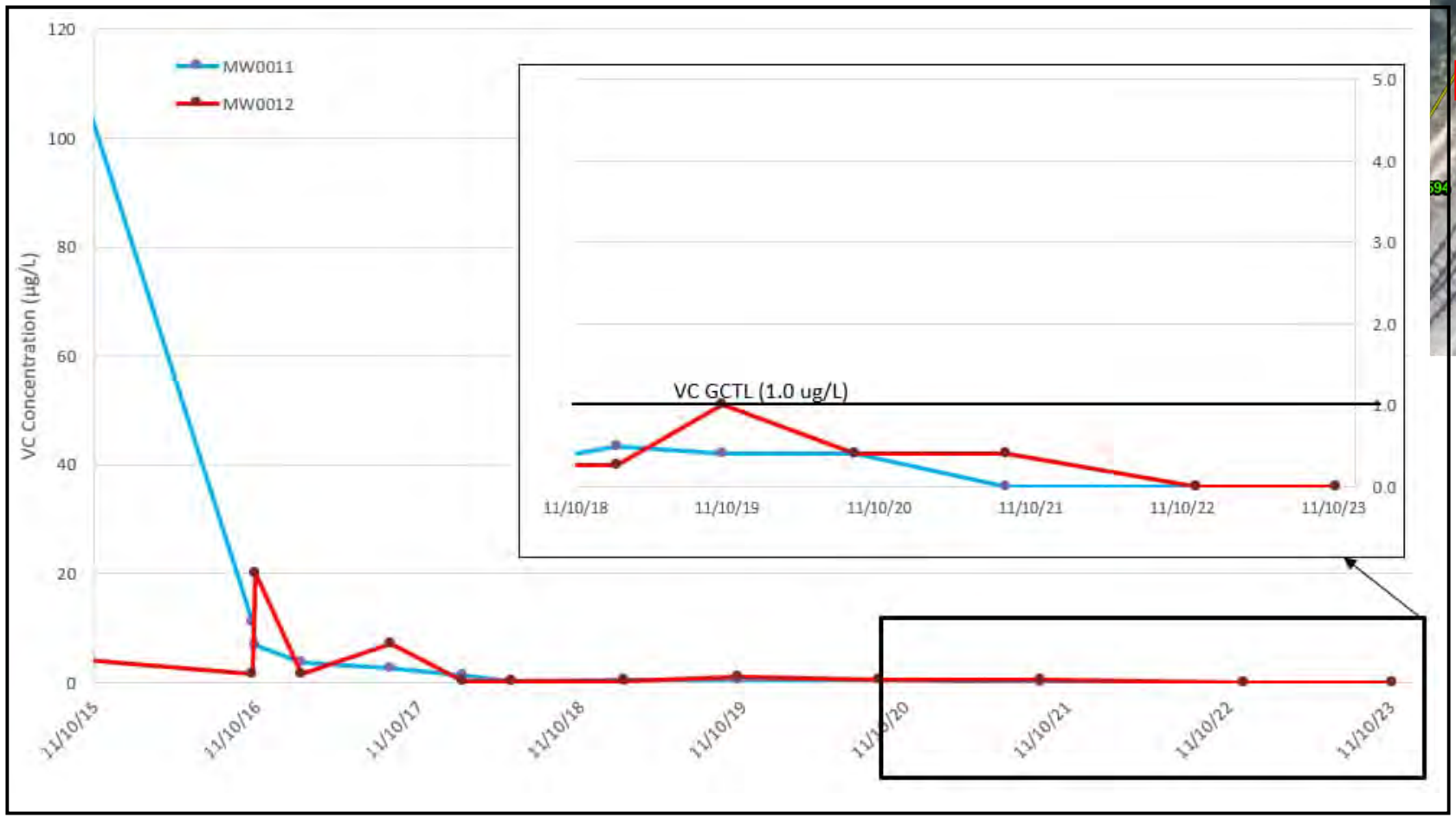
- All CVOCs were below GCTL except for VC in MW0011 and MW0012
  - This is the first time VC exceeded the GCTL in these monitoring wells since August 2017
  - Both monitoring wells were resampled November 16, 2023 and results indicated VC was below laboratory detection limits
  - Additional monitoring wells will be installed as part of the HS3 IM to both evaluate the LCP and monitor substrate performance administered to upgradient HS3.



Hot Spot 3 OFW Area

VC Trend

- MW0011 (25 to 35 feet bls): CVOCs were below GCTLs during resample
- MW0012 (15 to 25 feet bls): CVOCs were below GCTLs during resample

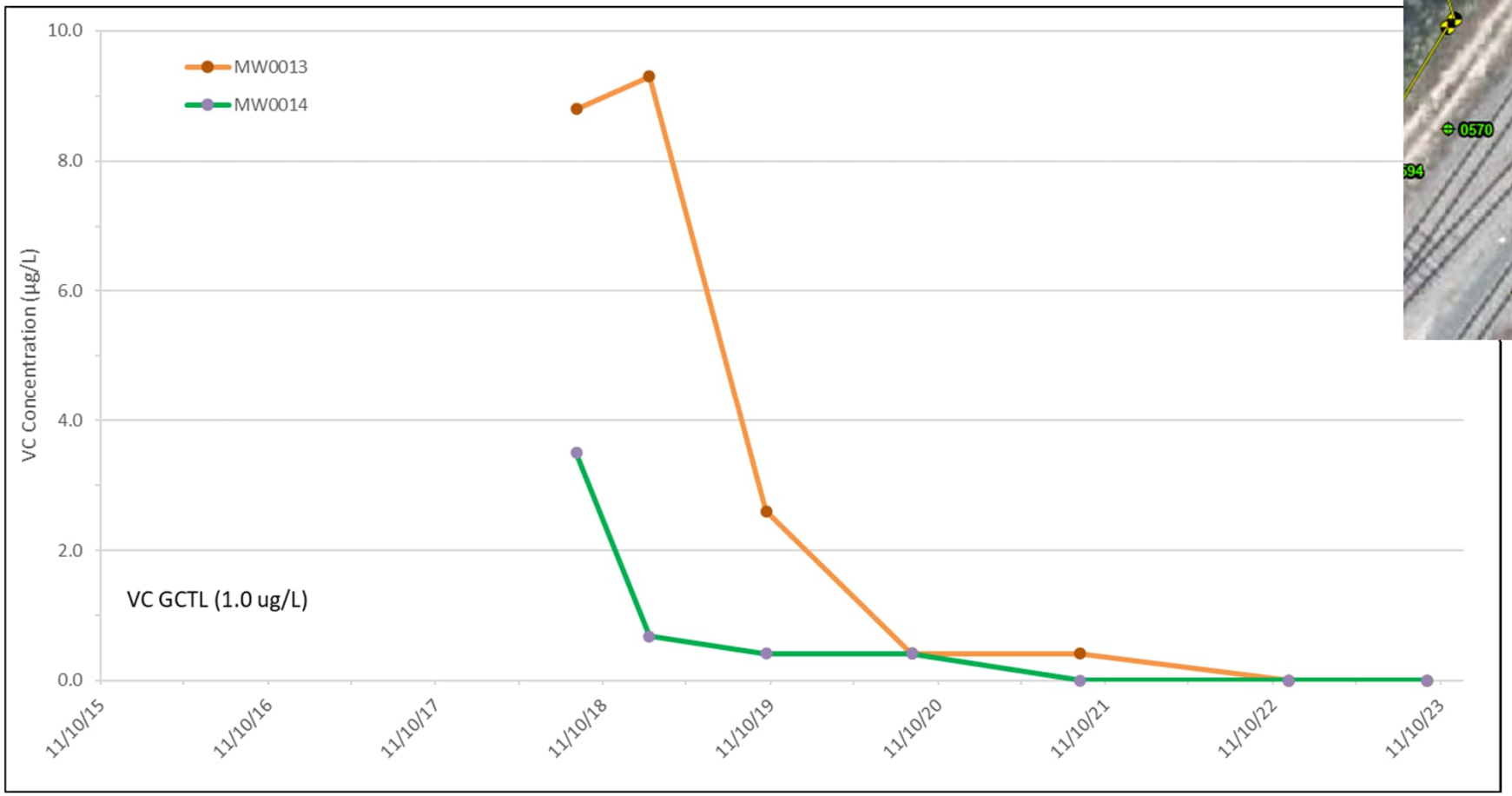


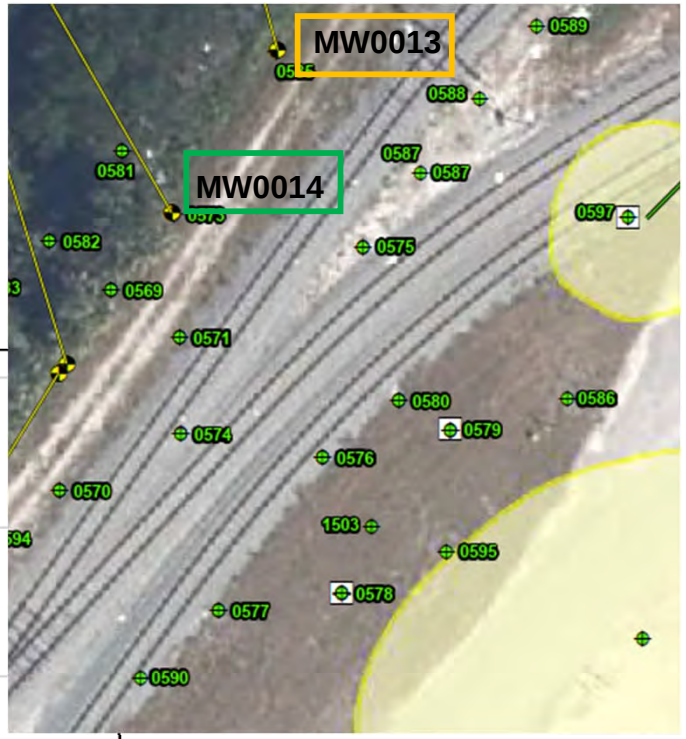


Hot Spot 3 OFW Area

VC Trend

- MW0013 (20 to 25 feet bls): CVOCs were below GCTLs
- MW0014 (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, continue annual performance monitoring to monitor groundwater quality downgradient of HS3 former and future treatment areas.

2024 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 results indicated limited change in overall plume footprint since 2018
- An evaluation of the LCP LTM monitoring well network began in 2022 and resulted in a modified sampling plan
  - 39 new monitoring wells proposed (37 monitoring wells installed from October 2022 through January 2023)
  - 12 existing monitoring wells added to the biennial sampling plan

Network Monitored	Location	Screen Interval (feet bls)	Sampling Method	Analytical Parameters
18 Existing LTM Plan Monitoring Wells	MLPV-IW0009D	45 to 50	Low Flow	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-IW0053	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
39 New LTM Plan Monitoring Wells	MLPV-MW0110	1 to 10	Low Flow	cDCE, tDCE, VC
	WCPS-IW0002SRR	3 to 13		
	MLPV-MW0100	15 to 25		
	MLPV-MW0086	15 to 25		
	MLPV-MW0095	25 to 35		
	MLPV-MW0106	25 to 35		
	MLPV-IW0002IR	28 to 33		
	MLPV-MW0109	20 to 30		
	MLPV-MW0078	25 to 35		
	MLPV-MW0077	25 to 35		
	MLPV-MW0081	25 to 35		
	MLPV-MW0079	25 to 35		
	MLPV-MW0102	25 to 35		
	MLPV-MW0098	20 to 30		
	MLPV-MW0103	35 to 45		
	MLPV-MW0096	35 to 45		
	MLPV-MW0094	35 to 45		
	MLPV-MW0108	35 to 45		
	MLPV-MW0088	35 to 45		
	MLPV-MW0089	35 to 45		
	MLPV-MW0093	35 to 45		
	MLPV-MW0097	35 to 45		
	MLPV-MW0082	35 to 45		
	MLPV-MW0107	35 to 45		
	MLPV-MW0104	47 to 57		
	MLPV-MW0105	47 to 57		
	MLPV-MW0091	47 to 57		
	MLPV-MW0087	47 to 57		
	MLPV-MW0092	47 to 57		
	MLPV-MW0099	40 to 50		
	MLPV-MW0101	40 to 50		
	E8 (Pending Install)	45 to 55		
	MLPV-MW0085	47 to 57		
	MLPV-MW0084	47 to 57		
	MLPV-MW0076	47 to 57		
	MLPV-MW0080	47 to 57		
	MLPV-MW0083	47 to 57		
	MLPV-MW0090	47 to 57		
	E15 (Pending Install)	47 to 57		

LCP LTM

Previous Activities

- March 2023 biennial sampling was performed using modified plan, including 37 newly installed monitoring wells throughout the site
- Results indicated an overall decrease in plume footprint observed at all intervals, with NADC plume migrating downgradient of the biosparge barrier. Team consensus was reached on the following:
  - Transition monitoring wells MLPV-MW0102, MLPV-MW0103, and MLPV-MW0107 to the semi-annual Biosparge Sampling Plan (Decision 2310-D14)
  - Replace monitoring wells: MLPV-IW0053 that historically exceeds GCTLs and is part of sampling plan (Decision 2310-D08), and MLPV-IW0001SR for general monitoring well maintenance (Decision 2310-D09)
  - Install four additional monitoring wells southeast of the biosparge barrier to confirm historical GCTL exceedances (KSCRT Decision 2310-D10 and D11)
  - Add monitoring well VABU-IW0006D to the biennial sampling plan (Decision 2310-D12)
  - Prior to further modifying the LCP LTM well network, one additional set of data will be collected to reflect four years of groundwater conditions from the newly installed monitoring wells (Decision 2310-D15). Additionally, TCE will be added to the analyte list (Decision 2310-D16).

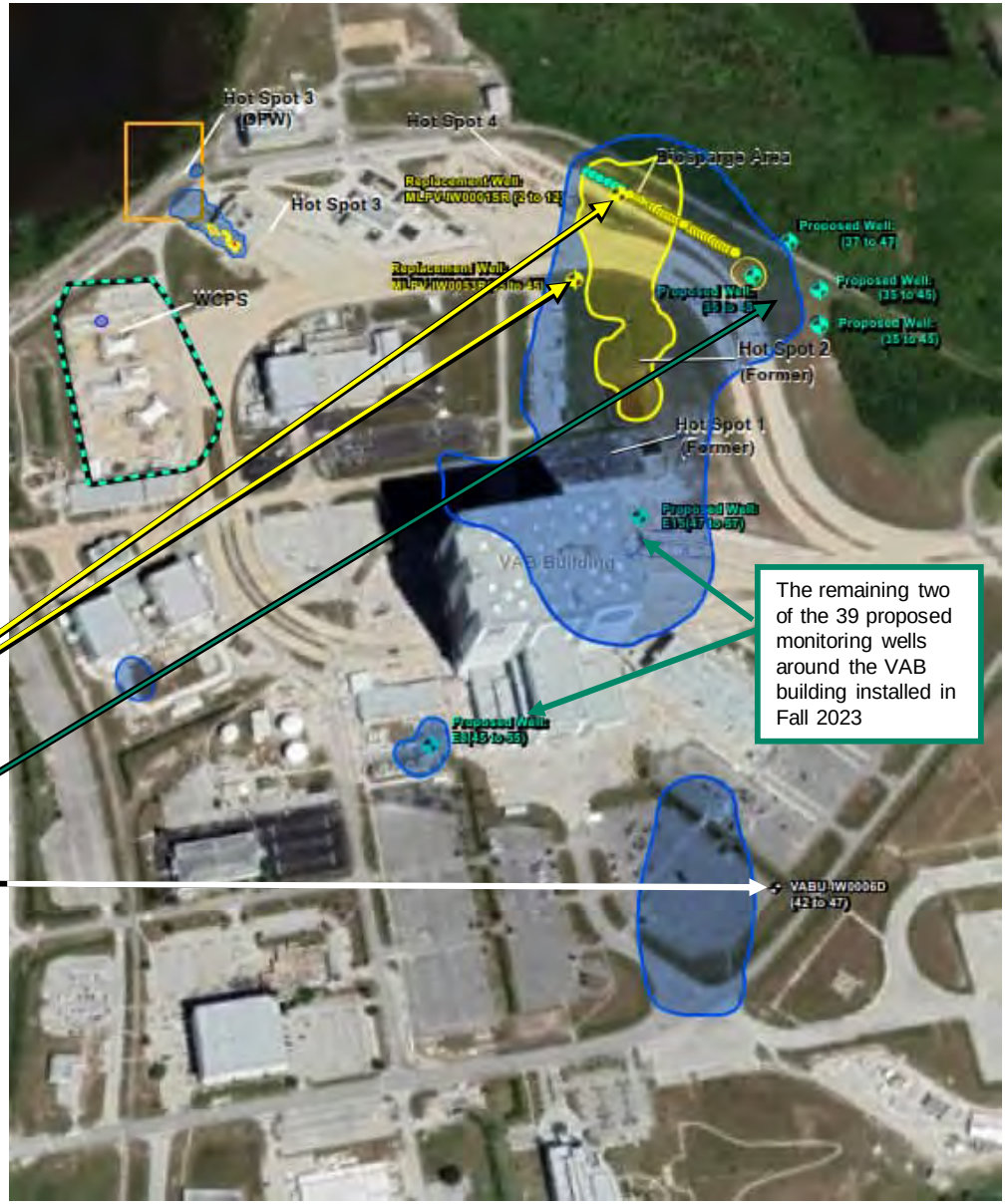
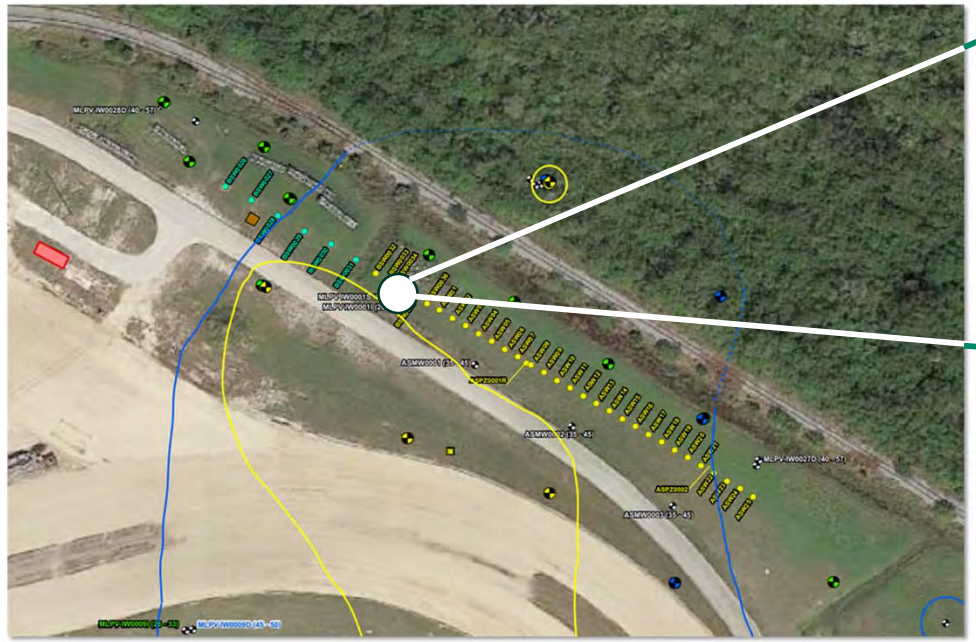


Figure: AECOM MLP/VAB SWMU 056, 2022-2023 CMI and IM Annual Report

LCP LTM

Monitoring Well Installations and Sampling – 1 to 20 feet bls

- November 17, 2023
  - Abandoned damaged monitoring well MLPV-IW0001S and replaced with MLPV-IW0001SR (Decision 2310-D09)
    - Monitoring well is not part of a current sampling plan, but was replaced as part of general well maintenance
    - Screened 2 to 12 feet bls





Abandoned MLPV-IW0001S

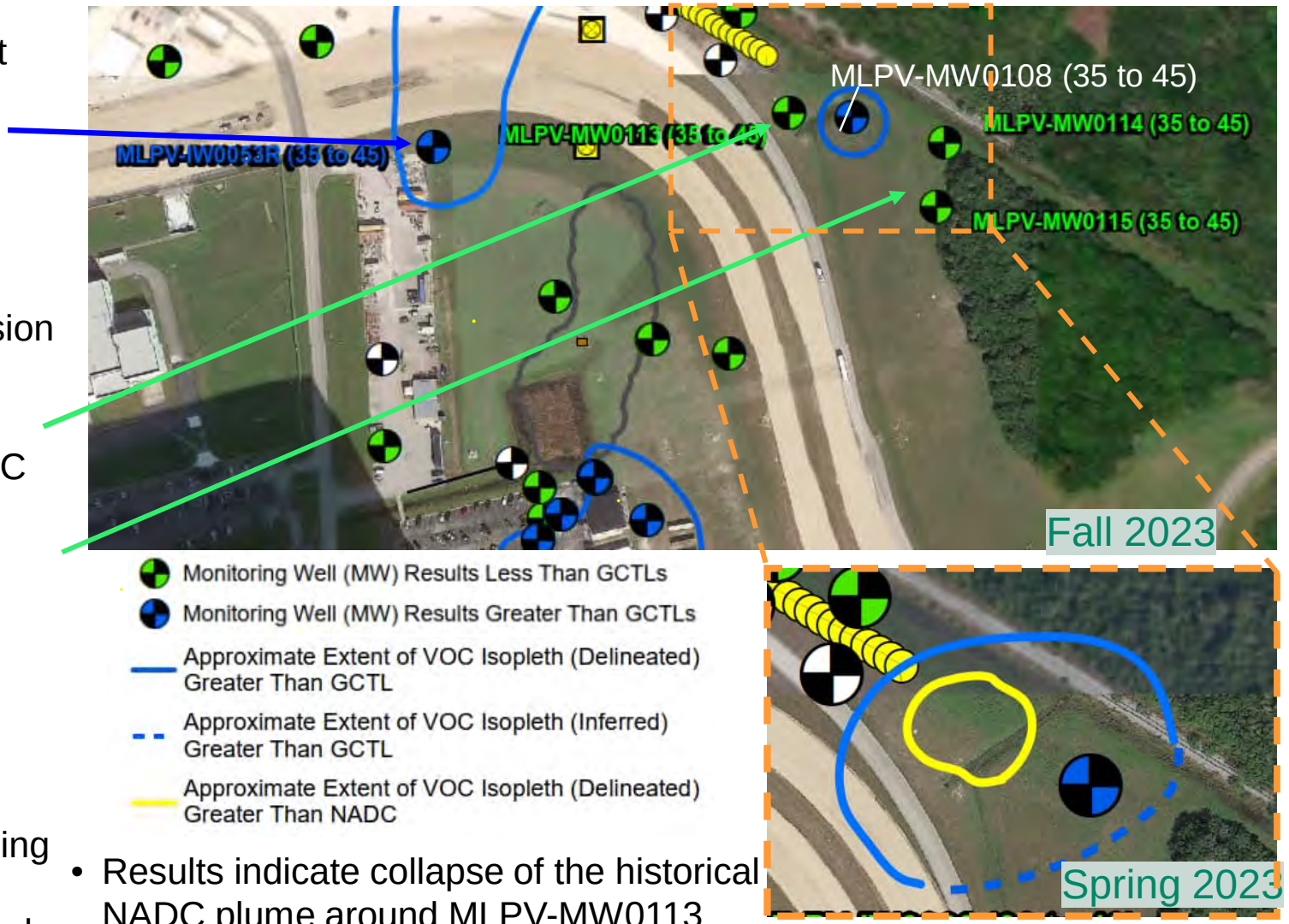


Replacement MLPV-IW0001SR

LCP LTM

Monitoring Well Installations and Sampling – 35 to 45 feet bls

- November 13 through 16, 2023
  - Replaced monitoring well MLPV-IW0053 that historically exceeds GCTLs and is part of sampling plan (Decision 2310-D08)
    - VC exceeded GCTL (18 µg/L)
  - Installed three additional monitoring wells southeast of the biosparge barrier to confirm historical GCTL exceedances (KSCRT Decision 2310-D10 and D11)
    - One southwest and upgradient of original location for MW0108 in the historical NADC plume footprint
      - MLPV-MW0113: CVOCs non-detect
    - Two installed southeast of the biosparge barrier to provide GCTL boundary data around monitoring well MLPV-MW0108
      - MLPV-MW0114 and MLPV-MW0115: CVOCs non-detect
    - One, east of the railroad tracks, was pending results from upgradient MLPV-MW0113. Results indicate installation is not warranted at this time.

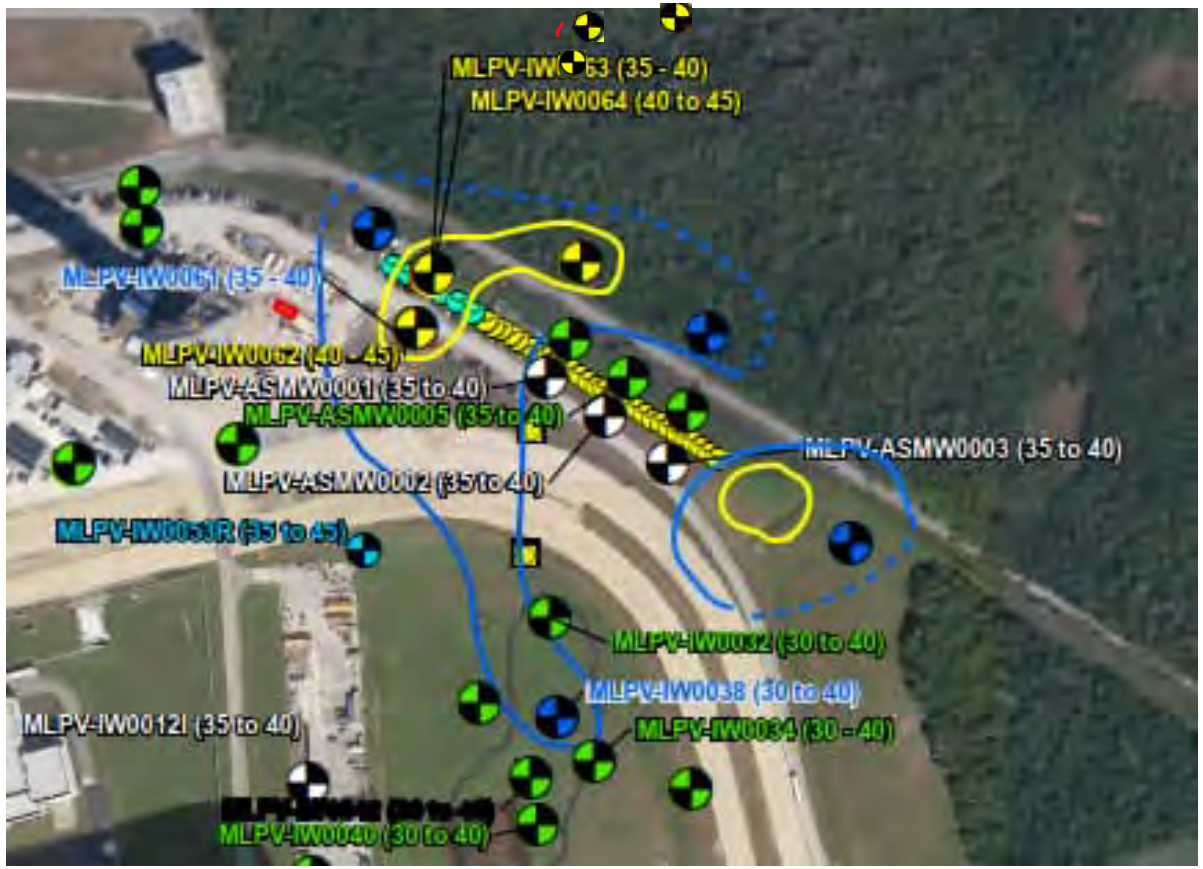


- Results indicate collapse of the historical NADC plume around MLPV-MW0113 and an isolated GCTL plume around MLPV-MW0108

LCP LTM

Analytical Summary - 35 to 45 feet bls

Spring 2023



Fall 2023



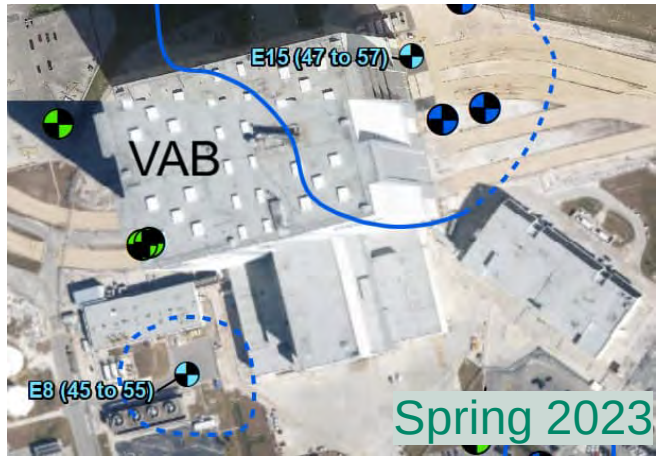
LCP LTM

Monitoring Well Installations and Sampling – 40 to 57 feet bls

- November 2023
  - Two monitoring wells installed within the VAB perimeter (originally proposed in 2022) to confirm historical GCTL plume footprint indicated during 2015 DPT sampling.
    - MLPV-MW0112 (47 to 57 ft bls): VC exceeds GCTL (2.5 µg/L)
    - MLPV-MW0111 (45 to 55 ft bls): CVOCs non-detect

- Sampling results from November 16, 2023 indicate collapse of the LCP southwest of the VAB and confirm GCTL presence in the deep interval east of the VAB.



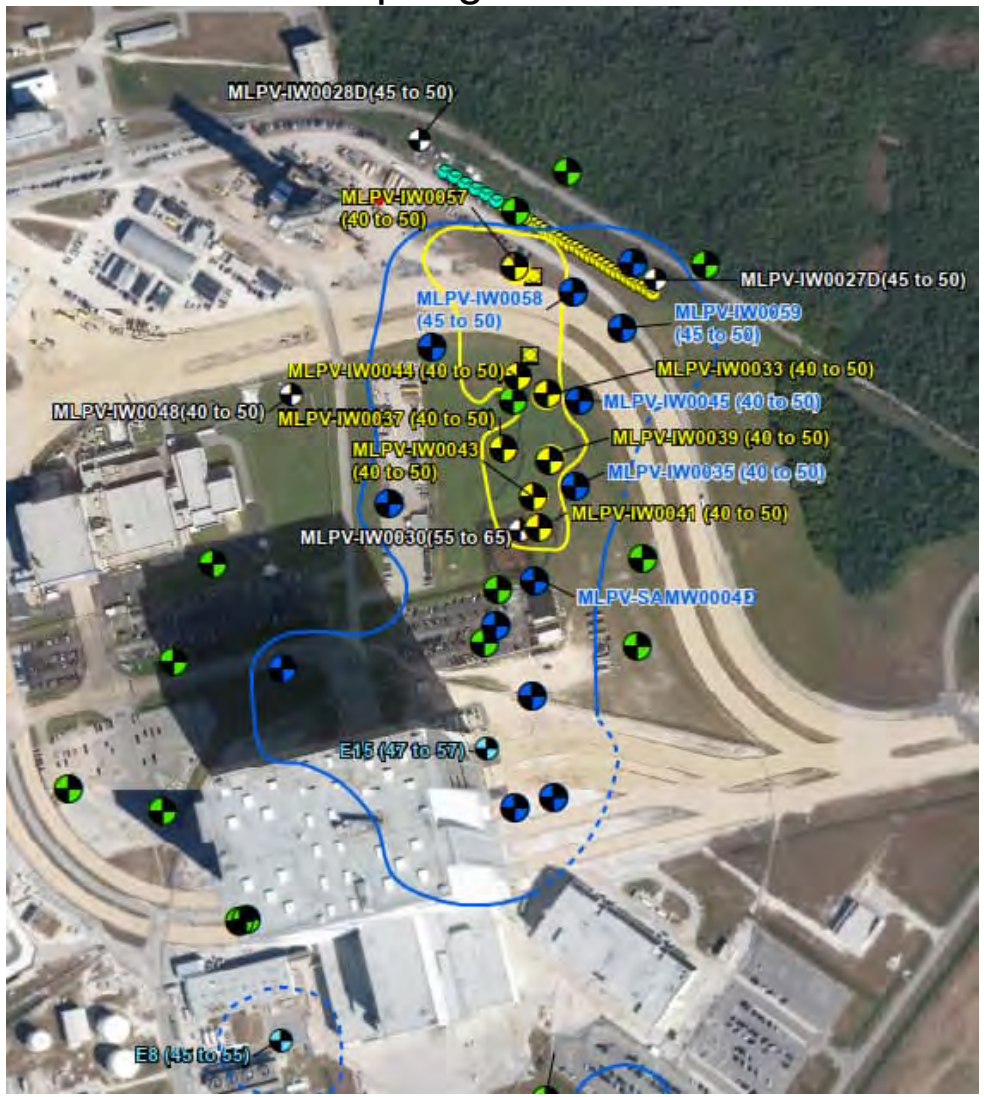


Monitoring Well (MW) Results Less Than GCTLs
Monitoring Well (MW) Results Greater Than GCTLs
Approximate Extent of VOC Isopleth (Delineated) Greater Than GCTL
Approximate Extent of VOC Isopleth (Inferred) Greater Than GCTL

LCP LTM

Analytical Summary - 40 to 57 feet bls

Spring 2023



Fall 2023



LCP LTM

Conclusions

Conclusions continued from the October 2023 KSCRT meeting

- If upgradient concentrations in MW0113 increase above NADC, install the remaining proposed monitoring well (Decision item 2310-D10).
  - Screened 37 to 47 feet bls, located east of the railroad tracks (downgradient, wetland area)

- Complete one more groundwater sampling event to have two biennial data sets that reflect four years of groundwater conditions from the newly installed monitoring wells prior to further modifying the LCP LTM sampling plan (Decision item 2310-D15).



LCP LTM

Test Consensus

- Continue LTM on a biennial basis with the addition of TCE.

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. Added to LTM Plan in 2023	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		
	MLPV-MW0113	35 to 45		
	MLPV-MW0114	35 to 45		
	MLPV-MW0115	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		
	MLPV-MW0111 (E8)	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		
	MLPV-MW0112 (E15)	47 to 57		

Thank you

APPENDIX B

BIOSPARGE SYSTEM FIELD NOTES

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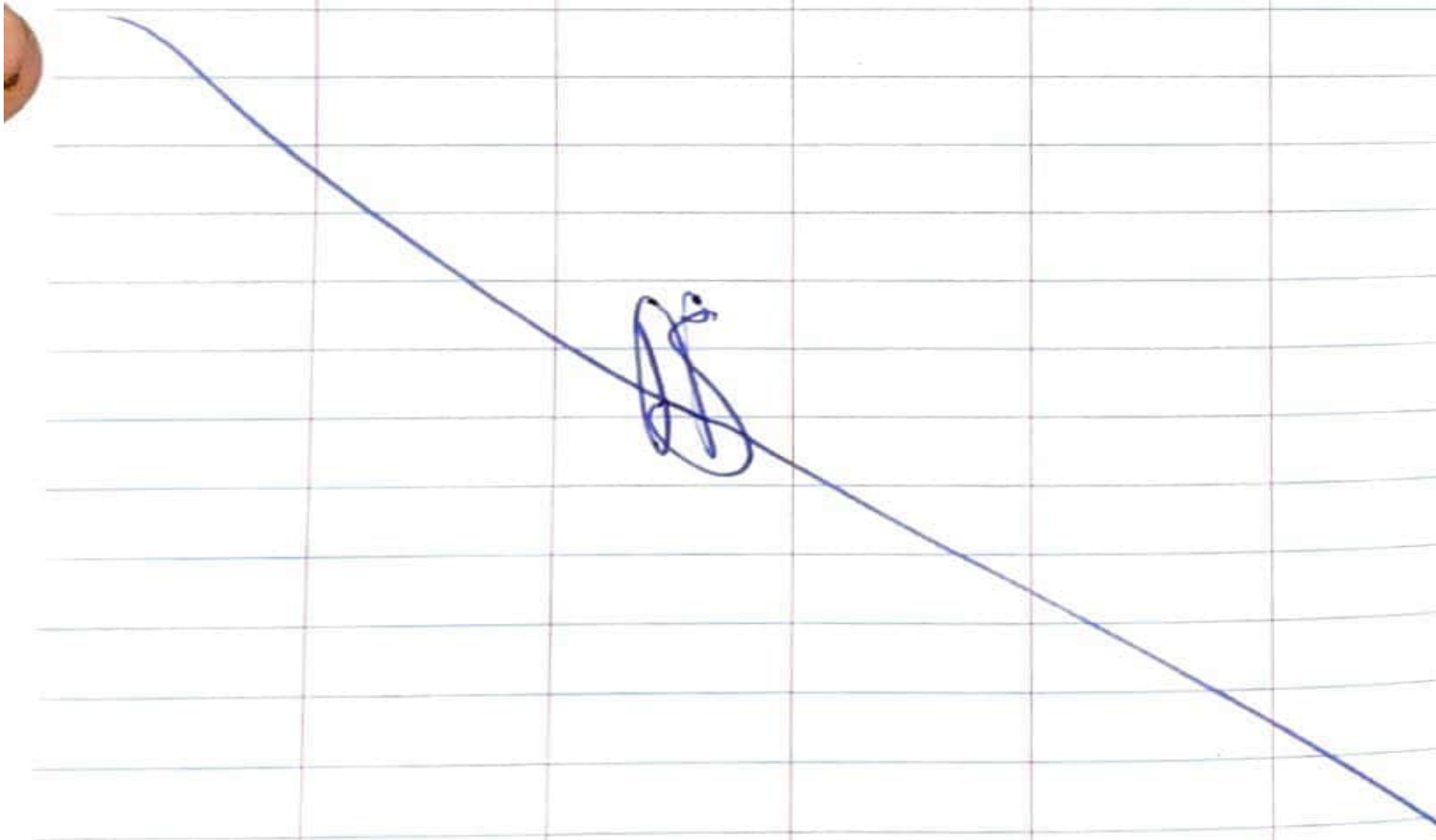
5/16/23 KSC MLPV p. 1 of 1 DS/DK

O&M

0745 - Dustin Slater & Devin Kehoe onsite.
Weather: Sunny, warm 79°F
H&S Meeting
- System on upon arrival.
- Begin O&M
  ↳ see log for all data collected.

1445 - O&M complete.
System on upon departure.

1500 - offsite.



SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 6/16/2023

NOTES BY: James Bradford (JB) and Chris Setrin (CS)

ADDITIONAL ON SITE: NA

TIME	FIELD NOTES
0900	JB onsite. Chris Setrin already onsite. Weather: overcast, possible rain, windy. 80 deg F. System running upon arrival.
	Checked for emails. Received email this morning. Did not reset modem.
0930	Shut system down for maintenance Belt tension is good. Cleaned prefilter. Added approx 1-qt of oil. Noticed small oil drip post coalescer. Cleaned and will monitor if drip continues.
1000	Restarted system. Switched to manual zone control for field readings.
	Note: area is getting overgrown with weeds and brush. Recommend clearing area.
	Continue field and trailer readings.
	For details, refer to O&M log.
1500	Complete field and trailer readings. Switch system back to AUTO.
1530	All personnel offsite. Rain starting.

0800 - Dustin Slater & Christopher Setzer onsite.

Weather: sunny, warm 82°F

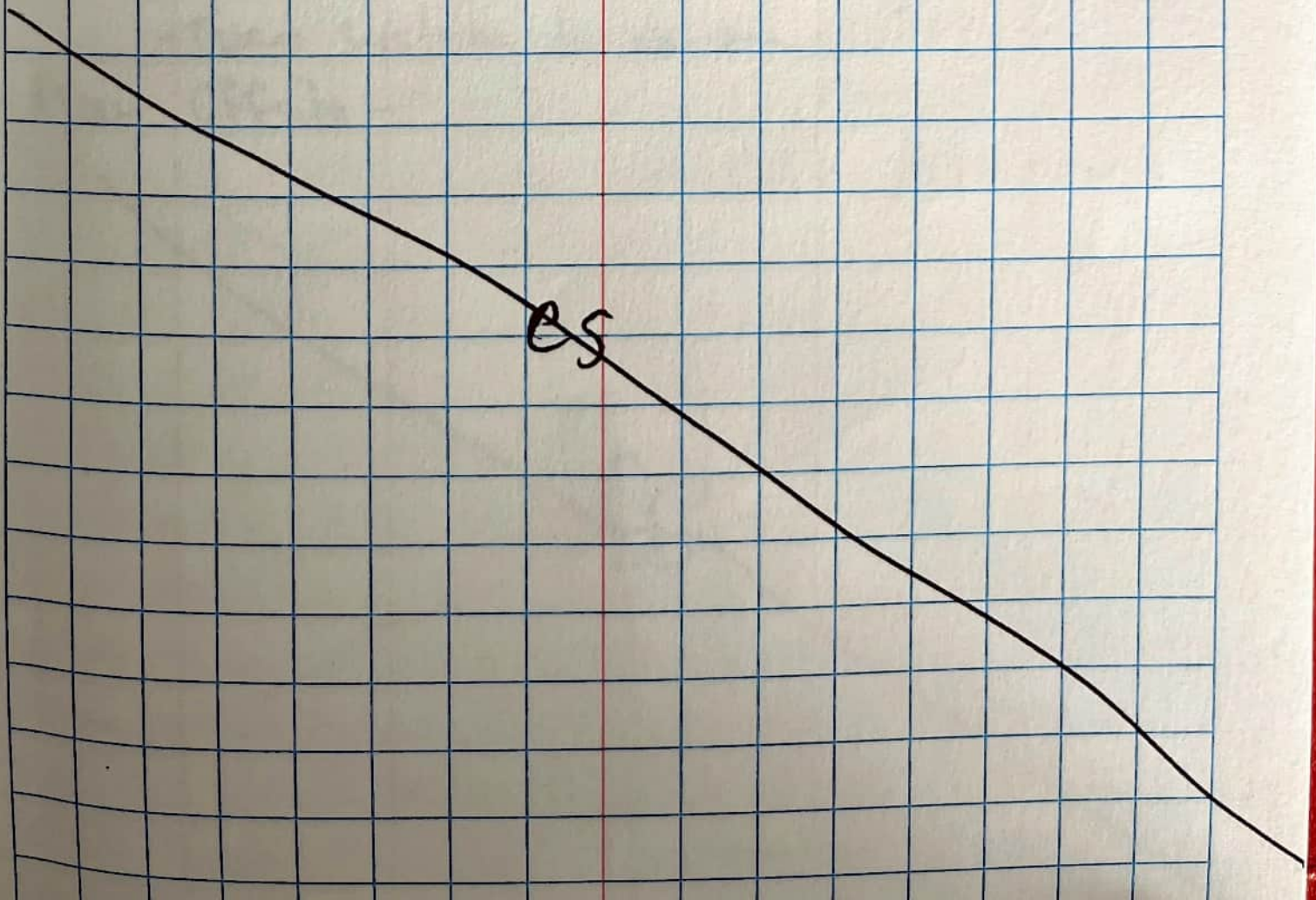
H&S meeting

- System on upon arrival
- Begin OfM
  - ↳ see log for all data collected.

1445 - OfM complete.

System on upon departure.

1500 - Offsite.



SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 8/16/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE: Chris Setrin (CS)

TIME	FIELD NOTES
07:00	JB and CS at Orlando Depot to load equipment into Truck 172.
07:30	Depart depot for site
08:50	Arrive onsite. System running upon arrival. Contact Tony Bucca (Bechtel) to relay SOW and check for simultaneous operations in area. Area is clear aside from minor activities. Weather is 81 degF and partly cloudy with a high of 91 degF and chance of rain.
	Begin collecting field and trailer readings for Zone 1. For details, refer to O&M Log.
11:00	Switch to Zone 2 and collect readings.
12:00	Switch to Leg 5 and collect readings.
13:50	Thunderstorm in area. All personnel offsite.

9/22/23 KSC MLP p.1 of 1 DS/CS

0800- Dustin Slaten & Christopher Sefrin onsite.

Weather: Sunny, 83°F.

H&S meeting.

System on upon arrival.

- Begin O&M
  - See log for data collected.

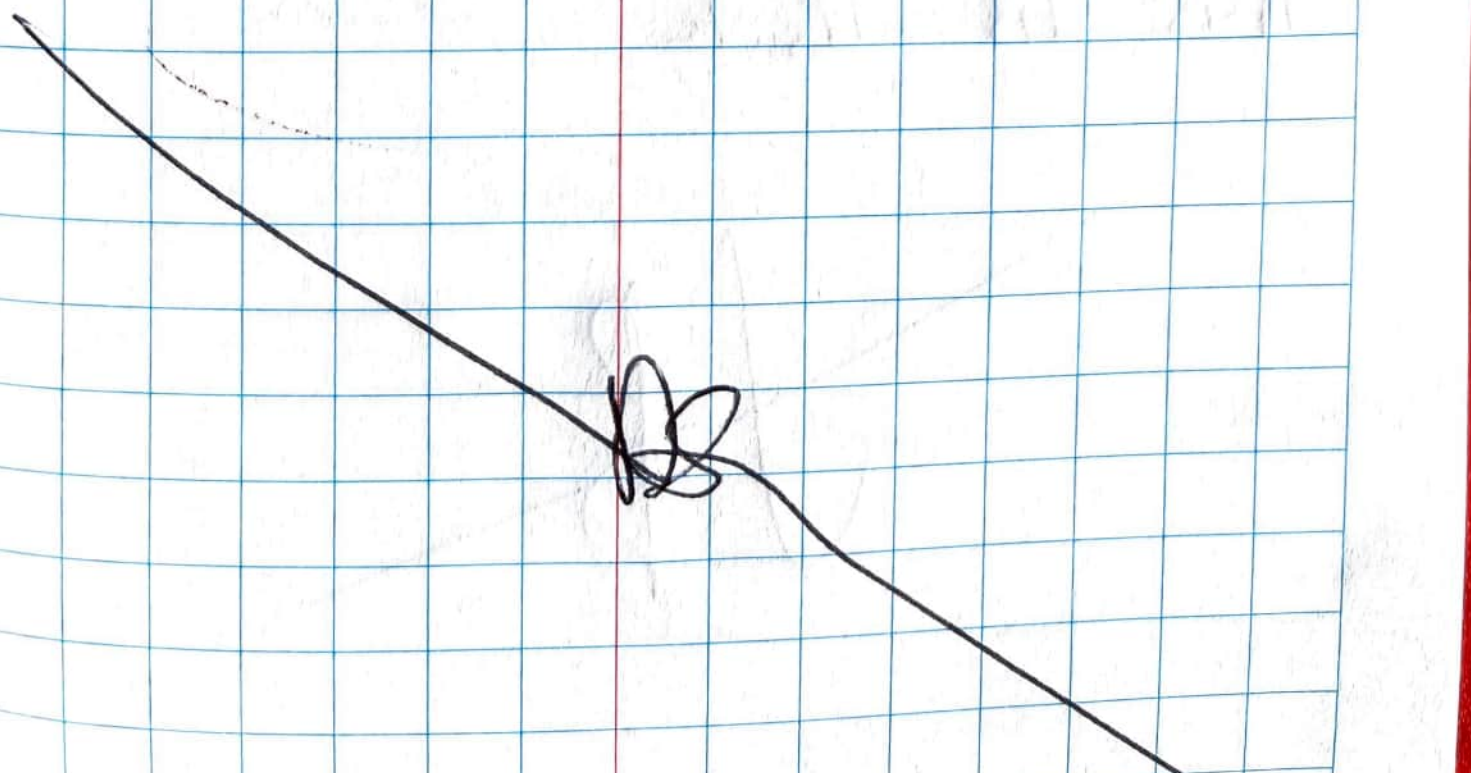
1430- O&M complete.

Shut compressor off to check belts.

- Belts needed to be tightened.

- Turn system back on.

1500- Offsite.



SITE: **NASA MLPV**

PLANNED ACTIVITIES: Telemetry troubleshooting

DATE: 10/5/2023

NOTES BY: James Bradford (JB)

ADDITIONAL ON SITE:

TIME	FIELD NOTES
07:05	JB departs home office in AECOM F-250 (Truck 707) for MLPV site.
08:30	JB arrives onsite at system trailer. Weather is 78degF and partly cloudy. System operating upon arrival.
	Telemetry is operating correctly. Did not make any changes to telemetry.
	The High-High Interior Alarm will not reset. Tested the Dwyer RRT225OU remote reading thermometer s operating properly.
	Telemetry stopped working while troubleshooting temperature alarm.
	Logged into Pepwave router and found it was not detecting the SIM card
	Found loose connection at PLC in reference to high high alarm. Connection is related to a screw that won't tighten completely. PLC requires new screw or anchoring to ensure connection remains tight.
	Left a message with AT&T rep to determine if new SIM card and/or new modem is required.
11:45	JB offsite. System operating and high-high alarm is off. Telemetry is not working.

10/20/23 JB/DT

MCPV O&M

0830 James Bradford onsite in FORD F-250 (70
Dave Tran onsite in FORD F-150 (#9076)
System off upon arrival
- Weather: 67°F, sunny, H81°F

- Begin 4000 hr maintenance.
  = Change air/oil separator
- Change belts (XPI207 x 2)
- Change coalescer filters
  (1) EK6Ø2B
  (1) { F701-C3-0773 / FN15060CU6 }

* NOTE: NO REPLACEMENT FOR
AIRCEL AF100-D-AC01
= Will need to order (# A100ACC)

1000 Start system w/ valve off to zones to check belts.
- Replaced ZONE 3 flowmeter after shutting down system.

1130 JB & DT offsite

1330 JB at COMPAIR to pick up maintenance items. Deliver to Depot

10/23/23 p 1 of 1 JB/PB

NASH MLRV O&M

0830 James Bradford onsite in FORD F-250 (AECOM #707). Patrick Bendik onsite in FORD F-150 (AECOM # 903)
- System running upon arrival.
- Weather: 72°F, cloudy to 82°F
Begin O&M - collect readings for ZONE 1
* FOR DETAILS, REFER TO O&M LOG

11:00 Switch to ZONE 2; Collect readings
* FOR DETAILS REFER TO O&M LOG
* Repaired EXHAUST STACK

12:20 Switch to Zone 5; collect readings
* FOR DETAILS, REFER TO O&M LOG
* FLOW METER INOPERABLE. R&R FLOW METER FOR ZONE 5.
= Replacement Flow meter also inoperable.
= Will order another replacement
= Changed oil & filters (4000 hr service) — completed — 33133 hrs.
= Pulled apart solenoid valve to retrieve pieces of broken flow meter

16:20 Restarted system. Checked for proper zone operation & flows.

16:40 ALL PERSONNEL OFFSITE

SITE: **NASA MLPV**

PLANNED ACTIVITIES: O&M

DATE: 11/20/2023

NOTES BY: James Bradford

ADDITIONAL ON SITE: Dustin Slater

TIME	FIELD NOTES
7:45	JB onsite in Ford F-250 #707. DS onsite in Ford F-150 #903. Weather: 69degF and mostly sunny (high of 76degF and cloudy predicted)
	System on upon arrival. Switch to manual and leave Zone 1 operating.
	Collect trailer and field readings for Zone 1. For details, refer to O&M Log.
9:15	Switch to Zone 2 and collect readings. For details, refer to O&M Log.
10:25	Switch to Zone 5.
	Collect readings. For details, refer to O&M Log.
11:15	Shut system down for maintenance items.
	Added 1-qt oil to compressor. Cleaned the re-filter.
	Tightened compressor belts.
12:20	Restarted system and switched controls to auto.
12:30	Picked up equipment and locked trailer.
13:15	JB offsite.

12/20/23 p 1 of 1 JB/DS

NASH MLPV O;M

0600 James Bradford at Orlando Depot to load equipment.

0615 JB Departs DEPOT

0745 JB arrives onsite in #707 FORD F-250. DS onsite in #289 FORD F-150

Weather: 46°F, cloudy (H67°F)

SOW: O;M

~~Zone~~ System operating upon arrival

8:15 - Shut system down for maintenance.

- Tightened belts, oil level ok.

Comp HRS on compressor panel: 34512

8:40 RESTART SYSTEM. Begin collecting readings for ZONE 1

*FOR DETAILS, REFER TO O;M LOG

*NOTE: Swale is full of water preventing access to monitor wells along the railroad tracks to the north of the swale. All other wells are accessible.

9:50 Switch to Zone 2, collect readings.

*FOR DETAILS, REFER TO O;M LOG.

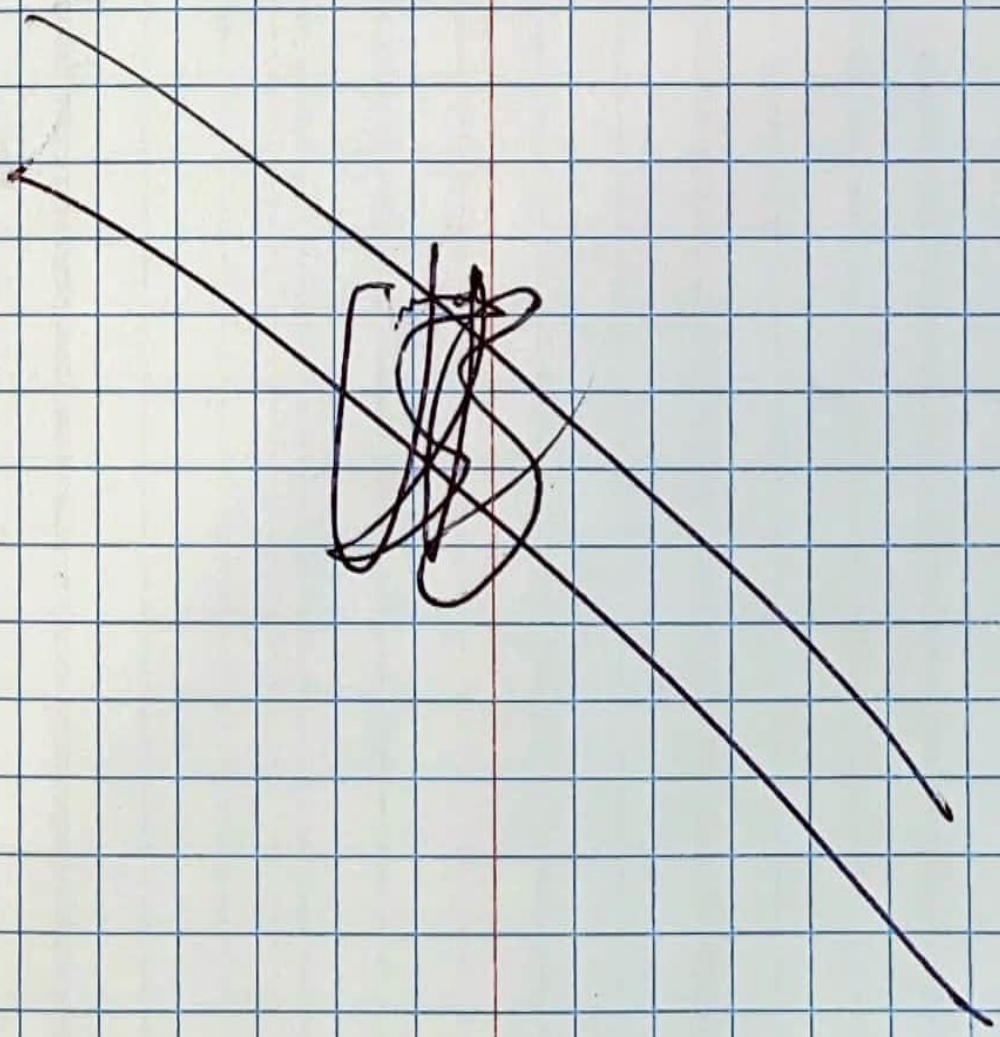
JB

NASA MLPV O&M

1045 Switch to EGG 5, collect readings.
#FOR DETAILS, REFER TO O&M LOG.

1130 Switch system back to AUTO, Pick up area, equipment

1210 ALL PERSONNEL OFFSITE



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APPENDIX C

BIOSPARGE SYSTEM OM&M LOGS

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MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel: Dustin Slater, D	Date: 5/16/2023	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 (XPA1207)	Each Visit	Yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	NA	

Equipment Trailer Readings (Biosparge)

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	24887.6	24/37	Air Outlet Temperature (°F)	178	181	180	°F
Heat Exchanger	24966.0	1.8	Load/Unload Time (sec)	31/17	30/17	22/22	sec
Temperature (TSHH-801)	68	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80	75	100	psig
Zone 1 Hours	3380.3	hrs	Pressure Regulator (psig)	21	20	24.5	psig
Zone 2 Hours	3556.5	hrs	Manifold Pressure (psig)	20	25	25.5	psig
Zone 3 Hours	341.2	hrs	Main Flow (ACFM)	130	130	110	ACFM
Zone 4 Hours	6793.3	hrs	Manifold Temperature (°F)	93	102	100	°F
Compressor			Zone Pressure (psig)	21	21	22.5	psig
Dilution Valve Open	-	%	Zone Flow (ACFM)	15	16	14.5	ACFM
Coalescer Differential Pressure	3	psig	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)	19.3	19.3	19.2	19.2	19.2	19.3	19.1	19.2
Temp. (°F)	60	62	71	84	73	73	74	74
Differential (in. WC)	0.150	0.030	0.070	0.100	0.010	0.070	0.030	0.010
Flow (ACFM)	6.6	3.0	4.5	5.3	1.7	4.5	2.9	1.7
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	19.3	19.2	19.2	19.2	19.2	20.3	20.3	20.2
Temp. (°F)	73	73	74	72.0	73	74	75	75
Differential (in. WC)	0.030	0.050	0.600	0.050	0.030	0.010	0.010	0.020
Flow (ACFM)	2.9	3.8	13.1	3.8	2.9	1.7	1.7	2.4
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	20.3	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Temp. (°F)	75	76	77	74	76	75	75	76
Differential (in. WC)	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010
Flow (ACFM)	1.7	1.7	1.7	1.7	1.7	2.4	1.7	1.7
	ASW25	**Biosparge**	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.2	**Expansion**						
Temp. (°F)	77.0	Pressure (psig)	20.0	23.0	20.0	20.0	21.0	23.0
Differential (in. WC)	0.10	Flow (ACFM)	2.0	2.6	2.0	1.6	2.0	2.0
Flow (ACFM)	5.4	Flow (SCFM)	3.1	4.1	3.1	2.4	3.1	3.2
			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		**Biosparge**	20.0	15.4	15.6	20.0	19.5	
Temp. (°F)		**Expansion**						
Differential (in. WC)		**System**	0.120	0.100	0.150	0.030	0.050	
Flow (ACFM)		**Readings**	6.4	5.4	6.7	3.2	4.1	

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)	3.94	3.29	5.13	5.15	5.68	1.32	1.91	1.18
Stress (in. WC)	0.04	0.17			0.04	0.06	0.04	0.03
Dissolved Oxygen (mg/L)	3.56	7.80	6.35	5.56	4.96	6.36	5.05	2.33
Temperature (°F)	25.8	26.2	24.4	25.6	26.7	25.8	25.6	28.7
ORP (mV)	182	140	179	169	191	217	207	158
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)	1.50	4.70	4.69	2.54	2.37	2.58		
Stress (" H2O)		0.05	0.17	0.00	0.00	4.50		
Dissolved Oxygen (mg/L)	5.57	4.53	5.59	5.41	1.91	8.70		
Temperature °F	25.5	27.1	27.4	28.1	27.8	25.6		
ORP (mV)	197	184	199	209	189	151		
Zone/Leg	5	5	5	5	5	5		

Comments

ASMW-1 is covered by a pile of gravel, so no readings were collected at that well.

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	James Bradford, Chris Strin	**Date:**	6/16/2023	**Time:**	9:00 AM

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 approximately 1-qt.
Check Compressor Belts (XPA1207)	Each Visit	Yes	
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	No	Note: next month will require 2000 hour service.

Equipment Trailer Readings (Biosparge)

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	30271	25	Air Outlet Temperature (°F)	185	176	192	°F
Heat Exchanger	25651.6	1.8	Load/Unload Time (sec)	27.6/18.8	29.3/18.4	23.8/20.1	sec
Temperature (TSHH-801)	110	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80-110	80-110	80-110	psig
Zone 1 Hours	3625.9	hrs	Pressure Regulator (psig)	26	23	19	psig
Zone 2 Hours	3506.1	hrs	Manifold Pressure (psig)	24	25.5	26	psig
Zone 3 Hours	594	hrs	Main Flow (ACFM)	140	130	110	ACFM
Zone 4 Hours	7531.9	hrs	Manifold Temperature (°F)	80	95	110	°F
Compressor			Zone Pressure (psig)	20.5	22	23	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	17	16	14	ACFM
Coalescer Differential Pressure	3	psig	Zone Flow (SCFM)	26.0	24.7	21.6	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)	19.4	19.4	19.5	19.4	19.4	19.4	19.5	19.5
Temp. (°F)	78	78	76	76	77	77	79	75
Differential (in. WC)	0.015	0.015	0.010	0.020	0.050	0.030	0.010	0.050
Flow (ACFM)	2.1	2.1	1.7	2.4	3.8	2.9	1.7	3.8
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	19.6	19.4	19.4	19.5	19.7	20.2	20.4	20.5
Temp. (°F)	73	76	70	71.0	73	79	80	80
Differential (in. WC)	0.040	0.035	0.020	0.005	0.020	0.025	0.020	0.015
Flow (ACFM)	3.4	3.2	2.4	1.2	2.4	2.7	2.4	2.1
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	20.0	20.6	20.6	20.7	20.5	20.6	20.5	20.7
Temp. (°F)	78	78	78	75	76	75	80	79
Differential (in. WC)	0.005	0.015	0.005	0.030	0.020	0.010	0.035	0.070
Flow (ACFM)	1.2	2.1	1.2	3.0	2.4	1.7	3.2	4.5
	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.6	Pressure (psig)						
Temp. (°F)	79.0	Flow (ACFM)	21.0	23.0	19.0	20.0	20.0	22.0
Differential (in. WC)	0.11	Flow (SCFM)	2.0	2.0	2.0	1.9	2.2	2.1
Flow (ACFM)	5.7		3.1	3.2	3.0	2.9	3.3	3.3
			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		Biosparge Expansion System Readings	21.7	21.2	21.1	19.3	19.8	
Temp. (°F)			83	79	80	78	80	
Differential (in. WC)			0.020	0.025	0.020	0.045	0.015	
Flow (ACFM)			2.5	2.7	2.4	3.6	2.1	

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 (in. WC)								
Dissolved Oxygen (mg/L)								
Temperature (°F)								
ORP (mV)								
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)								
Zone/Leg	5	5	5	5	5	5		

Comments

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	Dustin Slater, Chris Strin	**Date:**	7/18/2023	**Time:**	8:00 AM

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.	Yes	

Equipment Trailer Readings (Biosparge)

Control Panel			**Compressor HMI**				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	30912	37	Air Outlet Temperature (°F)	181	172	172	°F
Heat Exchanger	26292.8	2	Load/Unload Time (sec)	31.4/17.4	22.3/23.0	25.2/20.7	sec
Temperature (TSHH-801)	68	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80-110	80-110	80-110	psig
Zone 1 Hours	3625.9	hrs	Pressure Regulator (psig)	27	25	24	psig
Zone 2 Hours	3506.1	hrs	Manifold Pressure (psig)	27	25	27	psig
Zone 3 Hours	594	hrs	Main Flow (ACFM)	140	140	120	ACFM
Zone 4 Hours	7531.9	hrs	Manifold Temperature (°F)	85	95	85	°F
Compressor			Zone Pressure (psig)	22	21	25	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	16	17	12.5	ACFM
Coalescer Differential Pressure	3	psig	Zone Flow (SCFM)	24.9	25.9	20.2	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)	19.7	19.7	19.8	19.8	19.8	19.8	19.8	19.7
Temp. (°F)	82	86	83	85	84	88	90	92
Differential (in. WC)	0.15	4.30	1.85	2.13	0.18	0.16	0.54	0.79
Flow (ACFM)	6.5	34.9	23.0	24.6	7.2	6.7	12.3	14.9
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	19.7	19.8	19.8	19.6	19.6	20.2	20.2	20.3
Temp. (°F)	90	89	87	89.0	88	88	90	82
Differential (in. WC)	0.78	0.30	0.10	1.91	0.05	0.17	0.17	0.17
Flow (ACFM)	14.8	9.2	5.3	23.1	3.7	7.0	7.0	7.0
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	20.3	20.2	20.3	20.3	20.2	20.3	20.4	20.5
Temp. (°F)	87	87	87	87	86	81	81	82
Differential (in. WC)	-	0.17	0.26	0.15	0.17	0.01	0.01	0.16
Flow (ACFM)	#VALUE!	7.0	8.6	6.6	7.0	1.7	1.7	6.8
	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.4							
Temp. (°F)	82.0	Pressure (psig)	21.0	23.0	20.0	20.0	21.0	22.0
Differential (in. WC)		Flow (ACFM)	2.0	2.3	2.0	2.0		
Flow (ACFM)	0.0	Flow (SCFM)	3.1	3.6	3.0	3.0	0.0	0.0
			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		Biosparge Expansion System Readings	20.4	20.4	20.2	19.9	19.7	
Temp. (°F)								
Differential (in. WC)			2.600	0.120	0.010	0.540	2.400	2.1
Flow (ACFM)			29.8	6.4	1.8	13.5	28.4	2.1

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)	2.90	2.22		4.13	4.45			
Stress (in. WC)	0.00	0.10		0.00	0.00			
Dissolved Oxygen (mg/L)	2.35	6.67		3.89	4.03			
Temperature (°F)	30.1	30.1		28.5	30.7			
ORP (mV)	118	149		111	108			
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)		3.77	3.73					
Stress (" H2O)		0.10	2.90					
Dissolved Oxygen (mg/L)		1.25	5.91					
Temperature °F		26.1	26.7					
ORP (mV)		153	145					
Zone/Leg	5	5	5	5	5	5		

Comments

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	James Bradford, Chris Strin	**Date:**	8/16/2023	**Time:**	8:30 AM

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	

Equipment Trailer Readings (Biosparge)

Control Panel			**Compressor HMI**				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	31609	25-35	Air Outlet Temperature (°F)	192	194	194	°F
Heat Exchanger	26990.5	2	Load/Unload Time (sec)	32.3/18.5	25.7/21.1	26.0/21.3	sec
Temperature (TSHH-801)	110	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80-110	80-110	80-110	psig
Zone 1 Hours	4097.6	hrs	Pressure Regulator (psig)	16.5	18	16.5	psig
Zone 2 Hours	3972.6	hrs	Manifold Pressure (psig)	23	25	23	psig
Zone 3 Hours	1067.8	hrs	Main Flow (ACFM)	140	120	120	ACFM
Zone 4 Hours		hrs	Manifold Temperature (°F)	110	110	117	°F
Compressor			Zone Pressure (psig)	20.5	19.5	23	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	17	13	12	ACFM
Coalescer Differential Pressure	2	psig	Zone Flow (SCFM)	25.3	19.1	18.4	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)	20.3	20.3	20.1	20.3	20.2	20.3	20.2	20.2
Temp. (°F)	84	84	83	84	82	84	84	82
Differential (in. WC)	0.160	0.150	0.055	0.090	0.010	0.005	0.000	0.210
Flow (ACFM)	6.8	6.6	4.0	5.1	1.7	1.2	0.0	7.8
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	20.3	20.3	20.2	20.4	20.4	21.1	21.3	21.1
Temp. (°F)	79	84	82	82.0	82	83	84	83
Differential (in. WC)	0.025	0.000	0.005	0.005	0.010	0.010	0.015	0.010
Flow (ACFM)	2.7	0.0	1.2	1.2	1.7	1.7	2.1	1.7
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	21.1	21.2	21.1	21.3	20.9	21.1	21.1	21.1
Temp. (°F)	83	82	81	81	83	83	81	82
Differential (in. WC)	0.005	0.005	0.230	0.010	0.010	0.010	0.015	0.015
Flow (ACFM)	1.2	1.2	8.3	1.7	1.7	1.7	2.1	2.1

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	21.3							
Temp. (°F)	81.0	Pressure (psig)	20.0	23.0	20.0	20.0	23.0	22.0
Differential (in. WC)	0.01	Flow (ACFM)	2.0	2.2	2.2	2.2	2.0	2.0
Flow (ACFM)	1.7	Flow (SCFM)	3.0	3.5	3.3	3.3	3.2	3.1

			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		Biosparge	21.4	21.2	21.2	20.1	20.3	
Temp. (°F)		Expansion	85	83	83	82	82	
Differential (in. WC)		System	0.030	0.045	0.025	0.100	0.020	
Flow (ACFM)		Readings	3.0	3.7	2.7	5.4	2.4	

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)	3.17	3.83	covered	9.49	5.09	0.39	1.11	0.69
Stress (in. WC)	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00
Dissolved Oxygen (mg/L)	3.53	7.11	-	4.96	6.11	0.51	0.65	1.01
Temperature (°F)	32.3	31.3	-	29.7	32.1	30.8	29.1	29.7
ORP (mV)	206	188	-	155	171	142	-66	89
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)	1.05	4.15	4.15	1.98	1.81	2.09		
Stress (" H2O)	0.06	0.10	0.45	0.00	0.20	4.61		
Dissolved Oxygen (mg/L)	3.10	0.89	0.94	1.58	3.68	8.41		
Temperature °F	29.4	31.8	32.0	32.1	32.1	28.7		
ORP (mV)	115	98	126	189	201	173		
Zone/Leg	5	5	5	5	5	5		

Comments

ASMW-1 is covered by a pile of gravel, so no readings were collected at that well.

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	Dustin Slader Christopher Setrin	Date:	9/22/2023	Time:	8:00 AM

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	Tightened
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	No	

Equipment Trailer Readings (Biosparge)

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	32495		Air Outlet Temperature (°F)	187	180	183	°F
Heat Exchanger	27875.8		Load/Unload Time (sec)	45 / 13	29 / 18	27 / 20	sec
Temperature (TSHH-801)	150	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	90	85	90	psig
Zone 1 Hours	4390.9	hrs	Pressure Regulator (psig)	24	26	26	psig
Zone 2 Hours	4269.5	hrs	Manifold Pressure (psig)	25	23	24	psig
Zone 3 Hours	1365.2	hrs	Main Flow (ACFM)	150	120	130	ACFM
Zone 4 Hours	9494.5	hrs	Manifold Temperature (°F)	125	125	128	°F
Compressor			Zone Pressure (psig)	21.5	21	24	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	22	14	15	ACFM
Coalescer Differential Pressure	2	psig	Zone Flow (SCFM)	32.8	20.8	23.1	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)	19.6	19.5	19.6	19.6	19.5	19.5	19.5	19.4
Temp. (°F)	78	81	79	78	77	75	76	75
Differential (in. WC)	0.120	0.180	0.130	0.090	0.050	0.070	0.180	0.640
Flow (ACFM)	5.9	7.1	6.1	5.1	3.8	4.5	7.2	13.5
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	19.5	19.5	19.5	19.5	19.6	20.1	20.1	20.2
Temp. (°F)	77	73	74	72.1	74	72	72	73
Differential (in. WC)	0.940	0.080	0.250	0.250	0.020	0.770	0.020	0.040
Flow (ACFM)	16.4	4.8	8.5	8.5	2.4	15.0	2.4	3.4
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	20.1	20.2	20.1	20.1	20.2	20.2	20.2	20.3
Temp. (°F)	71.2	71.4	71.4	70.5	71.1	70.2	69.6	71.1
Differential (in. WC)	-	0.010	0.180	0.050	0.005	0.030	0.400	0.070
Flow (ACFM)	-	1.7	7.3	3.8	1.2	3.0	10.9	4.5
	ASW25	**Biosparge**	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.0	**Expansion**						
Temp. (°F)	69.4	Pressure (psig)	20.0	23.0	20.0	20.0	21.0	22.0
Differential (in. WC)	0.38	Flow (ACFM)	2.4	2.6	2.5	2.4	2.2	2.0
Flow (ACFM)	10.6	Flow (SCFM)	3.7	4.2	3.8	3.7	3.4	3.2
			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		**Biosparge**	0.21	0.07	0.01	0.76	0.22	
Temp. (°F)		**Expansion**						
Differential (in. WC)		**System**						
Flow (ACFM)		**Readings**						

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)	3.71	3.42	covered	5.02	5.70	1.17	1.56	1.15
Stress (in. WC)	0.00	0.00	-	0.00	0.00	0.10	0.00	-0.70
Dissolved Oxygen (mg/L)	5.25	7.62	-	6.01	6.59	6.64	2.75	4.09
Temperature (°F)	28.9	28.5	-	28.4	30.2	28.4	27.9	28.2
ORP (mV)	96	65	-	103	78	83	72	56
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)	1.56	4.75	4.77	2.45	2.25	2.50		
Stress (" H2O)	0.20	0.00	0.70	0.15	0.00	4.10		
Dissolved Oxygen (mg/L)	5.76	1.88	5.10	7.87	1.12	8.76		
Temperature °F	29.1	27.4	27.0	28.4	27.7	27.8		
ORP (mV)	52	50	69	29	-50	81		
Zone/Leg	5	5	5	5	5	5		

Comments

Lower ball valve rusted on ASW-17

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	James Bradford, Patrick Bendl	**Date:**	10/23/2023	**Time:**	8:45 AM

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	replaced coalescer filters (10/20/2023)
Check Oil Level in Compressor	Each Visit	yes	4000 hour service completed
Check Compressor Belts (XPA1207)	Each Visit	yes	replaced belts (10/20/2023)
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	yes	4000 hour service completed

Equipment Trailer Readings (Biosparge)

Control Panel			**Compressor HMI**				
	(hrs)	amps (A)		**Zone 1 (ASW01 - 13)**	**Zone 2 (ASW14-25)**	**Zone 5 (ASW26-31)**	
Air Compressor (61.7 FLA)	33133	30-40	Air Outlet Temperature (°F)	194	190	180	°F
Heat Exchanger	10523	1.8	Load/Unload Time (sec)	31 / 18	26 / 20	26 / 21	sec
Temperature (TSHH-801)	90	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80-100	80-100	80-100	psig
Zone 1 Hours	4606.7	hrs	Pressure Regulator (psig)	19	20	25	psig
Zone 2 Hours	4485.8	hrs	Manifold Pressure (psig)	24	25	28	psig
Zone 3 Hours	1584.6	hrs	Main Flow (ACFM)	150	130	130	ACFM
Zone 4 Hours	10439.2	hrs	Manifold Temperature (°F)	100	95	100	°F
Compressor			Zone Pressure (psig)	20.5	22	24	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	19	17	16	ACFM
Coalescer Differential Pressure	3	psig	Zone Flow (SCFM)	28.6	26.2	25.2	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)	19.5	19.6	19.5	19.3	19.6	19.5	19.4	19.4
Temp. (°F)	77	78	76	76	75	74	73	71
Differential (in. WC)	0.350	0.040	0.110	0.115	0.045	0.030	0.220	0.025
Flow (ACFM)	10.0	3.4	5.6	5.7	3.6	2.9	7.9	2.7
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (psig)	19.3	19.3	19.6	19.5	19.5	20.9	21.0	20.9
Temp. (°F)	73	73	75	75.0	77	74	78	78
Differential (in. WC)	0.000	0.045	0.050	0.015	0.065	0.040	0.040	0.030
Flow (ACFM)	0.0	3.6	3.8	2.1	4.3	3.5	3.5	3.0
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (psig)	21.0	20.8	20.9	20.8	20.8	20.9	20.8	20.9
Temp. (°F)	77	79	79	77	79	79	78	80
Differential (in. WC)	0.030	0.030	0.035	0.015	0.035	0.025	0.035	0.030
Flow (ACFM)	3.0	3.0	3.2	2.1	3.2	2.7	3.2	3.0
	ASW25	**Biosparge Expansion**	**BSW26 (Leg 5)**	**BSW27 (Leg 5)**	**BSW28 (Leg 5)**	**BSW29 (Leg 5)**	**BSW30 (Leg 5)**	**BSW31 (Leg 5)**
Pressure (psig)	20.6							
Temp. (°F)	80.0	Pressure (psig)	20.0	23.0	20.0	20.0	21.0	22.0
Differential (in. WC)	0.015	Flow (ACFM)	2.1	2.1	2.1	2.0	2.0	2.0
Flow (ACFM)	2.1	Flow (SCFM)	3.2	3.3	3.2	3.0	3.1	3.1
			BSW32 (Zone 2)	**BSW33 (Zone2)**	**BSW34 (Zone 2)**	**BSW35 (Zone 1)**	**BSW36 (Zone 1)**	
Pressure (psig)		**Biosparge Expansion System Readings**	20.8	20.8	20.7	19.5	19.6	
Temp. (°F)			77	78	77	77	77	
Differential (in. WC)			0.120	0.115	0.140	0.060	0.060	
Flow (ACFM)			6.0	5.8	6.4	4.1	4.1	

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)	3.44	2.88	covered	4.64	5.22	0.87	1.34	0.79
Stress (in. WC)	0.1	0.0	-	0.1	0.0	0.1	0.1	0.0
Dissolved Oxygen (mg/L)	1.32	5.41	-	5.24	5.02	5.53	1.33	0.86
Temperature (°F)	25.5	26.0	-	27.5	27.4	25.9	25.9	26.6
ORP (mV)	43	42	-	51	50	3	27	56
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)	1.13	4.32	4.38	2.07	1.92	2.12		
Stress (" H2O)	0.0	0.0	0.0	0.0	0.0	0.2		
Dissolved Oxygen (mg/L)	5.76	4.29	3.50	6.35	3.77	7.84		
Temperature °F	26.4	28.2	27.6	28.3	27.4	26.7		
ORP (mV)	67	64	78	90	55	70		
Zone/Leg	5	5	5	5	5	5		

Comments

ASMW-1 coulld not be found under pile of gravel. Compressor hours taken at the compressor panel. Control panel HMI lists compressor hours as 10519.

ASW01 globe valve 100% off.

ASW07 globe valve 100% off.

ASW09 globe valve 100% open.

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

AECOM

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	James Bradford, Dustin Slater	**Date:**	11/20/2023	**Time:**	8:05 AM

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 1-qt
Check Compressor Belts (XPA1207)	Each Visit	Yes	tightened belts
Oil Change (with Air/Oil Separator every 4000 hrs)	2,000 / 4,000 hrs.	No	

Equipment Trailer Readings (Biosparge)

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	29098.4	28-42	Air Outlet Temperature (°F)	178	167	171	°F
Heat Exchanger	29173.8	1.8	Load/Unload Time (sec)	30/16	29/21	26/20	sec
Temperature (TSHH-801)	75	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	80-105	80-100	80-100	psig
Zone 1 Hours	4825.0	hrs	Pressure Regulator (psig)	23	28	27	psig
Zone 2 Hours	4703.6	hrs	Manifold Pressure (psig)	25	26	26	psig
Zone 3 Hours	1809.3	hrs	Main Flow (ACFM)	135	150	135	ACFM
Zone 4 Hours	11089	hrs	Manifold Temperature (°F)	85	74	75	°F
Compressor			Zone Pressure (psig)	22	22.5	25	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	17	16	16	ACFM
Coalescer Differential Pressure	2	psig	Zone Flow (SCFM)	26.5	25.1	25.9	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)	19.4	19.6	19.3	19.5	19.4	19.5	19.4	19.5
Temp. (°F)	71	72	71	71	71	70	70	70
Differential (in. WC)	0.360	0.060	0.120	0.150	0.045	0.040	0.430	0.100
Flow (ACFM)	10.2	4.2	5.9	6.6	3.6	3.4	11.1	5.4
	ASW09	**ASW10**	**ASW11**	**ASW12**	**ASW13**	**ASW14**	**ASW15**	**ASW16**
Pressure (psig)	19.5	19.4	19.4	19.3	19.4	21.4	21.4	21.3
Temp. (°F)	70	69	69	69.0	69	68	68	67
Differential (in. WC)	0.000	0.045	0.045	0.030	0.005	0.055	0.030	0.035
Flow (ACFM)	0.0	3.6	3.6	2.9	1.2	4.1	3.0	3.3
	ASW17	**ASW18**	**ASW19**	**ASW20**	**ASW21**	**ASW22**	**ASW23**	**ASW24**
Pressure (psig)	21.2	21.2	21.2	21.4	21.0	21.0	20.8	20.8
Temp. (°F)	67	67	67	66	66	66	66	66
Differential (in. WC)	0.030	0.040	0.040	0.020	0.040	0.025	0.045	0.045
Flow (ACFM)	3.0	3.5	3.5	2.5	3.5	2.8	3.7	3.7

	ASW25	Biosparge Expansion	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.6							
Temp. (°F)	65.0	Pressure (psig)	21.0	23.0	20.0	20.0	21.0	22.0
Differential (in. WC)	0.04	Flow (ACFM)	2.2	2.0	1.9	2.0	2.1	2.0
Flow (ACFM)	3.2	Flow (SCFM)	3.4	3.2	2.9	3.1	3.3	3.2

		Biosparge Expansion System Readings	BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)			20.8	20.6	20.7	19.4	19.5	
Temp. (°F)			73	72	72	75	75	
Differential (in. WC)			0.110	0.090	0.100	0.065	0.060	
Flow (ACFM)			5.7	5.2	5.5	4.3	4.1	

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)	3.37	2.65		4.57	4.99	0.64	1.38	0.58
Stress (in. WC)	0.0	0.0		0.0	0.0	0.0	1.4	0.0
Dissolved Oxygen (mg/L)	3.52	7.67		6.32	6.06	6.38	6.35	5.60
Temperature (°F)	24.5	25.0		26.0	27.0	24.1	24.3	26.3
ORP (mV)	82	88		74	76	46	55	78
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	**IW0061**	**IW0062**	**IW0063**	**IW0064**	**IW0006IR**		
Depth to Water (feet BTOC)	0.97	4.05	4.03	1.88	1.70	1.02		
Stress (" H2O)	0.0	0.0	1.4	0.0	0.0	6.9		
Dissolved Oxygen (mg/L)	5.29	2.64	7.04	7.31	5.30	8.76		
Temperature °F	25.0	25.9	25.9	26.4	26.1	26.1		
ORP (mV)	73	82	92	80	86	73		
Zone/Leg	5	5	5	5	5	5		

Comments

ASMW-1 is covered by a pile of gravel. No readings were collected for that well.

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

MLP/VAB O&M

MLP/VAB Area, SWMU No. 56

Kennedy Space Center, Florida

Personnel:	James Bradford, Dustin Slater	**Date:**	12/20/2023	**Time:**	9:00 AM

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	

Equipment Trailer Readings (Biosparge)

Control Panel			Compressor HMI				
	(hrs)	amps (A)		Zone 1 (ASW01 - 13)	Zone 2 (ASW14-25)	Zone 5 (ASW26-31)	
Air Compressor (61.7 FLA)	29817.2	42	Air Outlet Temperature (°F)	169	169	169	°F
Heat Exchanger	29892.6	2	Load/Unload Time (sec)	42/19	38/20	24/20	sec
Temperature (TSHH-801)	57	°F	**Trailer**				
PLC HMI			Tank Pressure (psig)	90-100	90-100	90-100	psig
Zone 1 Hours	5064.1	hrs	Pressure Regulator (psig)	26	26	28	psig
Zone 2 Hours	4944.0	hrs	Manifold Pressure (psig)	26	23	28	psig
Zone 3 Hours	2050.5	hrs	Main Flow (ACFM)	130	135	120	ACFM
Zone 4 Hours	11798	hrs	Manifold Temperature (°F)	77	82	78	°F
Compressor			Zone Pressure (psig)	21	22.5	26	psig
Dilution Valve Open	0	%	Zone Flow (ACFM)	16	17	14	ACFM
Coalescer Differential Pressure	3	psig	Zone Flow (SCFM)	24.8	26.8	23.1	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)	19.8	19.7	19.8	19.7	19.8	19.7	19.7	19.6
Temp. (°F)	64	64	63	64	63	63	65	65
Differential (in. WC)	0.250	0.070	0.030	0.110	0.035	0.030	0.250	0.120
Flow (ACFM)	8.6	4.5	3.0	5.7	3.2	3.0	8.6	5.9
	ASW09	ASW10	ASW11	ASW12	ASW13	ASW14	ASW15	ASW16
Pressure (psig)	19.6	19.8	19.7	19.6	19.7	21.2	21.2	21.2
Temp. (°F)	67	65	64	63.0	66	64	65	65
Differential (in. WC)	0.000	0.035	0.050	0.250	0.040	0.025	0.030	0.025
Flow (ACFM)	0.0	3.2	3.8	8.6	3.4	2.8	3.0	2.8
	ASW17	ASW18	ASW19	ASW20	ASW21	ASW22	ASW23	ASW24
Pressure (psig)	21.3	21.1	21.2	21.1	21.2	21.2	21.1	21.2
Temp. (°F)	65	66	65	64	65	65	65	64
Differential (in. WC)	0.025	0.030	0.040	0.030	0.025	0.015	0.040	0.015
Flow (ACFM)	2.8	3.0	3.5	3.0	2.8	2.1	3.5	2.1
	ASW25	**Biosparge**	BSW26 (Leg 5)	BSW27 (Leg 5)	BSW28 (Leg 5)	BSW29 (Leg 5)	BSW30 (Leg 5)	BSW31 (Leg 5)
Pressure (psig)	20.8	**Expansion**						
Temp. (°F)	63.0	Pressure (psig)	21.0	23.0	21.0	20.0	22.0	22.0
Differential (in. WC)	0.03	Flow (ACFM)	2.0	2.0	2.5	2.3	2.0	2.0
Flow (ACFM)	2.8	Flow (SCFM)	3.1	3.2	3.9	3.6	3.2	3.2
			BSW32 (Zone 2)	BSW33 (Zone2)	BSW34 (Zone 2)	BSW35 (Zone 1)	BSW36 (Zone 1)	
Pressure (psig)		**Biosparge**	20.8	20.7	20.7	19.8	19.8	
Temp. (°F)		**Expansion**	63	63	63	63	63	
Differential (in. WC)		**System**	0.085	0.100	0.135	0.020	0.130	
Flow (ACFM)		**Readings**	5.1	5.5	6.4	2.4	6.2	

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)	2.97	2.32	-	4.15	4.63	*	*	*
Stress (in. WC)	0.0	0.0	-	0.0	0.0	*	*	*
Dissolved Oxygen (mg/L)	5.02	8.43	covered	6.46	6.81	inaccessible	inaccessible	inaccessible
Temperature (°F)	20.9	20.9	-	23.6	23.1	*	*	*
ORP (mV)	112	91	-	96	63	*	*	*
Zone/Leg	1	2	1	1	2	1	1	2
	IW0031	IW0061	IW0062	IW0063	IW0064	IW0006IR		
Depth to Water (feet BTOC)	*	3.92	3.93	*	*	*		
Stress (" H2O)	*	0.0	0.0	*	*	*		
Dissolved Oxygen (mg/L)	inaccessible	6.78	7.63	inaccessible	inaccessible	inaccessible		
Temperature °F	*	23.2	22.6	*	*	*		
ORP (mV)	*	74	90	*	*	*		
Zone/Leg	5	5	5	5	5	5		

Comments

- ASMW-1 is covered with a pile of gravel.

* ASMW-4,5,6 and IW0031, 0063, 0064, and 0006IR were inaccessible due to flooding.

1. A blank cell indicates not recorded.
2. ACFM = Actual/Observed Cubic Feet per Minute

APPENDIX D

BIOSPARGE SYSTEM PIPING AND INSTRUMENTATION DIAGRAM

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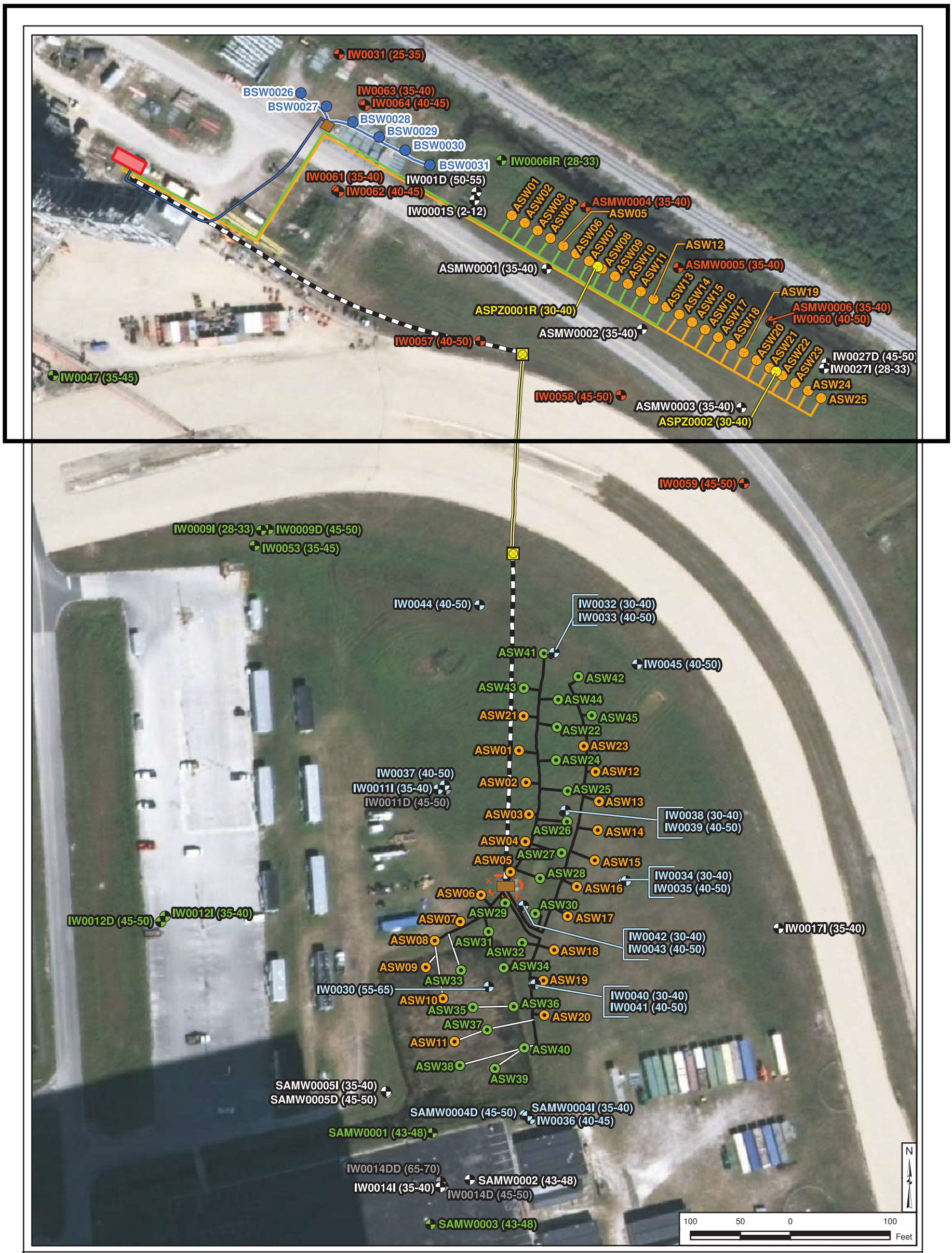


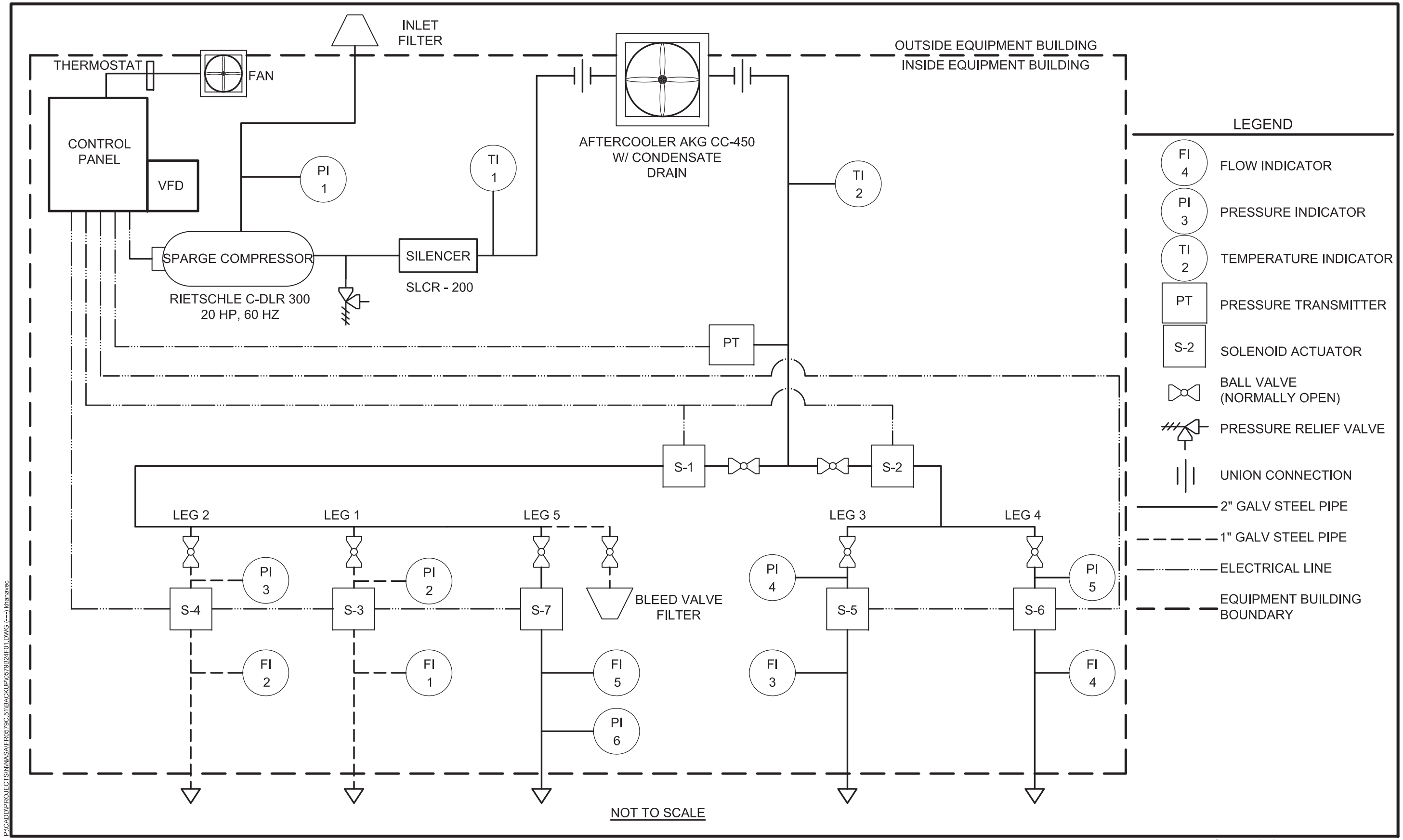
Figure 2-1
Air Sparge and Biosparge System Layouts

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.

Path: (Titusville-01\DATA) T:\0GIS\FR0579\MXDs\201802\Remedial_System_Layout_MAR2018.mxd 01 March 2018 JRB



P:\CADD\PROJECTS\1NA\SAIF\05679\c-51\BACKUP\05679\24F01.DWG (—) khanavec

LEG 1, LEG 2, & LEG 5 operate the BS System

Figure 2-2
Biosparge and Air Sparge System
Process and Instrumentation Diagram
(August 2016)

APPENDIX E

MONITORING WELL SURVEYS

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AECOM BIOSPARGE & MONITORING WELLS AT MOBILE LAUNCH PLATFORM/VEHICLE ASSEMBLY BUILDING AREA

N
W E
S
150 0 150 300
SCALE 1" = 150 FEET

CONTROL CHART AS PER LSSC				
NORTHING	EASTING	ELEVATION	DESCRIPTION	SYMBOL
1545727.20	766601.25	4.87'	SET ND5170 BM1	BM1
1546468.59	768010.24	7.79'	SET ND5170 BM2	BM2
1546493.67	769365.61	5.40'	NGS MONUMENT "ODOP 1.39.7"	BM3
1544816.33	768783.06	7.45'	NGS MONUMENT "WRIGHT"	BM4

LEGEND	
	BENCHMARK
BM	BENCHMARK
ND	NAIL AND DISC
MW	MONITORING WELL
	PIPE
NGS	NATIONAL GEODETIC SURVEY
MLPV	MOBILE LAUNCH PLATFORM VEHICLE ASSEMBLY BUILDING AREA
MLP	MOBILE LAUNCH PLATFORM
VAB	VEHICLE ASSEMBLY AREA
LSSC	LAND AND SEA SURVEYING CONCEPTS. INC
KSC	KENNEDY SPACE CENTER
N	NORTHING
E	EASTING
	CONCRETE

Monitoring Well Pictures (Not to Scale)



Monitoring Well MLPV -MW0101



Inside Monitoring Well MLPV -MW0101

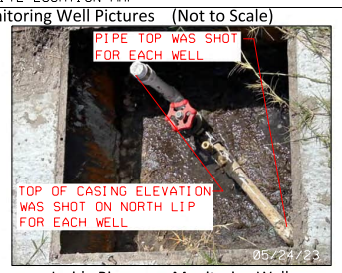


SITE LOCATION MAP

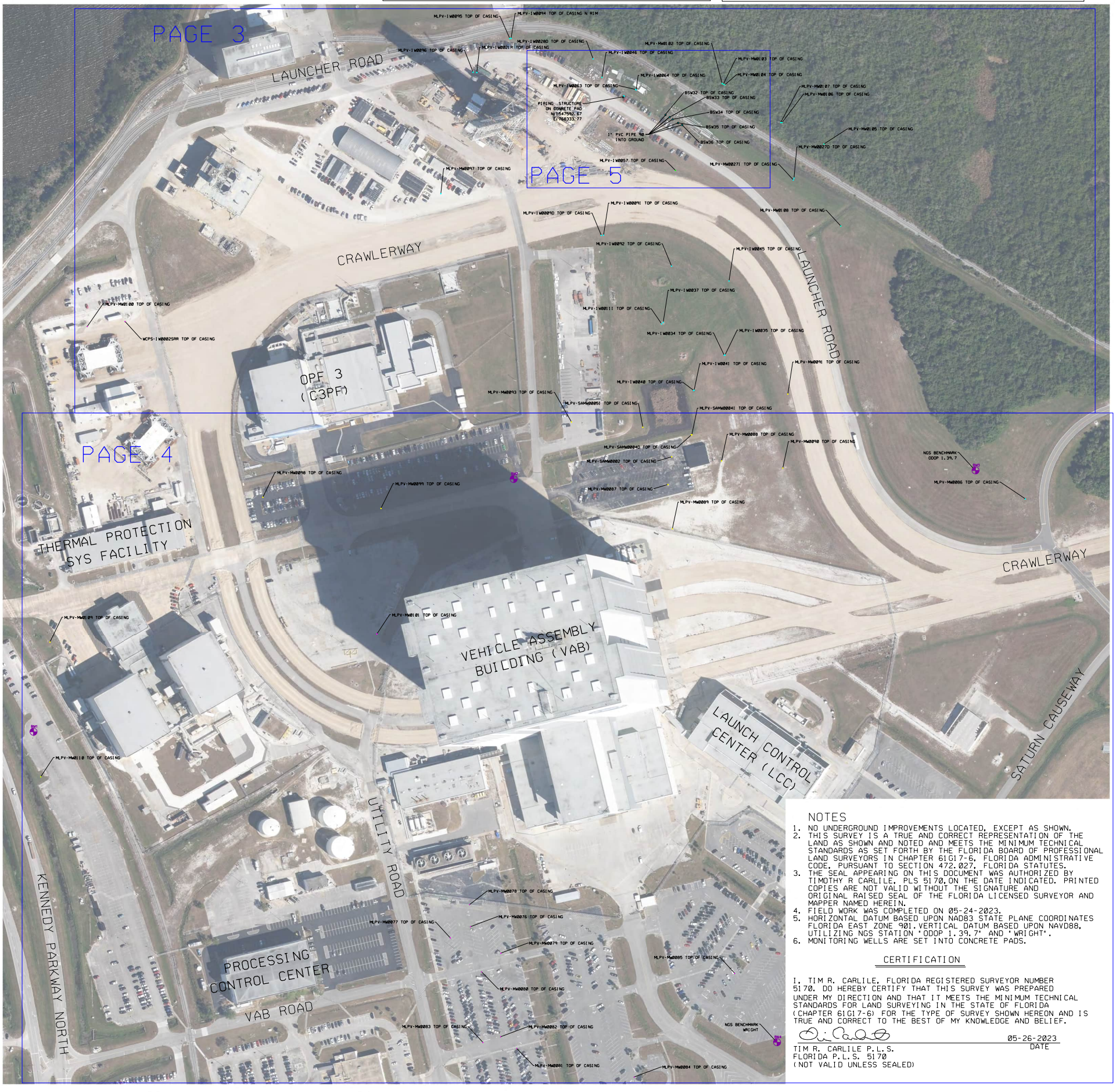
Biosparge Monitoring Well Pictures (Not to Scale)



Biosparge Monitoring Well



Inside Biosparge Monitoring Well



NOTES

1. NO UNDERGROUND IMPROVEMENTS LOCATED, EXCEPT AS SHOWN.
2. THIS SURVEY IS A TRUE AND CORRECT REPRESENTATION OF THE LAND AS SHOWN AND NOTED AND MEETS THE MINIMUM TECHNICAL STANDARDS AS SET FORTH BY THE FLORIDA BOARD OF PROFESSIONAL LAND SURVEYORS IN CHAPTER 61G17-6, FLORIDA ADMINISTRATIVE CODE, PURSUANT TO SECTION 472.027, FLORIDA STATUTES.
3. THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY TIMOTHY R CARLILE, PLS 5170, ON THE DATE INDICATED. PRINTED COPIES ARE NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF THE FLORIDA LICENSED SURVEYOR AND MAPPER NAMED HEREIN.
4. FIELD WORK WAS COMPLETED ON 05-24-2023.
5. HORIZONTAL DATUM BASED UPON NAD83 STATE PLANE COORDINATES FLORIDA EAST ZONE 901. VERTICAL DATUM BASED UPON NAVD88, UTILIZING NGS STATION "ODOP 1.39.7" AND "WRIGHT".
6. MONITORING WELLS ARE SET INTO CONCRETE PADS.

CERTIFICATION

I, TIM R. CARLILE, FLORIDA REGISTERED SURVEYOR NUMBER 5170, DO HEREBY CERTIFY THAT THIS SURVEY WAS PREPARED UNDER MY DIRECTION AND THAT IT MEETS THE MINIMUM TECHNICAL STANDARDS FOR LAND SURVEYING IN THE STATE OF FLORIDA (CHAPTER 61G17-6) FOR THE TYPE OF SURVEY SHOWN HEREON AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

05-26-2023
DATE

TIM R. CARLILE P.L.S.
FLORIDA P.L.S. 5170
(NOT VALID UNLESS SEALED)

LAND SEA SURVEYING CONCEPTS. INC.
WWW.LAND-AND-SEA-SURVEYING.COM

LAND BUSINESS #6447
PHONE: 321-454-6310
FAX: 321-454-6998
E-MAIL: TC5170@AOL.COM
1605 CHASE HAMMOCK RD.
MERRITT ISLAND, FL 32953

SHEET: 1 OF 5
AECOM MONITORING WELLS
JOB NUMBER: 2023-018

SURVEY FOR: AECOM

AECOM VAB BIOSPARGE WELLS & MONITORING WELLS

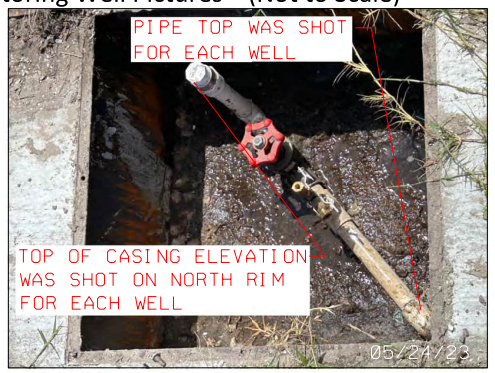
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SCALE	1" = 150'	
DATE	05-26-23	

AECOM BIOSPARGE & MONITORING WELLS AT MOBILE LAUNCH PLATFORM/VEHICLE ASSEMBLY BUILDING AREA

Biosparge Monitoring Well Pictures (Not to Scale)



Biosparge Monitoring Well



Inside Biosparge Monitoring Well

Monitoring Well Pictures (Not to Scale)



Monitoring Well
MLPV -MW0101



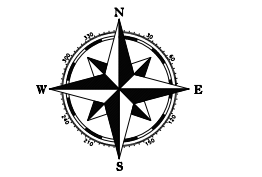
Inside Monitoring Well
MLPV -MW0101



SITE LOCATION MAP

Monitoring Well Coordinates and Elevations (Located 05/22/23, 05/23/23 AND 05/24/23)

Monitoring Well #	Northing	Easting	Cap Elevation	Top of Casing Elevation (shot on North rim of each well)
MLPV-IW0095	1547760.93	767998.75	6.77'	6.25'
MLPV-IW0094	1547761.64	768002.49	6.79'	6.37'
MLPV-IW0096	1547662.08	767891.15	7.11'	6.63'
MLPV-IW002IR	1547661.51	767902.07	6.96'	6.46'
MLPV-IW0028D	1547701.26	768243.14	3.34'	3.29'
MLPV-IW0063	1547611.43	768367.93	4.13'	3.79'
MLPV-IW0064	1547610.52	768369.65	4.09'	3.95'
MLPV-IW0046	1547647.20	768269.38	3.73'	3.53'
MLPV-MW0102	1547629.19	768621.87	1.93'	1.47'
MLPV-MW0103	1547627.11	768625.57	1.67'	1.07'
MLPV-MW0104	1547624.84	768629.82	1.55'	1.24'
BSW32	1547537.69	768455.44	5.37'	4.56'
BSW33	1547530.14	768468.14	5.49'	4.53'
BSW34	1547523.85	768477.13	5.01'	4.18'
BSW35	1547513.23	768493.59	5.11'	4.51'
BSW36	1547506.85	768505.24	5.18'	4.70'
MLPV-IW0057	1547374.31	768484.64	6.03'	5.69'
MLPV-MW0027I	1547346.06	768830.71	3.43'	3.11'
MLPV-MW0027D	1547351.58	768832.99	2.75'	2.45'
MLPV-MW0107	1547514.28	768793.95	3.00'	2.61'
MLPV-MW0106	1547514.33	768797.84	2.96'	2.58'
MLPV-MW0105	1547451.39	768920.81	2.67'	2.39'
MLPV-MW0108	1547210.64	768970.26	4.64'	4.43'
MLPV-MW0097	1547305.89	767796.60	7.12'	6.74'
MLPV-IW0009I	1547184.20	768274.12	4.45'	4.07'
MLPV-IW0009D	1547183.52	768267.20	4.62'	4.10'
MLPV-IW0092	1547093.37	768473.54	6.35'	5.66'
MLPV-IW0045	1547049.85	768642.28	3.73'	3.23'
MLPV-IW0011I	1546923.87	768444.22	6.78'	6.30'
MLPV-IW0037	1546928.48	768449.12	6.75'	6.32'
MLPV-IW0035	1546832.67	768630.63	6.32'	5.95'
MLPV-IW0034	1546831.73	768628.07	6.44'	5.87'
MLPV-MW0091	1546717.95	768814.72	6.84'	6.49'
MLPV-IW0040	1546728.64	768538.16	6.49'	5.97'
MLPV-IW0041	1546729.16	768539.78	6.56'	6.06'
MLPV-SAMW0004D	1546598.15	768531.59	5.91'	5.59'
MLPV-SAMW0004I	1546598.66	768532.97	5.88'	5.57'
MLPV-SAMW0005I	1546620.73	768389.10	6.19'	5.88'
MLPV-MW0093	1546635.85	768179.95	5.94'	5.64'
MLPV-SAMW0002	1546533.92	768474.03	5.91'	5.56'
MLPV-MW0087	1546452.63	768463.10	6.12'	6.07'
MLPV-MW0088	1546521.93	768620.40	5.75'	5.45'
MLPV-MW0090	1546500.79	768799.96	6.44'	6.15'
MLPV-MW0089	1546322.95	768475.96	7.58'	7.23'
MLPV-MW0086	1546410.31	769511.66	5.89'	5.54'
MLPV-MW0099	1546382.75	767620.96	6.68'	6.39'
MLPV-MW0098	1546415.44	767274.27	6.78'	6.64'
MLPV-MW0100	1546916.30	766759.04	4.84'	4.66'
WCPS-IW0002SRR	1546930.61	766869.86	5.79'	5.50'
MLPV-MW0109	1545990.57	766649.53	6.19'	5.91'
MLPV-MW0110	1545595.32	766622.48	3.90'	3.80'
MLPV-MW0101	1546014.26	767608.91	8.80'	8.58'
MLPV-MW0078	1545220.25	767880.87	7.18'	6.99'
MLPV-MW0076	1545155.47	767883.41	7.35'	6.94'
MLPV-MW0077	1545122.77	767824.07	7.17'	6.89'
MLPV-MW0079	1545077.84	767972.65	7.28'	6.99'
MLPV-MW0080	1545022.95	767916.01	7.33'	7.11'
MLPV-MW0081	1544798.09	768019.22	7.24'	6.91'
MLPV-MW0082	1544832.44	767971.79	7.41'	7.01'
MLPV-MW0083	1544816.12	767919.81	7.43'	7.06'
MLPV-MW0084	1544714.38	768363.82	7.71'	7.38'
MLPV-MW0085	1545018.79	768658.81	8.16'	7.79'



100 0 100 200
SCALE 1" = 100 FEET

REVISIONS | BY | DATE | SCALE 1" = 50' | DATE 05-26-23

SURVEY FOR: AECOM

AECOM VAB BIOSPARGE WELLS & MONITORING WELLS

SHEET: 2 OF 5
AECOM MONITORING WELLS
JOB NUMBER: 2023-018

LAND & SEA SURVEYING CONCEPTS, INC.

LAND BUSINESS #6447
PHONE: 321-454-6310
FAX: 321-454-6998
E-MAIL: TCS1720@AOL.COM
1680 CLEARLAKE AVE.
MERRITT ISLAND, FL 32953

WWW.LAND-AND-SEA-SURVEYING.COM

AECOM BIOSPARGE & MONITORING WELLS AT MOBILE LAUNCH PLATFORM/VEHICLE ASSEMBLY BUILDING AREA

CONTROL CHART AS PER LSSC				
NORTHING	EASTING	ELEVATION	DESCRIPTION	SYMBOL
1545727.20	766601.25	4.87'	SET ND5170 BM1	
1546468.59	768010.24	7.79'	SET ND5170 BM2	
1546493.67	769365.61	5.40'	NGS MONUMENT "ODOP 1.39.7"	
1544816.33	768783.06	7.45'	NGS MONUMENT "WRIGHT"	

LEGEND	
	BENCHMARK
BM	BENCHMARK
ND	NAIL AND DISC
MW	MONITORING WELL
	PIPE
NGS	NATIONAL GEODETIC SURVEY
MLPV	MOBILE LAUNCH PLATFORM VEHICLE ASSEMBLY BUILDING AREA
MLP	MOBILE LAUNCH PLATFORM
VAB	VEHICLE ASSEMBLY AREA
LSSC	LAND AND SEA SURVEYING CONCEPTS. INC
KSC	KENNEDY SPACE CENTER
N	NORTHING
E	EASTING
	CONCRETE

Monitoring Well Pictures (Not to Scale)



Monitoring Well
MLPV -MW0101



Inside Monitoring Well
MLPV -MW0101



SITE LOCATION MAP



MATCHLINE PAGE 4

N
W E
S

100 0 100 200
SCALE 1" = 100 FEET

REVISIONS	BY	DATE

SCALE 1" = 50'
DATE 05-26-23

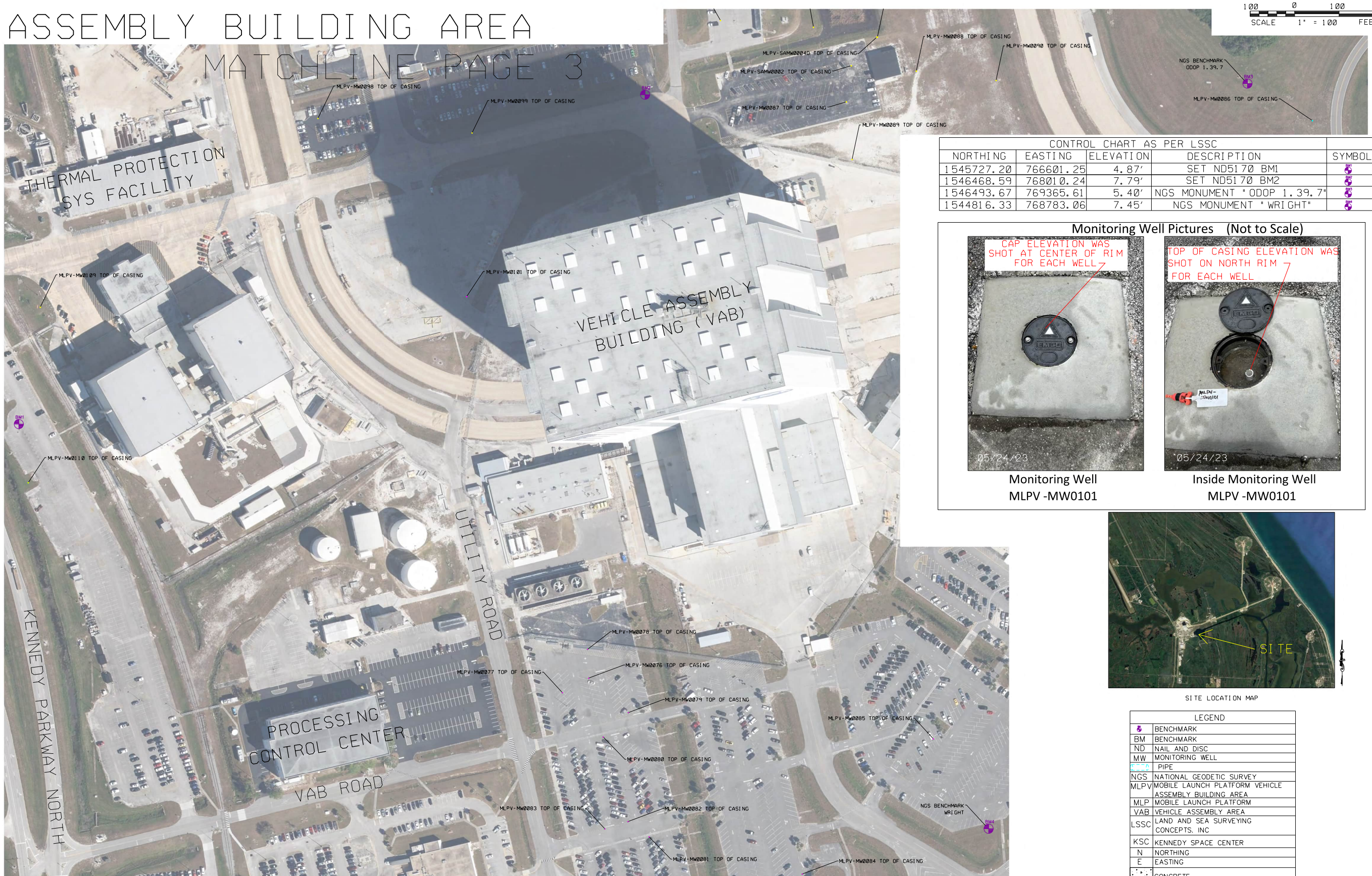
SURVEY FOR: AECOM

AECOM VAB BIOSPARGE WELLS & MONITORING WELLS

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MERRITT ISLAND, FL 32953

SHEET: 3 OF 5
AECOM MONITORING WELLS
JOB NUMBER: 2023-018

AECOM BIOSPARGE & MONITORING WELLS AT MOBILE LAUNCH PLATFORM/VEHICLE ASSEMBLY BUILDING AREA



CONTROL CHART AS PER LSSC				
NORTHING	EASTING	ELEVATION	DESCRIPTION	SYMBOL
1545727.20	766601.25	4.87'	SET ND5170 BM1	
1546468.59	768010.24	7.79'	SET ND5170 BM2	
1546493.67	769365.61	5.40'	NGS MONUMENT "ODOP 1.39.7"	
1544816.33	768783.06	7.45'	NGS MONUMENT "WRIGHT"	

Monitoring Well Pictures (Not to Scale)

Monitoring Well
MLPV -MW0101

Inside Monitoring Well
MLPV -MW0101

SITE LOCATION MAP

LEGEND	
	BENCHMARK
BM	BENCHMARK
ND	NAIL AND DISC
MW	MONITORING WELL
	PIPE
NGS	NATIONAL GEODETIC SURVEY
MLPV	MOBILE LAUNCH PLATFORM VEHICLE ASSEMBLY BUILDING AREA
MLP	MOBILE LAUNCH PLATFORM
VAB	VEHICLE ASSEMBLY AREA
LSSC	LAND AND SEA SURVEYING CONCEPTS, INC
KSC	KENNEDY SPACE CENTER
N	NORTHING
E	EASTING
	CONCRETE

N
W E
S

100 0 100 200
SCALE 1" = 100 FEET

REVISIONS	BY	DATE

SCALE: 1" = 50'
DATE: 05-26-23

SURVEY FOR: AECOM

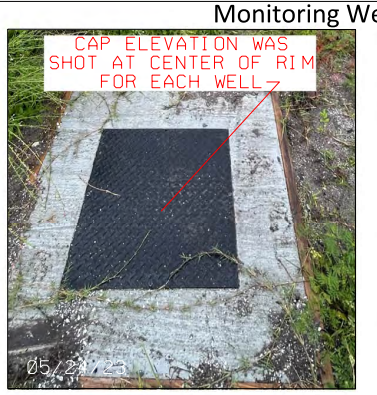
AECOM VAB BIOSPARGE WELLS & MONITORING WELLS

SHEET: 4 OF 5
AECOM MONITORING WELLS
JOB NUMBER: 2023-018

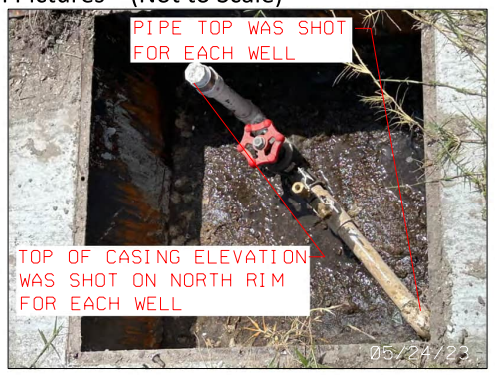
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AECOM BIOSPARGE & MONITORING WELLS AT MOBILE LAUNCH PLATFORM/VEHICLE ASSEMBLY BUILDING AREA

Monitoring Well Pictures (Not to Scale)



Biosparge Monitoring Well



Inside Biosparge Monitoring Well



PIPING STRUCTURE ON CONRETE PAD

CONTROL CHART AS PER LSSC				
NORTHING	EASTING	ELEVATION	DESCRIPTION	SYMBOL
1545727.20	766601.25	4.87'	SET ND5170 BM1	BM
1546468.59	768010.24	7.79'	SET ND5170 BM2	BM
1546493.67	769365.61	5.40'	NGS MONUMENT "ODOP 1.39.7"	NGS
1544816.33	768783.06	7.45'	NGS MONUMENT "WRIGHT"	NGS

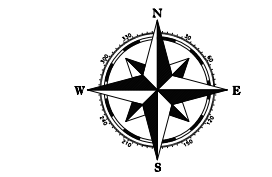
Pipe Coordinates and Elevations			
Pipe shot in Well #	Northing	Easting	Elevation
BSW32	1547536.40	768455.73	4.15'
BSW33	1547529.59	768466.84	3.94'
BSW34	1547523.21	768475.91	3.91'
BSW35	1547513.01	768491.98	4.02'
BSW36	1547506.86	768503.90	4.12'





SITE LOCATION MAP

LEGEND	
	BENCHMARK
BM	BENCHMARK
ND	NAIL AND DISC
MW	MONITORING WELL
	PIPE
NGS	NATIONAL GEODETIC SURVEY
MLPV	MOBILE LAUNCH PLATFORM VEHICLE ASSEMBLY BUILDING AREA
MLP	MOBILE LAUNCH PLATFORM
VAB	VEHICLE ASSEMBLY AREA
LSSC	LAND AND SEA SURVEYING CONCEPTS, INC
KSC	KENNEDY SPACE CENTER
N	NORTHING
E	EASTING
	CONCRETE



REVISIONS | BY | DATE

SCALE: 1" = 30'
DATE: 02-26-24

SURVEY FOR: AECOM

AECOM VAB BIOSPARGE WELLS & MONITORING WELLS

SHEET: 5 OF 5
AECOM MONITORING WELLS
JOB NUMBER: 2023-018

LAND AND SEA SURVEYING CONCEPTS, INC.
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klsinc@cfl.rr.com KLS# 2023041 LB 6575

SPECIFIC PURPOSE SURVEY FOR: AECOM
MLPV (SWMU 056), NASA, KENNEDY SPACE CENTER, MERRITT ISLAND, FL

POINT #	NORTHING (FT)	EASTING (FT)	NORTHING (M)	EASTING (M)	TOC EL (FT)	GND EL (FT)	DESC	ID
28	1545451.66	767879.68	471054.612	234050.195	7.43	7.7	MW	MLPV-MW0111
31	1546223.97	768436.23	471290.014	234219.833	7.68	7.9	MW	MLPV-MW0112
16	1547217.03	768862.78	471592.698	234349.847	6.05	6.2	MW	MLPV-MW0113
5	1547167.25	769129.44	471577.527	234431.124	3.03	3.4	MW	MLPV-MW0114
2	1547058.26	769115.56	471544.306	234426.893	3.59	3.8	MW	MLPV-MW0115
19	1547519.82	768485.10	471684.989	234234.728	4.57	4.8	MW	MLPV-IW0001SR
35	1546784.55	768785.05	471460.879	234326.155	5.49	5.8	MW	MLPV-IW0017I
20	1547705.36	768245.96	471741.542	234161.838	2.68	2.8	MW	MLPV-IW0028I
23	1547701.20	768243.00	471740.275	234160.938	3.11	3.3	MW	MLPV-IW0028D
15	1547661.89	768343.23	471728.294	234191.487	2.60	2.7	MW	MLPV-IW0031
40	1547060.38	768556.85	471544.952	234256.599	4.88	5.3	MW	MLPV-IW0032
41	1547061.65	768558.79	471545.339	234257.190	4.91	5.3	MW	MLPV-IW0033
38	1546902.03	768568.84	471496.686	234260.255	4.83	5.0	MW	MLPV-IW0038
39	1546903.33	768570.15	471497.084	234260.653	4.73	5.0	MW	MLPV-IW0039
44	1547109.55	768484.16	471559.939	234234.441	4.08	4.3	MW	MLPV-IW0044
45	1547159.25	768256.61	471575.087	234165.086	4.33	4.8	MW	MLPV-IW0053R
9	1547393.04	768775.70	471646.347	234323.304	1.98	2.2	MW	MLPV-IW0060
24	1547525.26	768341.29	471686.647	234190.897	5.85	6.3	MW	MLPV-IW0061
25	1547523.87	768343.25	471686.224	234191.492	5.92	6.3	MW	MLPV-IW0062
12	1547504.84	768592.59	471680.422	234267.492	2.00	2.1	MW	MLPV-ASMW0004
10	1547444.26	768685.15	471661.958	234295.704	2.64	2.7	MW	MLPV-ASMW0005
6	1547390.92	768780.41	471645.700	234324.741	1.96	2.1	MW	MLPV-ASMW0006
33	1546618.84	768389.50	471410.370	234205.591	5.66	6.0	MW	MLPV-SAMW0005D
32	1546620.74	768389.00	471410.949	234205.438	5.70	6.0	MW	MLPV-SAMW0005I

SURVEYOR'S NOTES: PAGE 2 OF 2

1. THE PURPOSE OF THIS SURVEY IS TO DETERMINE THE HORIZONTAL AND VERTICAL LOCATION OF GROUNDWATERING WELLS.
2. THE TOP OF THE WELL CASING PVC WILL BE NOTCHED BY THE SURVEYOR AT THE NORTH POINT ON THE PVC, UNLESS THE TOP OF THE PVC IS NOT LEVEL. IN THAT CASE, THE SURVEYOR WILL NOTCH THE PVC PIPE AT THE HIGHEST POINT AT THE TOP OF THE PVC OF THE WELL FOR THE TOP OF CASING ELEVATION.
3. HORIZONTAL COORDINATES ARE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), 1990 ADJUSTMENT AND ARE BASED ON THE UNITED STATES COAST AND GEODETIC MONUMENT "WRIGHT" AND "ODOP 1.39.7", HAVING PUBLISHED COORDINATES OF N.1544816.33, E.768783.06 AND N. 1546493.67, E. 769365.61, RESPECTIVELY.
4. ELEVATIONS DEPICTED HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988) AND ARE BASED ON UNITED STATES COAST AND GEODETIC SURVEY MONUMENT "WRIGHT" AND "ODOP 1.39.7" HAVING A PUBLISHED ELEVATION OF 7.45 AND 5.40 FEET, RESPECTIVELY.
5. THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT(S) SHOWN HEREON AND COPIES ARE VALID ONLY WITH THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED PROFESSIONAL SURVEYOR & MAPPER UNLESS ELECTRONICALLY SIGNED AND SEALED IN ACCORDANCE WITH FLORIDA STATUTES CHAPTER 472.025 AND THE STANDARDS OF PRACTICE FOR SURVEYS AS REFERENCED BY CHAPTER 5J-17, FLORIDA ADMINISTRATIVE CODES.

ABBREVIATIONS:

TOC =	TOP OF CASING	DESC =	DESCRIPTION
GND =	GROUND	ID =	IDENTIFICATION
EL =	ELEVATION		
(FT) =	IN FEET		
(M) =	IN METER		

David J Kugelmann

Digitally signed by David J Kugelmann
Date: 2023.12.22 09:25:01 -05'00'

DAVID J. KUGELMANN, PLS



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APPENDIX F

FIELD NOTES – MONITORING WELL INSTALLATION ACTIVITIES

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SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/13/2023
NOTES BY:	Caroline Bekins (CB) and Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 71, Cloudy and raining
	Trucks 275 (F-150) and 977 (Ford Transit)
0600	CB and DS arrive at Aecom depot to load trucks
	Equipment: Aquatroll, iPad #45, 2 DTW meters, geopumps, YSI, sample kits
0630	CB and DS depart depot for KSC
0735	Arrive on site at Former Hot Spot 2: SOW- Monitor well installation and retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0745	PDS onsite- H&S Meeting; 71 F, Raining
0800	Check in to VAB but PDS badges not yet updated. Contacted Linnea King Clark and badge request was updated/submitted by NASA
0815	Begin mobilizing to Biosparge Area to start at MLPV-MW0113
0915	PDS staging equipment in Bechtel fencing area
0950	Begin to hand auger 5' bls at MW0113. Rain stopped and mostly cloudy
1015	Start to drill MW0113 to 45' bls
1040	Install PVC/filter/grout at MW0113
1130	Complete with install, start on manhole and pad
1140	Mobilize to MW0114 then break fro lunch
1230	PDS back on site and hand auger 5' bls at MW0114
1240	Start to drill MW0114 to 45' bls
1315	Install PVC/filter/grout at MW0114
1400	Mobilize to MW0115 and hand auger 5' bls while complete manhole and pad on MW0114
1440	Drilled MW0115 to 45' bls, start to cleanup for the day
1530	Trailer parked in Former Hot Spot 2 lot- materials staged in Bechtel fencing area with safety cones
1545	PDS, CB and DS off site for the day
1650	CB and DS back in Orlando

SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/14/2023
NOTES BY:	Caroline Bekins (CB) and Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 74, Cloudy
	Trucks 275 (F-150) and 977 (Ford Transit)
0600	CB and DS arrive at Aecom depot to load trucks
	Equipment: Aquatroll, iPad #45, 2 DTW meters, geopumps, YSI, sample kits
0615	CB and DS depart depot for KSC
0730	Arrive on site at Biosparge Area: SOW- Monitor well installation and retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0735	PDS onsite- H&S Meeting; Weather 74 F and cloudy with scattered showers
0810	Set up materials at MW0115 and begin to install PVC/filter/grout
0950	DS sets up at MW0113 to develop monitoring well
1025	Start on manhole and pad at MW0115
1045	Start to clean up and mobilize to MW0111 at VAB Utility Annex
1145	Set up at MW0112 and break for lunch; PDS offsite to buy 2" to 3" converter for backflow preventer in order to refill water tanks at CCF
1150	DS sets up at MW0114 to develop MW0114
1300	DS sets up at MW0115 to develop MW0115
1400	PDS onsite at CCF to refill water tanks for sonic drill
1440	Start to hand auger to 5' bls at MW0111
1450	Start drilling to 55 ' bls
1530	Begin to install PVC/filter/grout
1630	Cut asphalt and begin to install manhole and pad
1650	Complete with MW0111. Clean up and mobilize to VAB area
1715	PDS, CB and DS offsite
1830	CB and DS back in Orlando

SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/15/2023
NOTES BY:	Caroline Bekins (CB) and Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 71, Cloudy and scattered rain
	Trucks 275/905 (F-150) and 977 (Ford Transit)
0600	CB and DS arrive at Aecom depot to load trucks
	Equipment: Aquatroll, iPad #45, 2 DTW meters, geopumps, YSI, sample kits
0615	CB and DS depart depot for KSC
0730	Arrive on site at VAB area: SOW- Monitor well installation and retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0735	PDS onsite- H&S Meeting; Weather 71 F and cloudy with scattered showers
0800	Mobilize to MLPV-IW0053R
0830	Hand auger to 5' bls at IW0053R; DS at MW0111 to develop monitoring well
0840	Start drilling to 45' bls at IW0053R
0900	Start to install PVC/filter/grout
0940	Install manhole and pad at IW0053R; DS to VABRA wells for sampling
1050	DS offsite for a new truck since his starter is malfunctioning; PDS offsite to Badging Office for new badges in order to access VAB and break for lunch
1150	PDS at CCF to refill water tanks
1230	Mobilize to VAB and set up at MW0112
1245	Hand auger to 5' bls at MW0112
1315	Start drilling to 57' bls at MW0112; DS onsite to develop IW0053R
1345	Install PVC/filter/grout at MW0112
1425	Start manhole and pad at MW0112
1500	Complete at MW0112. Clean up and mobilize to Biosparge Area for MLPV-IW0001SR
1530	Set up at IW0001SR- hand auger 5' bls
1540	Start to drill 12' bls at IW0001SR
1600	Install PVS/filter/grout
1620	Start with manhole and pad at IW0001SR
1645	Complete with IW0001SR. Clean up and mobilize to Former Hot Spot 2 to stage vehicles
1710	PDS, CB, DS offsite
1820	CB and DS back in Orlando

SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/16/2023
NOTES BY:	Caroline Bekins (CB) and Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 72, Cloudy and scattered showers
	Trucks 905 (F-150) and 977 (Ford Transit)
0600	CB and DS arrive at Aecom depot to load trucks
	Equipment: Aquatroll, iPad #45, 2 DTW meters, geopumps, YSI, sample kits
0615	CB and DS depart depot for KSC
0730	Arrive on site at Former Hot Spot 2: SOW- Monitor well retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0745	PDS onsite- H&S Meeting; Weather 72 F and cloudy with scattered showers
0800	Start to locate and inspect Former Hot Spot 2 monitoring wells. Start to work on IW0038 and IW0039. Wells IW0032 and IW0033 are under water and need pump and hose to expose manhole covers. PDS offsite for parts
0830	DS starts to sample MW0113, MW0114, MW0115
0920	Very heavy rain in area. IW0032 and IW0033 under more water
1045	Rainstorm over, PDS back onsite. Begin to pump water from IW0038 and IW0039. Begin to raise casing flush to land surface.
1100	DS heads to HS3 OFW to sample VABRA wells
1200	Complete with IW0038 and IW0039; Move to IW0044 which was recently mowed over and corrugated pipe destroyed
1300	Complete with IW0032 and IW0033; Start to retrofit IW0044
1330	CB to start sampling IW0033 but well needs to be redeveloped. CB move to IW0053R to start sampling
1430	PDS to IW0017I to clear dirt and regrout manhole; DS sampling MW0111 and redevelops IW0033
1530	Mobilize to SAMW0005I and SAMW0005D to clean up wells
1600	CB to MW0112 to begin sampling; PDS complete with retrofits; DS to develop IW0001SR
1715	Complete for day. All offsite
1820	CB and DS back in Orlando

Sample ID	Time
MLPV-MW0113-040.0-20231116	824
MLPV-MW0114-040.0-20231116	930
MLPV-MW0115-040.0-20231116	1051
VABRA-MW0011-030.0-20231116	1152
VABRA-MW0012-020.0-20231116	1248
MLPV-MW0111-050.0-20231116	1448
MLPV-IW0053R-040.0-20231116	1520
MLPV-MW0112-052.0-20231116	1640

SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/17/2023
NOTES BY:	Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 70, Cloudy and scattered showers
	Truck 905 (F-150)
0630	DS departs Orlando for KSC
	Equipment: Aquatroll, iPad #45, 1 DTW meter
0730	Arrive on site at Biosparge Area: SOW- Monitor well retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
	PDS onsite- H&S Meeting; Weather 70 F and cloudy with scattered showers
0800	Start to locate and inspect Biosparge area monitoring wells. All wells accessible, begin retrofits
1230	Complete with wells: ASMW0004, ASMW0005, ASMW0006, IW0060, IW0031, IW0028I and
	28D- determined that IW0046 and IW0006IR were in good condition and no retrofit needed
1300	Move to IW0001S for abandonment of well
1400	Complete at IW0001S
1415	PDS packs up equipment and PDS and DS to CCF to stage IDW- 2 purge water drums (230244 and 230245) and 1 soi
	drum (230243) all approximately 80% full
1530	PDS and DS offsite
1630	DS arrives in Orlando. End of day

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APPENDIX G

MONITORING WELL CONSTRUCTION LOGS AND COMPLETION REPORTS

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WELL NUMBER MLPV-IW0001SR

AECOM

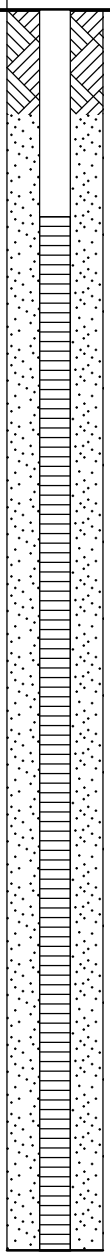
TOTAL DEPTH 12 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/15/2023 **COMPLETED** 11/15/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 4.57 ft **Ground Elevation** N/A
DRILLING METHOD Sonic
EASTING 234234.7 **NORTHING** 471685
TOTAL DEPTH 12 ft bgs
HOLE DIAMETER 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

Well Diagram



Well Casing
MLPV-IW0001SR
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 2 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 1 ft bgs
Type 1/type 2

Filter Pack
Type: #1 Filter Sand
Top: 1 ft bgs
Bottom: 12 ft bgs

Well Screen
MLPV-IW0001SR
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 2 ft bgs
Bottom: 12 ft bgs

AECOM WELL ONLY TEST V4 - BLANK GINT PROJECT FOR COLLECT.GPJ - 9/11/24 15:06 - C:\USERS\CHASTAINJ\DOCUMENTS\MY EQUIS WORK\NASA\KENNEDY SPACE CENTER\SB LOGS\MLPV\MLPV MW111-115 IWS\MLPV MW111-115 IW.GPJ

WELL NUMBER MLPV-IW0053R

AECOM

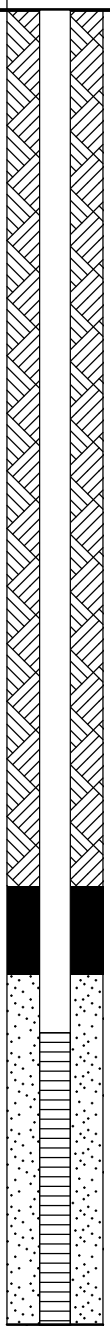
TOTAL DEPTH 45 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/15/2023 **COMPLETED** 11/15/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 4.33 ft **Ground Elevation** 4.8 ft
DRILLING METHOD Sonic
EASTING 234165.1 **NORTHING** 471575.1
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-IW0053R
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: 30 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 30 ft bgs
Bottom: 33 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 33 ft bgs
Bottom: 45 ft bgs

Well Screen
MLPV-IW0053R
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

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WELL NUMBER MLPV-MW0111

AECOM

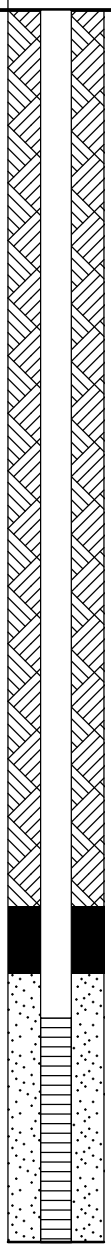
TOTAL DEPTH 55 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/14/2023 **COMPLETED** 11/14/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 7.43 ft **Ground Elevation** 7.7 ft
DRILLING METHOD Sonic
EASTING 234050.2 **NORTHING** 471054.6
TOTAL DEPTH 55 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
50
55

Well Diagram



Well Casing
MLPV-MW0111
Type: Schedule 40 PVC
Diameter: 1 in
Top: 0 ft bgs
Bottom: 45 ft bgs

Surface Seal
Type: Portland Cement
Top: 0 ft bgs
Bottom: 40 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 40 ft bgs
Bottom: 43 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 43 ft bgs
Bottom: 55 ft bgs
Filter pack

Well Screen
MLPV-MW0111
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 45 ft bgs
Bottom: 55 ft bgs

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WELL NUMBER MLPV-MW0112

AECOM

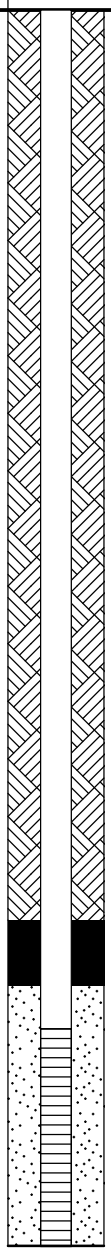
TOTAL DEPTH 57 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/15/2023 **COMPLETED** 11/15/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 7.68 ft **Ground Elevation** 7.9 ft
DRILLING METHOD Sonic
EASTING 234219.8 **NORTHING** 471290
TOTAL DEPTH 57 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
50
55

Well Diagram



Well Casing
MLPV-MW0112
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: 42 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 42 ft bgs
Bottom: 45 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 45 ft bgs
Bottom: 57 ft bgs
Filter pack

Well Screen
MLPV-MW0112
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 47 ft bgs
Bottom: 57 ft bgs

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WELL NUMBER MLPV-MW0113

AECOM

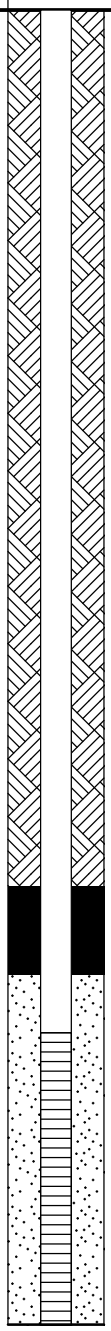
TOTAL DEPTH 45 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/13/2023 **COMPLETED** 11/13/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 6.05 ft **Ground Elevation** 6.2 ft
DRILLING METHOD Sonic
EASTING 234349.8 **NORTHING** 471592.7
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-MW0113
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: 30 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 30 ft bgs
Bottom: 33 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 33 ft bgs
Bottom: 45 ft bgs

Well Screen
MLPV-MW0113
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

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WELL NUMBER MLPV-MW0114

AECOM

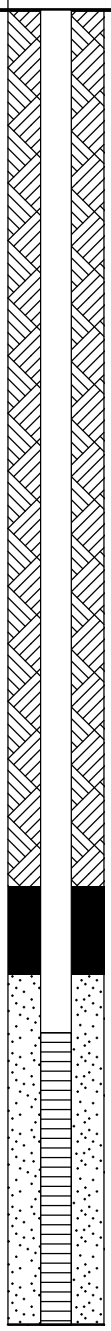
TOTAL DEPTH 45 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/13/2023 **COMPLETED** 11/13/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 3.03 ft **Ground Elevation** 3.4 ft
DRILLING METHOD Sonic
EASTING 234431.1 **NORTHING** 471577.5
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-MW0114
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: 30 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 30 ft bgs
Bottom: 33 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 33 ft bgs
Bottom: 45 ft bgs

Well Screen
MLPV-MW0114
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

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WELL NUMBER MLPV-MW0115

AECOM

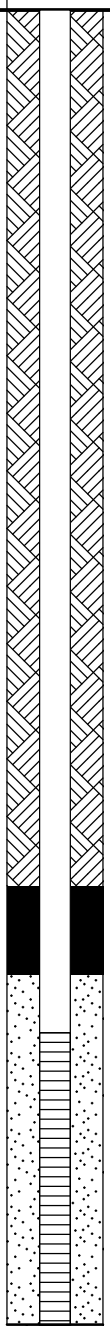
TOTAL DEPTH 45 FT BGS

CLIENT NASA
PROJECT NAME Kennedy Space Center
PROJECT NUMBER 60615493
SITE NAME Mobile Launch Platform Park Sites (SWMU 56)
DATE STARTED 11/15/2023 **COMPLETED** 11/15/2023
SURVEYING BY Kuglemann Land Surveying, Inc.
DRILLING CONTRACTOR PDS
TOC Elevation 3.59 ft **Ground Elevation** 3.8 ft
DRILLING METHOD Sonic
EASTING 234426.9 **NORTHING** 471544.3
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-MW0115
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: 30 ft bgs
Type 1/type 2

Well Seal
Type: Bentonite Pellets
Top: 30 ft bgs
Bottom: 33 ft bgs

Filter Pack
Type: #1 Filter Sand
Top: 33 ft bgs
Bottom: 45 ft bgs

Well Screen
MLPV-MW0115
Type: Schedule 40 PVC
Slot Size: 0.01 in
Top: 35 ft bgs
Bottom: 45 ft bgs

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APPENDIX H

MONITORING WELL INSTALLATION AND RETROFITTING PHOTOLOG

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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 Assessment

Photo No.	**Date:**
1	11/14/2023

Direction Photo Taken:
East

Description:

MLPV-MW0111
Installation





Photo No.	**Date:**
2	11/15/2023

Direction Photo Taken:
South

Description:

MLPV-MW0112
Installation





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 Assessment

Photo No.	**Date:**
3	11/13/2023

Direction Photo Taken:
East

Description:

MLPV-MW0113
Installation





Photo No.	**Date:**
4	11/14/2023

Direction Photo Taken:
Southeast

Description:

MLPV-MW0114
Installation





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 Assessment

Photo No.	**Date:**
5	11/14/2023

Direction Photo Taken:
Southeast

Description:

MLPV-MW0115
Installation



Photo No.	**Date:**
6	11/14/2023

Direction Photo Taken:
East

Description:

MLPV-IW0053R
Installation/Replacement



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 Assessment

Photo No.	**Date:**
7	11/15/2023

Direction Photo Taken:
East

Description:

MLPV-IW0001SR Installation/Replacement and MLPV-IW0001S Abandonment



Photo No.	**Date:**
8	11/16/2023

Direction Photo Taken:
East

Description:

MLPV-IW0017I manhole cleared of dirt, top-of-casing raised and re-grouted



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 Assessment

Photo No.	**Date:**
9	11/16/2023

Direction Photo Taken:
Northeast

Description:

MLPV-IW0032 (left) and MLPV-IW0033 (right) top of casing raised and new manholes/pads installed



Photo No.	**Date:**
10	11/16/2023

Direction Photo Taken:
East

Description:

MLPV-IW0038 (right) and MLPV-IW0039 (left) top of casing raised and new manholes/pads installed



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 Assessment

Photo No.	**Date:**
11	11/16/2023

Direction Photo Taken:
North

Description:

MLPV-IW0044 top-of-casing raised and manhole/pad installed

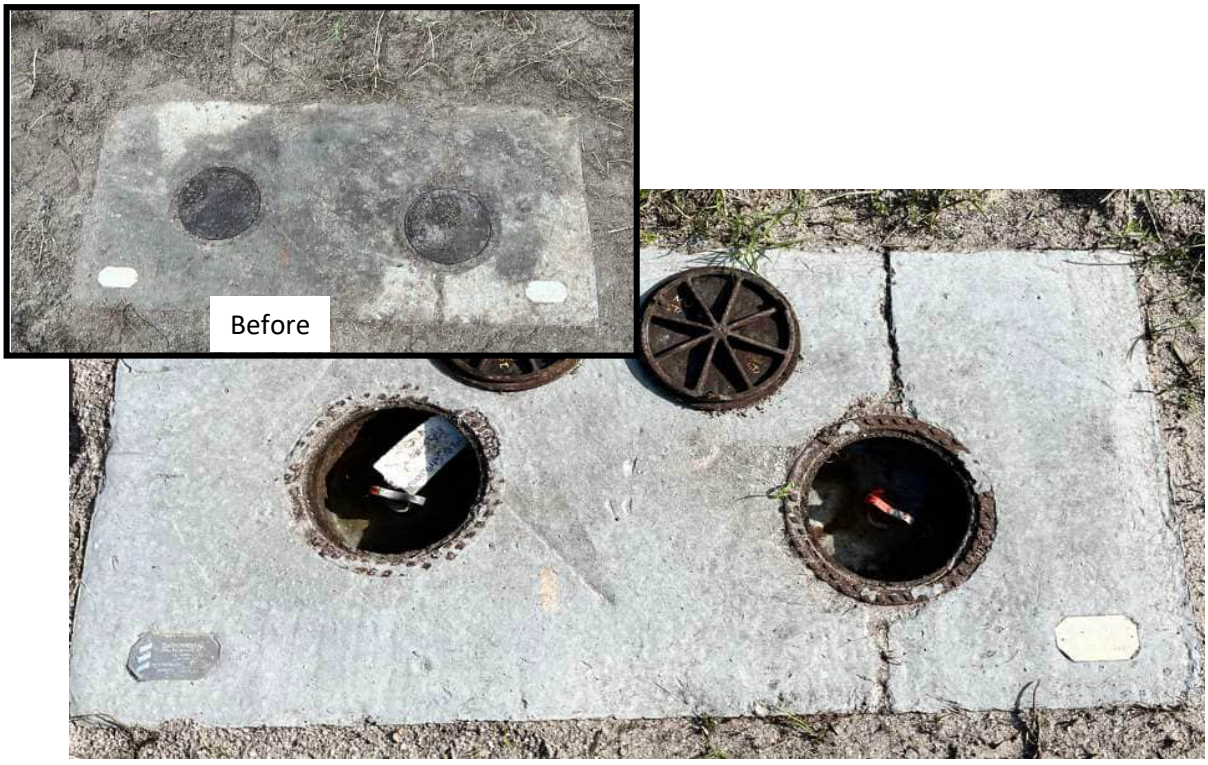


Photo No.	**Date:**
12	11/16/2023

Direction Photo Taken:
East

Description:

MLPV-SAMW0005I and MLPV-SAMW0005D pads cleaned and manholes re-grouted after clearing dirt.



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 Assessment

Photo No.	**Date:**
13	11/17/2023

Direction Photo Taken:
Southeast

Description:

MLPV-ASMW0004 top-of-casing raised and a new pad and manhole installed



Photo No.	**Date:**
14	11/17/2023

Direction Photo Taken:
West

Description:

MLPV-ASMW0005 retrofitted to raise top-of-casing re-grout manhole



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 Assessment

Photo No.	**Date:**
15	11/17/2023

Direction Photo Taken:
Northwest

Description:

MLPV-ASMW0006 and MLPV-IW0060 retrofitted to raise top-of-casing, secure pad, and re-grout manhole



Photo No.	**Date:**
16	11/17/2023

Direction Photo Taken:
Northeast

Description:

MLPV-IW0006IR pad cleared and determined to be in good condition with no retrofit needed.



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 Assessment

Photo No.	**Date:**
17	11/17/2023

Direction Photo Taken:
North

Description:

MLPV-IW0031 pad cleaned, top-of casing raised, manhole cleared of dirt and re-grouted



Photo No.	**Date:**
18	11/17/2023

Direction Photo Taken:
North

Description:

MLPV- IW0046 pad cleared and determined to be in good condition with no retrofit



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 Assessment

Photo No.	**Date:**
19	11/17/2023

Direction Photo Taken:
Northeast

Description:

MLPV-IW0028I (left) and MLPV-IW0028D (right) new/reinforced pads, top-of casing raised, and new manhole cover



APPENDIX I

FIELD NOTES – GROUNDWATER SAMPLING ACTIVITIES

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SITE:	**MLP/VAB: 60615493**
SOW	Semi Annual Groundwater Sampling
DATE:	10/11/2023
NOTES BY:	Caroline Bekins (CB) and Devin Kehoe (DK)
ADDITIONAL ON SITE:	Neighboring construction activities by Bechtel in Biosparge Area- PPE required in area

TIME	FIELD NOTES
	Weather: 76, Cloudy
	Truck 905 (F-150) and 903 (F-150)
0600	CB and DK arrive at Aecom depot to load trucks
	Equipment: 2 Aquatrolls, 2 iPads, 2 DTW meters, 2 geopumps
0630	CB and DK depart
0735	Arrive on site at Former Hot Spot 2: H&S meeting. SOW- Semi-annual monitor well sampling and gauging. Check in with Tony at Bechtel and AECOM PM Linnea King Clark- Biosparge trailer already turned off
0745	Begin to open wells for gauging. Well MLPV-IW0033 covered by dirt and hand cleared.
0830	Patrick Bendl (PB) and Madan Parsotan (MP) from AECOM on site to assist with clearing brush and monitor well assessment. Begin clearing overgrowth in Former Hot Spot 2 swale
1030	Complete with DTW measurements south of railroad tracks. CB and DK walk behind tracks into wetland area for wells MW00102, 103 and 107. Previously cleared walkway is overgrown and flooded in areas. Call PB to try and bring brush cutter and clear as much as possible while avoiding water
1100	PB and MD meet at tracks and begin clearing path. Due to terrain and flood pattern, cart cannot be loaded with equipment for sampling wells. Equipment is carried to gauge wells and begin sampling
1145	DTW measurements complete. Noted that well pads for MW0106 and 107 are loose and rock back and forth. Started to place tubing down MW0107 and wildlife spotted in the area. Appeared to be large cougar (large tan cat, long tail, no spots or stripes) and was stalking towards CB and DK about 40 feet away. Stopped work and walked slowly out of wetland area and back to trucks. Called Linnea and informed her of situation. Called Russ Lowers w/NASA bio to discuss options but signal kept getting interrupted.
1200	PB and MD back with CB and DK. Brough metal blade weed whacker to make noise and help to retrieve sampling equipment. Per Linnea, leaving area and will **not** sample wells due to danger
1230	Back at trucks to load equipment. CB and DK head to Former Hot Spot 2 to calibrate and begin sampling
1550	Complete sampling for the day. Drop off IDW at drums stage at CCF. No clamshells available and drums covered in plastic. Michelle Moore was previously contacted and will bring clamshells once available.
1615	CB and DK off site
1720	CB and DK arrive in Orlando

Sample ID:	Time:
MLPV-SAMW0004I-037.5-20231011	1510
MLPV-SAMW0004D-047.5-20231011	1450
MLPV-IW0043-045.0-20231011	1545
MLPV-IW0036-042.5-20231011	1430
MLPV-IW0037-045.0-20231011	1340
MLPV-IW0034-035.0-20231011	1408
MLPV-IW0035-045.0-20231011	1436
MLPV-IW0011I-037.5-20231011	1321

SITE:	**MLP/VAB: 60615493**
SOW	Semi Annual Groundwater Sampling
DATE:	10/12/2023
NOTES BY:	Caroline Bekins (CB) and Devin Kehoe (DK)
ADDITIONAL ON SITE:	Neighboring construction activities by Bechtel in Biosparge Area- PPE required in area

TIME	FIELD NOTES
	Weather: 78, Cloudy/scattered storms
	Truck 905 (F-150) and 903 (F-150)
0600	CB and DK depart Orlando
	Equipment: 2 Aquatrolls, 2 iPads, 2 DTW meters, 2 geopumps
0705	Arrive on site at Former Hot Spot 2: H&S meeting. SOW- Continue Semi-annual monitor well sampling. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0720	Walk around Former Hot Spot 2 and document flooding from overnight storms. Several wells under water. Begin to handpump MLPV-IW0039 in corrugated pipe. Cleared water down to manhole and water leaking in through sides of pipe. Take video for record.
0800	DK departs for Hot Spot 3 OFW, CB stays in Former Hot Spot 2 then to Biosparge area to sample accessible wells.
1258	Complete with sampling of all accessible wells. Flooding throughout site and wells under water. Photos and videos recorded to document site condition. Sprinkling and incoming storm headed towards VAB. Pack up equipment and head to CCF to dispose IDW
1300	Storm arrives. Call Linnea to check radar and decide to wait it out and dispose IDW and sample once storm passes
1320	Storm passed, blue skies. Dispose IDW and sample - Drum 230247, 40% full, pH 7.83
1400	CB and DK off site
1520	CB and DK arrive at AECOM depot to unload trucks, fill out chain of custody for lab. DK to drop off samples

Sample ID:	Time:
MLPV-IW0061-037.5-20231012	1258
MLPV-IW0062-042.5-20231012	1245
MLPV-IW0041-045.0-20231012	842
MLPV-IW0059-047.5-20231012	936
MLPV-IW0058-047.5-20231012	1026
MLPV-IW0057-045.0-20231012	1112
VABRA-MW0011-030.0-20231012	920
VABRA-MW0012-020.0-20231012	935
VABRA-MW0013-022.5-20231012	835
VABRA-MW0014-027.5-20231012	900
IDW01-20231012	1325

SITE:	**MLP/VAB: 60615493**
PLANNED ACTIVITIES:	MW Sampling
DATE:	10/20/2023
NOTES BY:	Patrick Bendl (PB) and Devin Kehoe (DK)
ADDITIONAL ON SITE:	NA

TIME	FIELD NOTES
	Weather: 67 F, Clear to partly cloudy
	Trucks 172 (F-250), 903 (F-150)
730	PB and DK on site. Tailgate safety meeting and calibrate Aqua Troll 600s and equipment. Duscuss plan for the day. SOW: Continue to sample semi-annual wells that are accessible. Calibrate equipment
745	PB and DK mobilize to wells. And Begin sampling
1430	Regroup to store IDW and complete field efforts for the day.
1440	Crew pack up and offsite.

Notes:

Samples/time	
902	MLPV-MW0107
927	MLPV-MW0102
948	MLPV-MW0103
1042	MLPV-ASMW0006
1040	MLPV-IW0060
1110	MLPV-ASMW0005
1135	MLPV-ASMW0004
1157	MLPV-IW0006IR
1240	MLPV-IW00063
1239	MLPV-IW00064
1309	MLPV-IW00031
1338	MLPV-IW00046
1334	MLPV-IW00028I

SITE:	**MLP/VAB: 60615493**
PLANNED ACTIVITIES:	MW Sampling
DATE:	10/23/2023
NOTES BY:	Caroline Bekins (CB) and Madan Parsotan (MP)
ADDITIONAL ON SITE:	Patrick Bendl and James Bradford of AECOM (O&M event)

TIME	FIELD NOTES
	Weather: 78 F, Partly Cloudy Trucks 904, 905 (F-150s)
730	CB and MP at AECOM depot to load equipment and paperwork. 1 aquatroll, 1 YSI, 1 turbidity metew, 2 DTW meters, 2 geopumps, tubing
0755	CB and MP depart for KSC
0900	CB and MP onsite at Former Hot Spot 2 parking lot. H&S Meeting. SOW: finish semi-annual sampling and sample IDW drum already staged at CCF. Calibrate equipment
1045	At IW0039- manhole cover is approximately 2.5 feet below corrugate pipe cover. Handpump and shovel the sludge but keeps filling in with water and cannot see manhole cover. Called Linnea (AECOM PM) and sent pictures. TOC is below groundwater levels per surrounding DTW measurements. Abort sampling IW0039 and move to IW0045.
1120	Complete sampling wells. Depart for CCF to dispose and sample IDW
1215	Complete IDW samping. IDW02-20231023 at 1135, pH 7.71 from Drum 230247, 65% full
1235	Depart KSC for AECOM depot to pack samples and complete chain of custody
1350	CB and MP at AECOM depot to unload trucks and complete chain of custody
1415	MP heads to lab. CB offsite to complete paperwork

Samples/time	
1015	MLPV-IW0039-045.0-20231023
1027	MLPV-IW0044-045.0-20231023
1117	MLPV-IW0045-045.0-20231023
1135	IDW02-20231023

SITE:	**MLP/VAB: 60615493**
SOW	Monitoring well installation and retrofitting of existing wells
DATE:	11/16/2023
NOTES BY:	Caroline Bekins (CB) and Dustin Slater (DS)
ADDITIONAL ON SITE:	Preferred Drilling Solutions, Inc (PDS)

TIME	FIELD NOTES
	Weather: 72, Cloudy and scattered showers
	Trucks 905 (F-150) and 977 (Ford Transit)
0600	CB and DS arrive at Aecom depot to load trucks
	Equipment: Aquatroll, iPad #45, 2 DTW meters, geopumps, YSI, sample kits
0615	CB and DS depart depot for KSC
0730	Arrive on site at Former Hot Spot 2: SOW- Monitor well retrofitting. Check in with Tony at Bechtel and AECOM PM Linnea King Clark
0745	PDS onsite- H&S Meeting; Weather 72 F and cloudy with scattered showers
0800	Start to locate and inspect Former Hot Spot 2 monitoring wells. Start to work on IW0038 and IW0039. Wells IW0032 and IW0033 are under water and need pump and hose to expose manhole covers. PDS offsite for parts
0830	DS starts to sample MW0113, MW0114, MW0115
0920	Very heavy rain in area. IW0032 and IW0033 under more water
1045	Rainstorm over, PDS back onsite. Begin to pump water from IW0038 and IW0039. Begin to raise casing flush to land surface.
1100	DS heads to HS3 OFW to sample VABRA wells
1200	Complete with IW0038 and IW0039; Move to IW0044 which was recently mowed over and corrugated pipe destroyed
1300	Complete with IW0032 and IW0033; Start to retrofit IW0044
1330	CB to start sampling IW0033 but well needs to be redeveloped. CB move to IW0053R to start sampling
1430	PDS to IW0017I to clear dirt and regrout manhole; DS sampling MW0111 and redevelops IW0033
1530	Mobilize to SAMW0005I and SAMW0005D to clean up wells
1600	CB to MW0112 to begin sampling; PDS complete with retrofits; DS to develop IW0001SR
1715	Complete for day. All offsite
1820	CB and DS back in Orlando

Sample ID	Time
MLPV-MW0113-040.0-20231116	824
MLPV-MW0114-040.0-20231116	930
MLPV-MW0115-040.0-20231116	1051
VABRA-MW0011-030.0-20231116	1152
VABRA-MW0012-020.0-20231116	1248
MLPV-MW0111-050.0-20231116	1448
MLPV-IW0053R-040.0-20231116	1520
MLPV-MW0112-052.0-20231116	1640

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APPENDIX J

GROUNDWATER SAMPLING LOGS AND CALIBRATION RECORDS

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Former Hot Spot 2

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0011I-037.5-20231011
Well ID: MLPV-IW0011I
Location Type: Monitoring Well
Comments:

Sample Date: 10/11/2023 1:21:00 PM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	2	Static Water Level (ft-BTOC):	3.90
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:12 PM	0.05	1.0	1.0	3.95	7.20	392.7	0.27	10.27	26.85	-109.7	0.19	Clear	None
1:14 PM	0.05	0.1	1.1	3.98	7.17	379.2	0.27	11.13	26.93	-103.1	0.18	Clear	None
1:16 PM	0.05	0.1	1.2	3.98	7.15	416.0	0.29	10.76	26.86	-95.6	0.2	Clear	None
1:18 PM	0.05	0.1	1.3	3.98	7.14	410.4	0.27	10.21	26.99	-98.3	0.37	Clear	None

Start Purge:	10/11/2023 12:48:00 PM	End Purge:	10/11/2023 1:18:00 PM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-IW0033-045.0-20231120
Sample Date: 11/20/2023 12:17:00 PM
Well ID: MLPV-IW0033
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments: Cannot fit DTW meter down with tubing

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.68
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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	2.68								Clear	None
12:10 PM	0.05	1	1	NA	7.23	4804	0.98	13.9	25.5	-63.7	2.54	Clear	None
12:12 PM	0.05	0.1	1.1	NA	7.23	4822	0.98	11.8	25.5	-63.3	2.55	Clear	None
12:14 PM	0.05	0.1	1.2	NA	7.24	4832	0.97	11.3	25.6	-63.1	2.55	Clear	None
12:16 PM	0.05	0.1	1.3	NA	7.25	4834	0.97	10.4	25.6	-63.1	2.55	Clear	None

Start Purge:	11/20/2023 11:50:00 AM	End Purge:	11/20/2023 12:16:00 PM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0034-035.0-20231011
Sample Date: 10/11/2023 2:08:00 PM
Well ID: MLPV-IW0034
Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.46
Top of Screen (ft-BTOC):	30.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:58 PM	0.05	0.75	0.75	3.52	7.17	645.0	0.24	8.60	26.29	-133.2	0.32	Clear	None
2:00 PM	0.05	0.10	0.85	3.52	7.17	649.5	0.21	7.40	26.79	-133.4	0.32	Clear	None
2:02 PM	0.05	0.10	0.95	3.52	7.17	649.9	0.20	7.40	26.71	-134.7	0.32	Clear	None
2:04 PM	0.05	0.10	1.05	3.52	7.18	650.8	0.20	6.98	26.71	-135.2	0.33	Clear	None

Start Purge:	10/11/2023 1:44:00 PM	End Purge:	10/11/2023 2:04:00 PM	Total Volume (gal):	1.05

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0035-045.0-20231011
Well ID: MLPV-IW0035
Location Type: Monitoring Well
Comments:

Sample Date: 10/11/2023 2:36:00 PM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.53
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
2:29 PM	0.05	0.10	0.10	3.61	7.04	3125.2	0.19	6.94	26.02	-108.4	1.65	Clear	None
2:31 PM	0.05	0.10	0.20	3.61	7.06	3040.5	0.18	6.27	26.19	-111.5	1.61	Clear	None
2:33 PM	0.05	0.10	0.30	3.61	7.06	3023.9	0.21	6.96	26.18	-112.7	1.60	Clear	None
2:47 PM	0.05	0.75	1.05	3.61	7.04	2980.5	0.21	9.47	25.95	-106.5	1.57	Clear	None

Start Purge:	10/11/2023 2:15:00 PM	End Purge:	10/11/2023 2:47:00 PM	Total Volume (gal):	1.05

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0036-042.5-20231011
Well ID: MLPV-IW0036
Location Type: Monitoring Well
Comments:

Sample Date: 10/11/2023 2:30:00 PM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.31
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
2:23 PM	0.08	0.48	0.48	3.42	7.25	1771.3	0.23	1.43	26.68	-130.7	0.91	Clear	None
2:25 PM	0.08	0.16	0.64	3.44	7.27	1927.4	0.15	1.52	26.54	-145.8	0.99	Clear	None
2:27 PM	0.08	0.16	0.80	3.45	7.27	1963.7	0.12	1.38	26.43	-155.8	1.01	Clear	None
2:29 PM	0.08	0.16	0.96	3.47	7.28	1989.3	0.11	1.31	26.47	-158.4	1.03	Clear	None

Start Purge:	10/11/2023 2:17:00 PM	End Purge:	10/11/2023 2:29:00 PM	Total Volume (gal):	0.96

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0037-045.0-20231011 Sample Date: 10/11/2023 1:40:00 PM
Well ID: MLPV-IW0037 Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments: Water reacted with HCL causing numerous small bubbles. Attempted to remove as many as possible.

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	4.02
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:35 PM	0.05	0.75	0.75	4.29	7.16	4268.2	0.14	11.47	26.18	-75.8	2.30	Clear	None
1:37 PM	0.05	0.10	0.85	4.29	7.15	4316.8	0.15	11.35	26.21	-81.4	2.33	Clear	None
1:39 PM	0.05	0.10	0.95	4.31	7.15	4173.5	0.10	8.21	26.32	-85.8	2.25	Clear	None

Start Purge:	10/11/2023 1:20:00 PM	End Purge:	10/11/2023 1:39:00 PM	Total Volume (gal):	0.95

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0039-045.0-20231023 Sample Date: 10/23/2023 10:15:00 AM
Well ID: MLPV-IW0039 Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments: DTW meter does not fit with tubing; DTW is 1.45' after sampling

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.41
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:04 AM	0.05	0.75	0.75	NA	6.90	2847.5	0.12	10.57	26.05	-180	1.49	Clear	None
10:06 AM	0.05	0.10	0.85	NA	6.90	2703.2	0.12	9.03	26.09	-179.8	1.34	Clear	None
10:08 AM	0.05	0.10	0.95	NA	6.89	2835.1	0.11	6.16	26.09	-178.7	1.35	Clear	None
10:10 AM	0.05	0.10	1.05	NA	6.89	2840.8	0.12	6.06	26.09	-178.9	1.36	Clear	None
10:12 AM	0.05	0.10	1.15	NA	6.89	2840.3	0.12	6.09	26.09	-178.3	1.34	Clear	None

Start Purge:	10/23/2023 9:49:00 AM	End Purge:	10/23/2023 10:12:00 AM	Total Volume (gal):	1.15

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0041-045.0-20231012
Well ID: MLPV-IW0041
Location Type: Monitoring Well
Comments: Bubbling with HCL

Sample Date: 10/12/2023 8:42:00 AM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.15
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
8:30 AM	0.05	0.75	0.75	2.21	7.50	2225.2	0.73	4.87	27.21	-42.5	1.08	Clear	None
8:32 AM	0.05	0.10	0.85	2.21	7.49	2292.6	0.65	4.99	26.57	-51.3	1.12	Clear	None
8:34 AM	0.05	0.10	0.95	2.21	7.49	2294.6	0.64	5.03	26.57	-70.2	1.11	Clear	None
8:36 AM	0.05	0.10	1.05	2.21	7.48	2301.3	0.64	4.96	26.56	-72.7	1.13	Clear	None
8:38 AM	0.05	0.10	1.15	2.21	7.48	2298.8	0.65	4.84	26.56	-73.2	1.13	Clear	None

Start Purge:	10/12/2023 8:14:00 AM	End Purge:	10/12/2023 8:38:00 AM	Total Volume (gal):	1.15

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0043-045.0-20231011
Sample Date: 10/11/2023 3:45:00 PM
Well ID: MLPV-IW0043
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.96
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
3:36 PM	0.08	0.48	0.48	1.19	7.20	2291.4	0.14	9.24	27.95	-141.8	1.19	Clear	None
3:38 PM	0.08	0.16	0.64	1.21	7.19	2305.9	0.12	17.4	27.86	-141.8	1.20	Clear	None
3:40 PM	0.08	0.16	0.8	1.24	7.19	2347.2	0.12	10.19	27.93	-142.5	1.22	Clear	None

Start Purge:	10/11/2023 3:30:00 PM	End Purge:	10/11/2023 3:40:00 PM	Total Volume (gal):	0.80

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0044-045.0-20231023 Sample Date: 10/23/2023 10:27:00 AM
Well ID: MLPV-IW0044 Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments: DTW meter does not fit with tubing; DTW is 0.30' after sampling

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.36
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:20 AM	0.05	1.50	1.50	NA	7.04	2725	0.22	8.91	24.8	-91.4	1.41	Clear	None
10:22 AM	0.05	0.10	1.60	NA	7.04	2725	0.22	8.75	24.8	-91.6	1.41	Clear	None
10:24 AM	0.05	0.10	1.70	NA	7.04	2726	0.23	8.62	24.8	-91.7	1.41	Clear	None
10:26 AM	0.05	0.10	1.80	NA	7.04	2728	0.22	8.51	24.9	-91.9	1.41	Clear	None

Start Purge:	10/23/2023 9:50:00 AM	End Purge:	10/23/2023 10:26:00 AM	Total Volume (gal):	1.8

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-IW0045-045.0-20231023 Sample Date: 10/23/2023 11:17:00 AM
Well ID: MLPV-IW0045 Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments: DTW meter does not fit with tubing; DTW is 1.09' after sampling

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.02
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
11:10 AM	0.05	1.50	1.50	NA	6.94	2567	0.56	15.61	26.6	-129.7	1.28	Clear	None
11:12 AM	0.05	0.10	1.60	NA	6.94	2567	0.54	15.54	26.6	-130.2	1.28	Clear	None
11:14 AM	0.05	0.10	1.70	NA	6.94	2569	0.54	15.41	26.5	-130.6	1.28	Clear	None
11:16 AM	0.05	0.10	1.80	NA	6.94	2568	0.54	15.32	26.5	-131.2	1.28	Clear	None

Start Purge:	10/23/2023 10:40:00 AM	End Purge:	10/23/2023 11:16:00 AM	Total Volume (gal):	1.8

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Sept 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-SAMW0004D-047.5-20231011 Sample Date: 10/11/2023 2:50:00 PM
Well ID: MLPV-SAMW0004D Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.97
Top of Screen (ft-BTOC):	45.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
2:40 PM	0.08	0.48	0.48	3.14	6.56	451.8	0.08	12.72	26.84	-197.8	0.22	Clear	None
2:42 PM	0.08	0.16	0.64	3.14	6.64	1769.5	0.06	17.13	26.89	-206.3	0.91	Clear	None
2:44 PM	0.08	0.16	0.80	3.15	6.76	3156.9	0.05	50.97	26.85	-212.1	1.67	Clear	None
2:46 PM	0.08	0.16	0.96	3.16	6.80	3131.9	0.03	50.32	26.83	-217.3	2.22	Clear	None
2:48 PM	0.08	0.16	1.12	3.15	6.87	3138.6	0.03	53.50	26.85	-219.6	2.34	Clear	None

Start Purge:	10/11/2023 2:34:00 PM	End Purge:	10/11/2023 2:48:00 PM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Hot Spot 2 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 2
Project #: 60615493

Sample ID: MLPV-SAMW0004I-037.5-20231011 Sample Date: 10/11/2023 3:10:00 PM
Well ID: MLPV-SAMW0004I Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	3.00
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
3:01 PM	0.08	0.80	0.80	3.07	7.16	824.4	0.15	1.44	26.98	-196.3	0.38	Clear	None
3:03 PM	0.08	0.16	0.96	3.10	7.18	835.5	0.09	1.36	26.84	-208.8	0.41	Clear	None
3:05 PM	0.08	0.16	1.12	3.10	7.18	836.4	0.09	1.38	26.81	-209.1	0.42	Clear	None

Start Purge:	10/11/2023 2:50:00 PM	End Purge:	10/11/2023 3:05:00 PM	Total Volume (gal):	1.12

Biosparge Area

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0004-037.5-20231020 Sample Date: 10/20/2023 11:35:00 AM
Well ID: MLPV-ASMW0004 Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.76
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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	0.08	0.80	0.80	0.85	7.24	1232.0	5.66	49.81	27.01	152.9	0.62	Clear	None
11:30 AM	0.08	0.16	0.96	0.86	7.24	1207.7	5.58	51.07	27.13	152.5	0.61	Clear	None
11:32 AM	0.08	0.16	1.12	0.86	7.23	1193.5	5.59	53.26	26.96	152.1	0.6	Clear	None

Start Purge:	10/20/2023 11:18:00 AM	End Purge:	10/20/2023 11:32:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0005-037.5-20231020
Sample Date: 10/20/2023 11:10:00 AM
Well ID: MLPV-ASMW0005
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.16
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
11:04 AM	0.08	0.80	0.80	1.24	7.26	1719.2	6.97	54.13	26.4	166.1	0.88	Clear	None
11:06 AM	0.08	0.16	0.96	1.24	7.28	1648.5	7.26	53.21	26.45	163.7	0.84	Clear	None
11:08 AM	0.08	0.16	1.12	1.25	7.29	1623.4	7.22	50.43	26.37	163.4	0.83	Clear	None

Start Purge:	10/20/2023 10:54:00 AM	End Purge:	10/20/2023 11:08:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-ASMW0006-037.5-20231020 Sample Date: 10/20/2023 10:42:00 AM
Well ID: MLPV-ASMW0006 Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.50
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:36 AM	0.08	0.80	0.80	0.59	7.09	3286.3	0.34	10.72	26.08	-188.3	1.74	Clear	None
10:38 AM	0.08	0.16	0.96	0.60	7.08	3261.2	0.29	10.58	26.06	-188.8	1.73	Clear	None
10:40 AM	0.08	0.16	1.12	0.61	7.08	3175.6	0.28	11.56	25.92	-189.4	1.68	Clear	None

Start Purge:	10/20/2023 10:26:00 AM	End Purge:	10/20/2023 10:40:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0006IR-030.5-20231020
Sample Date: 10/20/2023 11:57:00 AM
Well ID: MLPV-IW0006IR
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	2	Static Water Level (ft-BTOC):	1.58
Top of Screen (ft-BTOC):	28.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	33.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
11:53 AM	0.08	0.80	0.80	1.6	7.84	1198.6	10.85	24.87	27.74	152.3	0.6	Clear	None
11:55 AM	0.08	0.16	0.96	1.6	7.84	1147.4	10.83	27.84	27.63	149.9	0.58	Clear	None
11:57 AM	0.08	0.16	1.12	1.6	7.84	1125.3	11.62	25.86	27.8	148.1	0.58	Clear	None

Start Purge:	10/20/2023 11:43:00 AM	End Purge:	10/20/2023 11:57:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

Event: MLPV Biospare Area GW Sept 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0028I-030.5-20231020
Well ID: MLPV-IW0028I
Location Type: Monitoring Well
Comments:

Sample Date: 10/20/2023 1:34:00 PM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	2	Static Water Level (ft-BTOC):	1.41
Top of Screen (ft-BTOC):	28.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	33.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:30 PM	0.08	0.80	0.80	1.42	7.01	228	0.54	2.71	30.6	-159.6	0.11	Clear	None
1:32 PM	0.08	0.16	0.96	1.42	7.01	227.3	0.53	2.74	30.7	-160.3	0.11	Clear	None
1:34 PM	0.08	0.16	1.12	1.42	6.98	218.2	0.51	2.86	31	-163.2	0.10	Clear	None

Start Purge:	10/20/2023 1:20:00 PM	End Purge:	10/20/2023 1:34:00 PM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biospare Area GW Sept 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0031-030.0-20231020
Well ID: MLPV-IW0031
Location Type: Monitoring Well
Comments:

Sample Date: 10/20/2023 1:09:00 PM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.36
Top of Screen (ft-BTOC):	25.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	35.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:05 PM	0.08	0.80	0.80	1.38	7.23	1697.4	0.44	15.56	26.88	35.2	0.87	Clear	None
1:07 PM	0.08	0.16	0.96	1.38	7.22	1706.4	0.36	10.99	27.15	5.6	0.87	Clear	None
1:09 PM	0.08	0.16	1.12	1.38	7.22	1745.4	0.34	16.46	27.71	-29	0.89	Clear	None

Start Purge:	10/20/2023 12:55:00 PM	End Purge:	10/20/2023 1:09:00 PM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0046-040.0-20231020
Sample Date: 10/20/2023 1:38:00 PM
Well ID: MLPV-IW0046
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.09
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
1:32 PM	0.08	0.80	0.80	2.24	7.39	807.5	0.16	5.90	28.37	-282.8	0.40	Clear	None
1:34 PM	0.08	0.16	0.96	2.26	7.38	837.1	0.22	3.47	28.27	-287.3	0.42	Clear	None
1:36 PM	0.08	0.16	1.12	2.27	7.38	849.3	0.16	3.19	28.34	-289.3	0.42	Clear	None

Start Purge:	10/20/2023 1:22:00 PM	End Purge:	10/20/2023 1:36:00 PM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0057-045.0-20231012
Well ID: MLPV-IW0057
Location Type: Monitoring Well
Comments: Bubbling with HCL

Sample Date: 10/12/2023 11:12:00 AM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.10
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
11:00 AM	0.05	0.75	0.75	3.18	7.20	3661.2	0.25	8.97	26.9	-206.1	1.94	Clear	None
11:02 AM	0.05	0.10	0.85	3.18	7.21	3998.7	0.22	11.79	26.85	-206.7	2.06	Clear	None
11:04 AM	0.05	0.10	0.95	3.18	7.21	4000.1	0.21	12.03	26.83	-207.1	2.08	Clear	None
11:06 AM	0.05	0.10	1.05	3.18	7.21	3999.8	0.21	11.81	26.83	-208.1	2.08	Clear	None

Start Purge:	10/12/2023 10:46:00 AM	End Purge:	10/12/2023 11:06:00 AM	Total Volume (gal):	1.05

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0058-047.5-20231012
Well ID: MLPV-IW0058
Location Type: Monitoring Well
Comments: Bubbling with HCL

Sample Date: 10/12/2023 10:26:00 PM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.65
Top of Screen (ft-BTOC):	45.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:15 AM	0.05	0.75	0.75	2.71	7.19	2514.7	0.24	11.37	26.32	-176.6	1.29	Clear	None
10:17 AM	0.05	0.10	0.85	2.71	7.18	2382.8	0.23	10.29	26.27	180.2	1.20	Clear	None
10:19 AM	0.05	0.10	0.95	2.71	7.18	2379.5	0.22	10.71	26.29	-181.3	1.18	Clear	None
10:21 AM	0.05	0.10	1.05	2.71	7.18	2382.1	0.22	9.86	26.28	-181.7	1.19	Clear	None

Start Purge:	10/12/2023 9:59:00 AM	End Purge:	10/12/2023 10:21:00 AM	Total Volume (gal):	1.05

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0059-047.5-20231012
Well ID: MLPV-IW0059
Location Type: Monitoring Well
Comments: Bubbling with HCL

Sample Date: 10/12/2023 9:36:00 AM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.37
Top of Screen (ft-BTOC):	45.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:25 AM	0.05	0.75	0.75	3.41	7.22	1346.7	0.22	9.73	26.32	-199.8	0.65	Clear	None
9:27 AM	0.05	0.10	0.85	3.41	7.22	1324.2	0.21	9.18	26.51	-199.5	0.65	Clear	None
9:29 AM	0.05	0.10	0.95	3.41	7.21	1328.2	0.21	7.38	26.48	-200.6	0.66	Clear	None

Start Purge:	10/12/2023 9:10:00 AM	End Purge:	10/12/2023 9:29:00 AM	Total Volume (gal):	0.95

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0060-045.0-20231020
Well ID: MLPV-IW0060
Location Type: Monitoring Well
Comments:

Sample Date: 10/20/2023 10:40:00 AM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	0.85
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	50.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:36 AM	0.08	0.80	0.80	0.88	7.29	7862.3	0.47	6.23	26.49	40.4	4.41	Clear	None
10:38 AM	0.08	0.16	0.96	0.88	7.30	7800.3	0.38	6.69	26.61	-19.3	4.38	Clear	None
10:40 AM	0.08	0.16	1.12	0.89	7.29	7712.9	0.33	9.50	26.44	-53.5	4.32	Clear	None

Start Purge:	10/20/2023 10:26:00 AM	End Purge:	10/20/2023 10:40:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0061-037.5-20231012
Well ID: MLPV-IW0061
Location Type: Monitoring Well
Comments:

Sample Date: 10/12/2023 12:58:00 PM
Sampler: Caroline Bekins

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.58
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
12:46 PM	0.05	0.70	0.70	3.68	7.36	1717.9	0.30	0.54	27.81	-261.6	0.83	Clear	None
12:48 PM	0.05	0.10	0.80	3.68	7.36	1730.9	0.28	0.47	27.66	-264.1	0.86	Clear	None
12:50 PM	0.05	0.10	0.90	3.68	7.36	1730.5	0.28	0.38	27.66	-264.1	0.85	Clear	None
12:52 PM	0.05	0.10	1.00	3.68	7.36	1730.3	0.28	0.32	27.66	-264.8	0.86	Clear	None

Start Purge:	10/12/2023 12:33:00 PM	End Purge:	10/12/2023 12:52:00 PM	Total Volume (gal):	1.0

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0062-042.5-20231012
Well ID: MLPV-IW0062
Location Type: Monitoring Well
Comments: DTW meter will not fit with tubing

Sample Date: 10/12/2023 12:45:00 PM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	3.62
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
12:38 PM	0.08	0.48	0.48	NA	7.18	6570.5	1.55	4.51	28.13	-51.4	3.64	Clear	None
12:40 PM	0.08	0.16	0.64	NA	7.21	7234.8	0.37	2.35	27.88	-90.0	4.04	Clear	None
12:42 PM	0.08	0.16	0.80	NA	7.21	7352.9	0.22	1.78	27.86	-105.5	4.11	Clear	None
12:44 PM	0.08	0.16	0.96	NA	7.22	7434.7	0.21	0.00	27.81	-123.9	4.16	Clear	None

Start Purge:	10/12/2023 12:32:00 PM	End Purge:	10/12/2023 12:44:00 PM	Total Volume (gal):	0.96

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0063-037.5-20231020
Sample Date: 10/20/2023 12:40:00 PM
Well ID: MLPV-IW0063
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.44
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	40.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
12:32 PM	0.08	0.80	0.80	2.65	6.98	3929.5	1.52	64.74	27.27	-29.2	2.11	Clear	None
12:34 PM	0.08	0.16	0.96	2.67	6.96	4006.8	1.26	38.15	27.09	-30	2.15	Clear	None
12:36 PM	0.08	0.16	1.12	2.67	6.96	3983.9	1.17	40.99	26.99	-30.7	2.14	Clear	None
12:38 PM	0.08	0.16	1.28	2.68	6.97	4161.5	1.08	41.8	26.92	-32.1	2.24	Clear	None

Start Purge:	10/20/2023 12:22:00 PM	End Purge:	10/20/2023 12:38:00 PM	Total Volume (gal):	1.28

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-IW0064-042.5-20231020
Well ID: MLPV-IW0064
Location Type: Monitoring Well
Comments:

Sample Date: 10/20/2023 12:39:00 PM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.28
Top of Screen (ft-BTOC):	40.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
12:32 PM	0.08	0.80	0.80	2.34	7.11	7248.3	0.46	12.08	28.56	-60.9	4.05	Clear	None
12:34 PM	0.08	0.16	0.96	2.34	7.13	7947.1	0.37	17.11	28.6	-69.9	4.47	Clear	None
12:37 PM	0.08	0.16	1.12	2.35	7.14	8256.1	0.32	17.40	28.43	-67.2	4.65	Clear	None
12:40 PM	0.08	0.16	1.28	2.35	7.16	8327.8	0.24	14.59	28.38	-59.6	4.70	Clear	None

Start Purge:	10/20/2023 12:22:00 PM	End Purge:	10/20/2023 12:40:00 PM	Total Volume (gal):	1.28

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-MW0102-030.0-20231020
Sample Date: 10/20/2023 9:27:00 AM
Well ID: MLPV-MW0102
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	0.25
Top of Screen (ft-BTOC):	25.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	35.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:21 AM	0.08	0.80	0.80	0.25	7.2	1197.0	0.28	27.32	24.74	-177.8	0.60	Clear	None
9:23 AM	0.08	0.16	0.96	0.25	7.2	1212.9	0.25	29.93	24.86	-180.4	0.61	Clear	None
9:25 AM	0.08	0.16	1.12	0.25	7.2	1207.8	0.23	28.76	24.88	-183.6	0.61	Clear	None

Start Purge:	10/20/2023 9:11:00 AM	End Purge:	10/20/2023 9:25:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-MW0103-040.0-20231020
Sample Date: 10/20/2023 9:48:00 AM
Well ID: MLPV-MW0103
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments: DTW at TOC

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	0.00
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:42 AM	0.08	0.80	0.80	0	7.19	10034.7	0.34	93.60	25.12	-215.8	5.74	Clear	None
9:44 AM	0.08	0.16	0.96	0	7.2	9911.2	0.30	94.87	25.06	-215.9	5.66	Clear	None
9:46 AM	0.08	0.16	1.12	0	7.2	9816.3	0.26	98.63	25.05	-215.3	5.60	Clear	None

Start Purge:	10/20/2023 9:32:00 AM	End Purge:	10/20/2023 9:46:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Biosparge Area GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Biosparge Area
Project #: 60615493

Sample ID: MLPV-MW0107-040.0-20231020
Sample Date: 10/20/2023 9:02:00 AM
Well ID: MLPV-MW0107
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	2	Static Water Level (ft-BTOC):	1.37
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
8:56 AM	0.08	0.80	0.80	1.41	6.97	2205.9	0.26	96.66	24.74	-169.5	1.14	Clear	None
8:58 AM	0.08	0.16	0.96	1.41	6.97	2222.0	0.24	103.43	24.74	-172.4	1.15	Clear	None
9:00 AM	0.08	0.16	1.12	1.42	6.97	2241.7	0.23	108.4	24.75	-174.4	1.16	Clear	None

Start Purge:	10/20/2023 8:46:00 AM	End Purge:	10/20/2023 9:00:00 AM	Total Volume (gal):	1.12

Hot Spot 3 (OFW)

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Host Spot 3 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 3
Project #: 60615493

Sample ID: VABRA-MW0011-030.0-20231012
Sample Date: 10/12/2023 9:20:00 AM
Well ID: VABRA-MW0011
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.58
Top of Screen (ft-BTOC):	25.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	35.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:15 AM	0.08	0.80	0.80	1.65	7.28	580.5	0.28	0.00	27.16	-323.6	0.28	Clear	None
9:17 AM	0.08	0.16	0.96	1.65	7.29	587.3	0.24	0.00	27.07	-336.4	0.29	Clear	None
9:19 AM	0.08	0.16	1.12	1.66	7.29	584.4	0.19	0.59	27.08	-346.1	0.29	Clear	None

Start Purge:	10/12/2023 9:05:00 AM	End Purge:	10/12/2023 9:19:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: VABRA-MW0011-030.0-20231116
Sample Date: 11/16/2023 11:52:00 AM
Well ID: VABRA-MW0011
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments: Cannot fit DTW meter down with tubing

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.15
Top of Screen (ft-BTOC):	25.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	35.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
11:25 AM			0	2.15								Clear	None
11:45 AM	0.05	1	1	NA	7.51	540	0.22	5.09	25.2	-248.2	0.25	Yellow	Sulfur
11:47 AM	0.05	0.1	1.1	NA	7.51	540	0.23	4.45	25.2	-249.6	0.26	Yellow	Sulfur
11:49 AM	0.05	0.1	1.2	NA	7.51	541	0.21	4.17	25.2	-250.4	0.26	Yellow	Sulfur
11:51 AM	0.05	0.1	1.3	NA	7.5	541	0.22	3.97	25.2	-251	0.26	Clear	None

Start Purge:	11/16/2023 11:24:00 AM	End Purge:	11/16/2023 11:51:00 AM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Host Spot 3 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 3
Project #: 60615493

Sample ID: VABRA-MW0012-020.0-20231012
Well ID: VABRA-MW0012
Location Type: Monitoring Well
Comments:

Sample Date: 10/12/2023 9:35:00 AM
Sampler: Devin Kehoe

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.55
Top of Screen (ft-BTOC):	15.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	25.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:29 AM	0.08	0.80	0.80	1.69	7.28	523.1	0.20	0.00	27.35	-353.1	0.26	Clear	None
9:31 AM	0.08	0.16	0.96	1.72	7.28	527.0	0.16	0.00	27.34	-357.8	0.26	Clear	None
9:33 AM	0.08	0.16	1.12	1.75	7.28	527.3	0.18	0.00	27.26	-362.7	0.26	Clear	None

Start Purge:	10/12/2023 9:23:00 AM	End Purge:	10/12/2023 9:33:00 AM	Total Volume (gal):	1.12

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: VABRA-MW0012-020.0-20231116
Sample Date: 11/16/2023 12:48:00 PM
Well ID: VABRA-MW0012
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments: Cannot fit DTW meter down with tubing

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	2.35
Top of Screen (ft-BTOC):	15.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	25.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
12:21 PM			0	2.35								Clear	None
12:41 PM	0.05	1	1	NA	7.5	480.7	0.2	4.86	25.2	-246.4	0.23	Clear	Sulfur
12:43 PM	0.05	0.1	1.1	NA	7.5	481.6	0.45	4.11	25.2	-249	0.23	Clear	Sulfur
12:45 PM	0.05	0.1	1.2	NA	7.5	482	0.48	3.66	25.2	-249.8	0.23	Clear	Sulfur
12:47 PM	0.05	0.1	1.3	NA	7.5	482.8	0.5	3.09	25.3	-250.6	0.23	Clear	Sulfur

Start Purge:	11/16/2023 12:21:00 PM	End Purge:	11/16/2023 12:47:00 PM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Host Spot 3 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 3
Project #: 60615493

Sample ID: VABRA-MW0013-022.5-20231012
Sample Date: 10/12/2023 8:35:00 AM
Well ID: VABRA-MW0013
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.12
Top of Screen (ft-BTOC):	20.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	25.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
8:29 AM	0.08	0.48	0.48	1.27	7.55	380.8	0.11	1.68	26.45	-264.1	0.18	Clear	None
8:31 AM	0.08	0.16	0.64	1.29	7.55	383.8	0.09	0.38	26.44	-272.7	0.19	Clear	None
8:33 AM	0.08	0.16	0.80	1.31	7.48	386.4	0.09	0.18	26.42	-275.4	0.19	Clear	None

Start Purge:	10/12/2023 8:23:00 AM	End Purge:	10/12/2023 8:33:00 AM	Total Volume (gal):	0.80

GROUNDWATER SAMPLING LOG

AECOM

Event: MLPV Host Spot 3 GW Oct 2023
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056) - Hot Spot 3
Project #: 60615493

Sample ID: VABRA-MW0014-027.5-20231012
Sample Date: 10/12/2023 9:00:00 AM
Well ID: VABRA-MW0014
Sampler: Devin Kehoe
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	0.75	Static Water Level (ft-BTOC):	1.68
Top of Screen (ft-BTOC):	25.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	30.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
8:52 AM	0.08	0.48	0.48	1.84	7.21	637.4	0.16	1.51	26.90	-310.6	0.31	Clear	None
8:54 AM	0.08	0.16	0.64	1.82	7.21	637.9	0.15	0.00	26.92	-316.4	0.31	Clear	None
8:56 AM	0.08	0.16	0.80	1.81	7.21	638.1	0.13	0.00	26.93	-315	0.31	Clear	None

Start Purge:	10/12/2023 8:46:00 AM	End Purge:	10/12/2023 8:56:00 AM	Total Volume (gal):	0.80

LCP Monitoring

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-IW0053R-040.0-20231116
Sample Date: 11/16/2023 3:20:00 PM
Well ID: MLPV-IW0053R
Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.68
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
3:10 PM	0.05	0.8	0.8	2.62	7.93	2788.9	0.35	5.07	23.42	-273.5	1.47	Clear	None
3:12 PM	0.05	0.1	0.9	2.62	7.94	2829.2	0.33	4.48	23.4	-283.4	1.49	Clear	None
3:14 PM	0.05	0.1	1	2.62	7.94	2827.3	0.31	4.35	23.4	-284.3	1.48	Clear	None
3:16 PM	0.05	0.1	1.1	2.62	7.94	2828.3	0.31	4.31	23.4	-284.5	1.47	Clear	None

Start Purge:	11/16/2023 2:55:00 PM	End Purge:	11/16/2023 3:16:00 PM	Total Volume (gal):	1.1

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-MW0111-050.0-20231116
Sample Date: 11/16/2023 2:48:00 PM
Well ID: MLPV-MW0111
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	5.15
Top of Screen (ft-BTOC):	45.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	55.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
2:11 PM			0	5.15								Clear	None
2:41 PM	0.05	1.5	1.5	5.19	7.8	2277	0.5	4.9	26.9	-41.3	1.12	Clear	None
2:43 PM	0.05	0.1	1.6	5.19	7.8	2277	0.5	4.54	26.9	-42.5	1.12	Clear	None
2:45 PM	0.05	0.1	1.7	5.19	7.79	2284	0.5	3.87	26.9	-43.5	1.12	Clear	None
2:47 PM	0.05	0.1	1.8	5.19	7.79	2286	0.5	3.41	26.9	-43.8	1.12	Clear	None

Start Purge:	11/16/2023 2:10:00 PM	End Purge:	11/16/2023 2:47:00 PM	Total Volume (gal):	1.8

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-MW0112-052.0-20231116
Sample Date: 11/16/2023 4:40:00 PM
Well ID: MLPV-MW0112
Sampler: Caroline Bekins
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	5.46
Top of Screen (ft-BTOC):	47.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	57.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
4:27 PM	0.05	0.8	0.8	5.42	7.47	4285.7	1.59	4.15	24.25	-190.7	2.25	Clear	None
4:29 PM	0.05	0.1	0.9	5.42	7.47	4291.5	1.63	4.31	24.24	-192.7	2.29	Clear	None
4:31 PM	0.05	0.1	1	5.42	7.47	4296.8	1.6	3.94	24.24	-192.5	2.31	Clear	None
4:33 PM	0.05	0.1	1.1	5.42	7.47	4296.1	1.6	3.12	24.24	-192	2.3	Clear	None

Start Purge:	11/16/2023 4:11:00 PM	End Purge:	11/16/2023 4:33:00 PM	Total Volume (gal):	1.1

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-MW0113-040.0-20231116
Sample Date: 11/16/2023 8:24:00 AM
Well ID: MLPV-MW0113
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	4.58
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
7:57 AM			0	4.58								Clear	None
8:17 AM	0.05	1	1	4.59	7.56	525	0.39	7.04	24.9	-102.3	0.26	Clear	None
8:19 AM	0.05	0.1	1.1	4.59	7.56	525	0.38	6.52	24.8	-100.7	0.26	Clear	None
8:21 AM	0.05	0.1	1.2	4.59	7.56	524	0.35	6.3	24.8	-99.8	0.26	Clear	None
8:23 AM	0.05	0.1	1.3	4.59	7.56	524	0.34	5.97	24.8	-99.7	0.26	Clear	None

Start Purge:	11/16/2023 7:57:00 AM	End Purge:	11/16/2023 8:23:00 AM	Total Volume (gal):	1.3

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-MW0114-040.0-20231116
Sample Date: 11/16/2023 9:30:00 AM
Well ID: MLPV-MW0114
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.63
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
9:03 AM			0	1.63								Clear	None
9:23 AM	0.05	0.1	0.1	1.65	7.96	536	0.19	6.91	24.3	-79.5	0.26	Clear	None
9:25 AM	0.05	0.1	0.2	1.65	7.96	542	0.19	6.21	24.3	-80.8	0.26	Clear	None
9:27 AM	0.05	0.1	0.3	1.65	7.95	547	0.19	5.83	24.3	-82.1	0.26	Clear	None
9:29 AM	0.05	0.1	0.4	1.65	7.95	552	0.19	5.34	24.2	-83	0.27	Clear	None

Start Purge:	11/16/2023 9:03:00 AM	End Purge:	11/16/2023 9:29:00 AM	Total Volume (gal):	0.4

GROUNDWATER SAMPLING LOG

AECOM

Event: MLP/VAB November 2023 Sampling
Site Name: Mobile Launch Platform Park Sites/Vehicle Assembly Building Area (SWMU 056)
Project #: 60615493

Sample ID: MLPV-MW0115-040.0-20231116
Sample Date: 11/16/2023 10:51:00 AM
Well ID: MLPV-MW0115
Sampler: Dustin Slater
Location Type: Monitoring Well
Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.03
Top of Screen (ft-BTOC):	35.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	45.00	Purge/Sample Method:	Low Flow
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

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)
10:24 AM			0	2.03								Clear	None
10:44 AM	0.05	1	1	2.06	7.72	728	0.15	2.81	24.9	-18.3	0.36	Clear	None
10:46 AM	0.05	0.1	1.1	2.06	7.72	733	0.15	2.5	24.9	-19.6	0.36	Clear	None
10:48 AM	0.05	0.1	1.2	2.06	7.73	741	0.15	1.92	24.9	-21.4	0.36	Clear	None
10:50 AM	0.05	0.1	1.3	2.06	7.73	742	0.15	1.76	24.9	-21.9	0.36	Clear	None

Start Purge:	11/16/2023 10:24:00 AM	End Purge:	11/16/2023 10:50:00 AM	Total Volume (gal):	1.3

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	1017812
Created	10/12/2023

Serial Number	929293
Last Calibrated	10/11/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.972
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	8,436.1 µS/cm
Specific Conductivity	8,236.6 µS/cm

Post Measurement

Actual Conductivity	8,193.9 µS/cm
Specific Conductivity	8,000.0 µS/cm

Serial Number	780503
Last Calibrated	10/11/2023

Calibration Details

Slope	1
Offset	-8.90 NTU

Calibration Point 1

Pre Measurement	4.30 NTU
Post Measurement	2.00 NTU

Serial Number	1003301
Last Calibrated	10/12/2023

Calibration Details

Slope	1.031104
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.69 mg/L
Pre Measurement	104.98 %Sat
Post Measurement	100.00 %Sat
Temperature	27.02 °C
Barometric Pressure	1,008.3 mbar

Serial Number	982898
Last Calibrated	10/11/2023

Calibration Details

Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-11.3 mV
Temperature	26.27 °C

Pre Measurement

pH	7.08 pH
pH mV	-11.3 mV

Post Measurement

pH	6.98 pH
pH mV	-11.3 mV

Slope and Offset 1

Slope	-59.41 mV/pH
Offset	-12.5 mV

ORP

ORP Solution	Quick Cal
Offset	-16.8 mV
Temperature	26.27 °C
Pre Measurement	227.3 mV
Post Measurement	221.6 mV

Serial Number	1017812
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	1017812
Created	10/12/2023

Serial Number	929293
Last Calibrated	10/12/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.976
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	8,118.2 µS/cm
Specific Conductivity	7,942.1 µS/cm

Post Measurement

Actual Conductivity	8,177.4 µS/cm
Specific Conductivity	8,000.0 µS/cm

Serial Number	780503
Last Calibrated	10/12/2023

Calibration Details

Slope	1
Offset	-7.27 NTU

Calibration Point 1

Pre Measurement	3.06 NTU
Post Measurement	2.00 NTU

Serial Number	1003301
Last Calibrated	10/12/2023

Calibration Details

Slope	1.031104
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.69 mg/L
Pre Measurement	104.98 %Sat
Post Measurement	100.00 %Sat
Temperature	27.02 °C
Barometric Pressure	1,008.3 mbar

Serial Number	982898
Last Calibrated	10/12/2023

Calibration Details

Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-11.6 mV
Temperature	26.16 °C

Pre Measurement

pH	6.98 pH
pH mV	-11.6 mV

Post Measurement

pH	6.98 pH
pH mV	-11.6 mV

Slope and Offset 1

Slope	-59.39 mV/pH
Offset	-12.8 mV

ORP

ORP Solution	Quick Cal
Offset	-58.5 mV
Temperature	26.16 °C
Pre Measurement	264.2 mV
Post Measurement	221.8 mV

Serial Number	1017812
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	1017812
Created	10/11/2023

Serial Number	929293
Last Calibrated	10/11/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.972
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	8,436.1 µS/cm
Specific Conductivity	8,236.6 µS/cm

Post Measurement

Actual Conductivity	8,193.9 µS/cm
Specific Conductivity	8,000.0 µS/cm

Serial Number	780503
Last Calibrated	10/11/2023

Calibration Details

Slope	1
Offset	-8.90 NTU

Calibration Point 1

Pre Measurement	4.30 NTU
Post Measurement	2.00 NTU

Serial Number	1003301
Last Calibrated	10/11/2023

Calibration Details

Slope	1.083352
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.29 mg/L
Pre Measurement	88.61 %Sat
Post Measurement	100.00 %Sat
Temperature	27.60 °C
Barometric Pressure	1,015.8 mbar

Serial Number	982898
Last Calibrated	10/11/2023

Calibration Details

Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-11.3 mV
Temperature	26.27 °C

Pre Measurement

pH	7.08 pH
pH mV	-11.3 mV

Post Measurement

pH	6.98 pH
pH mV	-11.3 mV

Slope and Offset 1

Slope	-59.41 mV/pH
Offset	-12.5 mV

ORP

ORP Solution	Quick Cal
Offset	-16.8 mV
Temperature	26.27 °C
Pre Measurement	227.3 mV
Post Measurement	221.6 mV

Serial Number	1017812
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	1017812
Created	10/11/2023

Serial Number	929293
Last Calibrated	10/11/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.972
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	8,436.1 µS/cm
Specific Conductivity	8,236.6 µS/cm

Post Measurement

Actual Conductivity	8,193.9 µS/cm
Specific Conductivity	8,000.0 µS/cm

Serial Number	780503
Last Calibrated	7/18/2023

Calibration Details

Slope	1
Offset	-6.06 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	1.00 NTU

Serial Number	1003301
Last Calibrated	10/11/2023

Calibration Details

Slope	1.083352
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.29 mg/L
Pre Measurement	88.61 %Sat
Post Measurement	100.00 %Sat
Temperature	27.60 °C
Barometric Pressure	1,015.8 mbar

Serial Number	982898
Last Calibrated	10/11/2023

Calibration Details

Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-11.3 mV
Temperature	26.27 °C

Pre Measurement

pH	7.08 pH
pH mV	-11.3 mV

Post Measurement

pH	6.98 pH
pH mV	-11.3 mV

Slope and Offset 1

Slope	-59.41 mV/pH
Offset	-12.5 mV

ORP

ORP Solution	Quick Cal
Offset	-16.8 mV
Temperature	26.27 °C
Pre Measurement	227.3 mV
Post Measurement	221.6 mV

Serial Number	1017812
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	1017812
Created	10/11/2023

Serial Number	929293
Last Calibrated	7/31/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	1
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	8,294.3 µS/cm
Specific Conductivity	8,171.4 µS/cm

Post Measurement

Actual Conductivity	8,120.3 µS/cm
Specific Conductivity	8,000.0 µS/cm

Serial Number	780503
Last Calibrated	7/18/2023

Calibration Details

Slope	1
Offset	-6.06 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	1.00 NTU

Serial Number	1003301
Last Calibrated	10/11/2023

Calibration Details

Slope	1.083352
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.29 mg/L
Pre Measurement	88.61 %Sat
Post Measurement	100.00 %Sat
Temperature	27.60 °C
Barometric Pressure	1,015.8 mbar

Serial Number	982898
Last Calibrated	7/31/2023

Calibration Details

Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-5.4 mV
Temperature	25.79 °C

Pre Measurement

pH	7.04 pH
pH mV	-5.4 mV

Post Measurement

pH	6.98 pH
pH mV	-5.5 mV

Slope and Offset 1

Slope	-59.32 mV/pH
Offset	-6.6 mV

ORP

ORP Solution	Quick Cal
Offset	2.4 mV
Temperature	25.79 °C
Pre Measurement	134.6 mV
Post Measurement	222.3 mV

Serial Number	1017812
Last Calibrated	Factory Defaults

Calibration Report

Instrument	Aqua TROLL 600
Serial Number	959853
Created	10/23/2023

Sensor **Conductivity**

Serial Number	1020524
Last Calibrated	10/20/2023

Calibration Details

TDS Conversion Factor (ppm)	0.65
Cell Constant	0.99
Reference Temperature	25.00 °C

Pre Measurement

Actual Conductivity	7,750.5 µS/cm
Specific Conductivity	8,038.9 µS/cm

Post Measurement

Actual Conductivity	7,712.9 µS/cm
Specific Conductivity	8,000.0 µS/cm

Sensor **Turbidity**

Serial Number	931621
Last Calibrated	10/20/2023

Calibration Details

Slope	1
Offset	-0.40 NTU

Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	2.00 NTU

Sensor **RDO**

Serial Number	1002663
Last Calibrated	10/23/2023

Calibration Details

Slope	1.115517
Offset	0.00 mg/L

Calibration point 100%

Concentration	7.86 mg/L
Pre Measurement	135.74 %Sat
Post Measurement	100.00 %Sat
Temperature	22.16 °C
Barometric Pressure	1,019.1 mbar

Sensor	**pH/ORP**
Serial Number	996836
Last Calibrated	10/20/2023

Calibration Details

Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-16.6 mV
Temperature	23.12 °C

Pre Measurement

pH	6.99 pH
pH mV	-16.6 mV

Post Measurement

pH	7.00 pH
pH mV	-16.5 mV

Slope and Offset 1

Slope	-58.79 mV/pH
Offset	-16.6 mV

ORP

ORP Solution	Quick Cal
Offset	-86.3 mV
Temperature	23.12 °C
Pre Measurement	230.2 mV
Post Measurement	226.4 mV

Sensor	**Barometric Pressure**
Serial Number	959853
Last Calibrated	Factory Defaults

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APPENDIX K

LABORATORY ANALYTICAL REPORTS – GROUNDWATER SAMPLING

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10.14.2022
Date

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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 10/23/2023 6:43:26 AM

JOB DESCRIPTION

NASA KSC MLPV - Hot Spot 3 HS3

JOB NUMBER

670-28629-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

Job Notes

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Definitions/Glossary

Client: AECOM Technical Services Inc. Job ID: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

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: 670-28629-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-28629-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/13/2023 11:55 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 1.9°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: (670-28629-B-19). 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: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

Client Sample ID: VABRA-MW0011-030.0-20231012 — Lab Sample ID: 670-28629-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	5.4		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: VABRA-MW0012-020.0-20231012 — Lab Sample ID: 670-28629-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.0		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: VABRA-MW0013-022.5-20231012 — Lab Sample ID: 670-28629-3

No Detections.

Client Sample ID: VABRA-MW0014-027.5-20231012 — Lab Sample ID: 670-28629-4

No Detections.

Client Sample ID: MLPV-TB01 — Lab Sample ID: 670-28629-5

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: VABRA-MW0011-030.0-20231012 Lab Sample ID: 670-28629-1

Date Collected: 10/12/23 09:20 **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 13:04	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 13:04	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 13:04	1
Vinyl chloride	**5.4**		1.0	0.71	ug/L			10/20/23 13:04	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 13:04*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*10/20/23 13:04*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 13:04*	*1*

Client Sample ID: VABRA-MW0012-020.0-20231012 Lab Sample ID: 670-28629-2

Date Collected: 10/12/23 09:35 **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 13:21	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 13:21	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 13:21	1
Vinyl chloride	**2.0**		1.0	0.71	ug/L			10/20/23 13:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 13:21*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*10/20/23 13:21*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 13:21*	*1*

Client Sample ID: VABRA-MW0013-022.5-20231012 Lab Sample ID: 670-28629-3

Date Collected: 10/12/23 08:35 **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 13:39	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 13:39	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 13:39	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 13:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*97*		*40 - 146*		*10/20/23 13:39*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 13:39*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 13:39*	*1*

Client Sample ID: VABRA-MW0014-027.5-20231012 Lab Sample ID: 670-28629-4

Date Collected: 10/12/23 09:00 **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 13:56	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 13:56	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 13:56	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 13:56	1

Client: AECOM Technical Services Inc. Job ID: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

Client Sample ID: VABRA-MW0014-027.5-20231012 Lab Sample ID: 670-28629-4

Date Collected: 10/12/23 09:00 **Matrix: Water**
Date Received: 10/13/23 11:55

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 13:56*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 13:56*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 13:56*	*1*

Client Sample ID: MLPV-TB01 Lab Sample ID: 670-28629-5

Date Collected: 10/12/23 07:00 **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 12:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 12:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 12:46	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 12:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 12:46*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*10/20/23 12:46*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/20/23 12:46*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

Job ID: 670-28629-1

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)					
670-28629-1	VABRA-MW0011-030.0-20231012	95	104	100					
670-28629-2	VABRA-MW0012-020.0-20231012	94	104	100					
670-28629-3	VABRA-MW0013-022.5-20231012	97	103	101					
670-28629-4	VABRA-MW0014-027.5-20231012	95	103	100					
670-28629-5	MLPV-TB01	94	99	99					
670-28629-B-19 MS	Matrix Spike	94	97	99					
670-28629-B-19 MSD	Matrix Spike Duplicate	95	99	101					
LCS 670-59382/5	Lab Control Sample	96	99	98					
MB 670-59382/8	Method Blank	94	102	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 670-59382/8
Matrix: Water
Analysis Batch: 59382

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			10/20/23 11:00	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 11:00	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 11:00	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 11:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 11:00*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 11:00*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/20/23 11:00*	*1*

Lab Sample ID: LCS 670-59382/5
Matrix: Water
Analysis Batch: 59382

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	19.4		ug/L		97	56 - 128		
trans-1,2-Dichloroethene			20.0	24.0		ug/L		120	54 - 134		
Trichloroethene			20.0	20.2		ug/L		101	62 - 135		
Vinyl chloride			20.0	23.0		ug/L		115	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*98*		*53 - 146*

Lab Sample ID: 670-28629-B-19 MS
Matrix: Water
Analysis Batch: 59382

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	4.1	I	100	88.5		ug/L		84	56 - 128		
trans-1,2-Dichloroethene	3.7	U	100	109		ug/L		109	54 - 134		
Trichloroethene	4.5	U	100	91.6		ug/L		92	62 - 135		
Vinyl chloride	290		100	372		ug/L		78	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*94*		*40 - 146*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-28629-B-19 MSD
Matrix: Water
Analysis Batch: 59382

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
cis-1,2-Dichloroethene	4.1	I	100	85.7		ug/L		82	56 - 128	3	17
trans-1,2-Dichloroethene	3.7	U	100	105		ug/L		105	54 - 134	4	20
Trichloroethene	4.5	U	100	87.9		ug/L		88	62 - 135	4	20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-28629-B-19 MSD
Client Sample ID: Matrix Spike Duplicate
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 59382

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Vinyl chloride	290		100	365		ug/L		71	20 - 167	2	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

GC/MS VOA

Analysis Batch: 59382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28629-1	VABRA-MW0011-030.0-20231012	Total/NA	Water	8260D	
670-28629-2	VABRA-MW0012-020.0-20231012	Total/NA	Water	8260D	
670-28629-3	VABRA-MW0013-022.5-20231012	Total/NA	Water	8260D	
670-28629-4	VABRA-MW0014-027.5-20231012	Total/NA	Water	8260D	
670-28629-5	MLPV-TB01	Total/NA	Water	8260D	
MB 670-59382/8	Method Blank	Total/NA	Water	8260D	
LCS 670-59382/5	Lab Control Sample	Total/NA	Water	8260D	
670-28629-B-19 MS	Matrix Spike	Total/NA	Water	8260D	
670-28629-B-19 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

Client Sample ID: VABRA-MW0011-030.0-20231012 Lab Sample ID: 670-28629-1

Date Collected: 10/12/23 09:20 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 13:04

Client Sample ID: VABRA-MW0012-020.0-20231012 Lab Sample ID: 670-28629-2

Date Collected: 10/12/23 09:35 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 13:21

Client Sample ID: VABRA-MW0013-022.5-20231012 Lab Sample ID: 670-28629-3

Date Collected: 10/12/23 08:35 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 13:39

Client Sample ID: VABRA-MW0014-027.5-20231012 Lab Sample ID: 670-28629-4

Date Collected: 10/12/23 09:00 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 13:56

Client Sample ID: MLPV-TB01 Lab Sample ID: 670-28629-5

Date Collected: 10/12/23 07:00 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 12:46

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: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

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: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

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: 670-28629-1
Project/Site: NASA KSC MLPV - Hot Spot 3 HS3

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-28629-1	VABRA-MW0011-030.0-20231012	Water	10/12/23 09:20	10/13/23 11:55
670-28629-2	VABRA-MW0012-020.0-20231012	Water	10/12/23 09:35	10/13/23 11:55
670-28629-3	VABRA-MW0013-022.5-20231012	Water	10/12/23 08:35	10/13/23 11:55
670-28629-4	VABRA-MW0014-027.5-20231012	Water	10/12/23 09:00	10/13/23 11:55
670-28629-5	MLPV-TB01	Water	10/12/23 07:00	10/13/23 11:55

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: ~~Hot Spot 3 OFW~~ DK MLPV | 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 # Madan Parsotan 321-696-6000 Devin Kehoe 919-943-3797 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-15

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
	VABRA-MW0011-030.0-20231012	VABRA-MW0011	20231012	0920	WG	N	G	3	3	
	VABRA-MW0012-020.0-20231012	VABRA-MW0012	20231012	0935	WG	N	G	3	3	
	VABRA-MW0013-27.5-20231012	VABRA-MW0013	20231012	0835	WG	N	G	3	3	
	VABRA-MW0014-27.5-20231012	VABRA-MW0014	20231012	0900	WG	N	G	3	3	
	MLPV-TB01	MLPV-TB01	20231012	0700	WQ	TB	G	2	2	
	MLPV-SAMW0004I-037.5-20231012	MLPV-SAMW0004I	20231011	1510	WG	N	G	3	3	
	MLPV-SAMW0004D-047.5-20231012	MLPV-SAMW0004D	20231011	1450	WG	N	G	3	3	
	MLPV-IW0043-045.0-20231011	MLPV-IW0043	20231011	1545	WG	N	G	3	3	
	MLPV-IW0036-042.5-20231011	MLPV-IW0036	20231011	1430	WG	N	G	3	3	
	MLPV-IW0037-045.0-20231011	MLPV-IW0037	20231011	1340	WG	N	G	3	3	
	MLPV-IW0062-042.5-20231012	MLPV-IW0062	20231012	1245	WG	N	G	3	3	
	MLPV-IW0061-037.5-20231012	MLPV-IW0061	20231012	1258	WG	N	G	3	3	

670-28629 Chain of Custody

***Field* Comments:** Report only per QAPP WS #15-15

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 2

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	10/13/23	1155	1	10-13-23	1155
2			2		
3			3		

Samples Iced?(check) Yes✓ No___ 2.4/1.9

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 phosphonc acid, **HCl <2**=Adjust to pH < 2 with hydrochlonc 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: MLPV			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 #	Caroline Bekins 714-943-9928	Devin Kehoe 919-943-3797	Deliver Samples To:		
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-IW0011I-037.5-20231011	MLPV-IW0011I	20231011	1321	WG	N	G	3	3									
	MLPV-IW0034-035.0-20231011	MLPV-IW0034	20231011	1408	WG	N	G	3	3									
	MLPV-IW0035-045.0-20231011	MLPV-IW0035	20231011	1436	WG	N	G	3	3									
	MLPV-IW0041-045.0-20231012	MLPV-IW0041	20231012	0842	WG	N	G	3	3									
	MLPV-IW0059-047.5-20231012	MLPV-IW0059	20231012	0936	WG	N	G	3	3									
	MLPV-IW0058-047.5-20231012	MLPV-IW0058	20231012	1026	WG	N	G	3	3									
	MLPV-IW0057-045.0-20231012	MLPV-IW0057	20231012	1112	WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									DK

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	[signature]	10/13/23	1155	[signature]	10-13-23	1155
2						
3						

Samples Iced?(check) Yes ✓ No ____ 2.4/0.9
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: 670-28629-1

Login Number: 28629

List Source: Eurofins Orlando

List Number: 1

Creator: Bittle, David W

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 10/23/2023 6:43:26 AM

JOB DESCRIPTION

NASA KSC MLPV - Biosparge Area BSA

JOB NUMBER

670-28629-3

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.

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
10/23/2023 6:43:26 AM

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. Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area 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

Job ID: 670-28629-3

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-28629-3

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/13/2023 11:55 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 1.9°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: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

Client Sample ID: MLPV-IW0062-042.5-20231012 Lab Sample ID: 670-28629-11

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	2.8		2.0	1.1	ug/L	2		8260D	Total/NA
Vinyl chloride - DL	140		2.0	1.4	ug/L	2		8260D	Total/NA

Client Sample ID: MLPV-IW0061-037.5-20231012 Lab Sample ID: 670-28629-12

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.63	I	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-IW0059-047.5-20231012 Lab Sample ID: 670-28629-17

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.53	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	4.0		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0058-047.5-20231012 Lab Sample ID: 670-28629-18

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	7.2		2.0	1.1	ug/L	2		8260D	Total/NA
Vinyl chloride - DL	140		2.0	1.4	ug/L	2		8260D	Total/NA

Client Sample ID: MLPV-IW0057-045.0-20231012 Lab Sample ID: 670-28629-19

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	4.1	I	5.0	2.7	ug/L	5		8260D	Total/NA
Vinyl chloride - DL	290		5.0	3.6	ug/L	5		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0062-042.5-20231012 Lab Sample ID: 670-28629-11

Date Collected: 10/12/23 12:45 **Matrix: Water**
Date Received: 10/13/23 11:55

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	**2.8**		2.0	1.1	ug/L			10/20/23 17:14	2
trans-1,2-Dichloroethene	1.5	U	2.0	1.5	ug/L			10/20/23 17:14	2
Trichloroethene	1.8	U	2.0	1.8	ug/L			10/20/23 17:14	2
Vinyl chloride	**140**		2.0	1.4	ug/L			10/20/23 17:14	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 17:14*	*2*
4-Bromofluorobenzene (Surr)	*107*		*41 - 142*		*10/20/23 17:14*	*2*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*10/20/23 17:14*	*2*

Client Sample ID: MLPV-IW0061-037.5-20231012 Lab Sample ID: 670-28629-12

Date Collected: 10/12/23 12:58 **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.63**	**I**	1.0	0.53	ug/L			10/20/23 15:06	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 15:06	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 15:06	1
Vinyl chloride	**12**		1.0	0.71	ug/L			10/20/23 15:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*40 - 146*		*10/20/23 15:06*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 15:06*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*10/20/23 15:06*	*1*

Client Sample ID: MLPV-IW0059-047.5-20231012 Lab Sample ID: 670-28629-17

Date Collected: 10/12/23 09:36 **Matrix: Water**
Date Received: 10/13/23 11:55

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**	**I**	1.0	0.53	ug/L			10/20/23 16:16	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 16:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 16:16	1
Vinyl chloride	**4.0**		1.0	0.71	ug/L			10/20/23 16:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*96*		*40 - 146*		*10/20/23 16:16*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*10/20/23 16:16*	*1*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*10/20/23 16:16*	*1*

Client Sample ID: MLPV-IW0058-047.5-20231012 Lab Sample ID: 670-28629-18

Date Collected: 10/12/23 10:26 **Matrix: Water**
Date Received: 10/13/23 11:55

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	**7.2**		2.0	1.1	ug/L			10/20/23 17:54	2
trans-1,2-Dichloroethene	1.5	U	2.0	1.5	ug/L			10/20/23 17:54	2
Trichloroethene	1.8	U	2.0	1.8	ug/L			10/20/23 17:54	2
Vinyl chloride	**140**		2.0	1.4	ug/L			10/20/23 17:54	2

Client: AECOM Technical Services Inc. Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

Client Sample ID: MLPV-IW0058-047.5-20231012 Lab Sample ID: 670-28629-18

Date Collected: 10/12/23 10:26 **Matrix: Water**
Date Received: 10/13/23 11:55

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*96*		*40 - 146*		*10/20/23 17:54*	*2*
4-Bromofluorobenzene (Surr)	*105*		*41 - 142*		*10/20/23 17:54*	*2*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 17:54*	*2*

Client Sample ID: MLPV-IW0057-045.0-20231012 Lab Sample ID: 670-28629-19

Date Collected: 10/12/23 11:12 **Matrix: Water**
Date Received: 10/13/23 11:55

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	**4.1**	**I**	5.0	2.7	ug/L			10/20/23 11:37	5
trans-1,2-Dichloroethene	3.7	U	5.0	3.7	ug/L			10/20/23 11:37	5
Trichloroethene	4.5	U	5.0	4.5	ug/L			10/20/23 11:37	5
Vinyl chloride	**290**		5.0	3.6	ug/L			10/20/23 11:37	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*96*		*40 - 146*		*10/20/23 11:37*	*5*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 11:37*	*5*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*10/20/23 11:37*	*5*

Surrogate Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

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)
670-28629-11 - DL	MLPV-IW0062-042.5-20231012	95	107	103
670-28629-12	MLPV-IW0061-037.5-20231012	96	103	102
670-28629-17	MLPV-IW0059-047.5-20231012	96	100	102
670-28629-18 - DL	MLPV-IW0058-047.5-20231012	96	105	101
670-28629-19 - DL	MLPV-IW0057-045.0-20231012	96	102	102
670-28629-19 MS	MLPV-IW0057-045.0-20231012	94	97	99
670-28629-19 MSD	MLPV-IW0057-045.0-20231012	95	99	101
LCS 670-59382/5	Lab Control Sample	96	99	98
MB 670-59382/8	Method Blank	94	102	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 670-59382/8 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59382

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			10/20/23 11:00	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 11:00	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/20/23 11:00	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 11:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 11:00*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 11:00*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/20/23 11:00*	*1*

Lab Sample ID: LCS 670-59382/5 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59382

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	19.4		ug/L		97	56 - 128
trans-1,2-Dichloroethene	20.0	24.0		ug/L		120	54 - 134
Trichloroethene	20.0	20.2		ug/L		101	62 - 135
Vinyl chloride	20.0	23.0		ug/L		115	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*98*		*53 - 146*

Lab Sample ID: 670-28629-19 MS **Client Sample ID: MLPV-IW0057-045.0-20231012**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59382

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	4.1	I	100	88.5		ug/L		84	56 - 128
trans-1,2-Dichloroethene	3.7	U	100	109		ug/L		109	54 - 134
Trichloroethene	4.5	U	100	91.6		ug/L		92	62 - 135
Vinyl chloride	290		100	372		ug/L		78	20 - 167

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*94*		*40 - 146*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-28629-19 MSD **Client Sample ID: MLPV-IW0057-045.0-20231012**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59382

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	4.1	I	100	85.7		ug/L		82	56 - 128	3	17
trans-1,2-Dichloroethene	3.7	U	100	105		ug/L		105	54 - 134	4	20
Trichloroethene	4.5	U	100	87.9		ug/L		88	62 - 135	4	20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-28629-19 MSD **Client Sample ID: MLPV-IW0057-045.0-20231012**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59382

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Vinyl chloride	290		100	365		ug/L		71	20 - 167	2	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*95*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc. Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

GC/MS VOA

Analysis Batch: 59382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28629-11 - DL	MLPV-IW0062-042.5-20231012	Total/NA	Water	8260D	
670-28629-12	MLPV-IW0061-037.5-20231012	Total/NA	Water	8260D	
670-28629-17	MLPV-IW0059-047.5-20231012	Total/NA	Water	8260D	
670-28629-18 - DL	MLPV-IW0058-047.5-20231012	Total/NA	Water	8260D	
670-28629-19 - DL	MLPV-IW0057-045.0-20231012	Total/NA	Water	8260D	
MB 670-59382/8	Method Blank	Total/NA	Water	8260D	
LCS 670-59382/5	Lab Control Sample	Total/NA	Water	8260D	
670-28629-19 MS	MLPV-IW0057-045.0-20231012	Total/NA	Water	8260D	
670-28629-19 MSD	MLPV-IW0057-045.0-20231012	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

Client Sample ID: MLPV-IW0062-042.5-20231012 Lab Sample ID: 670-28629-11

Date Collected: 10/12/23 12:45 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	2	59382	KG	EET ORL	10/20/23 17:14

Client Sample ID: MLPV-IW0061-037.5-20231012 Lab Sample ID: 670-28629-12

Date Collected: 10/12/23 12:58 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 15:06

Client Sample ID: MLPV-IW0059-047.5-20231012 Lab Sample ID: 670-28629-17

Date Collected: 10/12/23 09:36 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 16:16

Client Sample ID: MLPV-IW0058-047.5-20231012 Lab Sample ID: 670-28629-18

Date Collected: 10/12/23 10:26 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	2	59382	KG	EET ORL	10/20/23 17:54

Client Sample ID: MLPV-IW0057-045.0-20231012 Lab Sample ID: 670-28629-19

Date Collected: 10/12/23 11:12 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	5	59382	KG	EET ORL	10/20/23 11:37

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: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-24

Method Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

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: 670-28629-3
Project/Site: NASA KSC MLPV - Biosparge Area BSA

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-28629-11	MLPV-IW0062-042.5-20231012	Water	10/12/23 12:45	10/13/23 11:55
670-28629-12	MLPV-IW0061-037.5-20231012	Water	10/12/23 12:58	10/13/23 11:55
670-28629-17	MLPV-IW0059-047.5-20231012	Water	10/12/23 09:36	10/13/23 11:55
670-28629-18	MLPV-IW0058-047.5-20231012	Water	10/12/23 10:26	10/13/23 11:55
670-28629-19	MLPV-IW0057-045.0-20231012	Water	10/12/23 11:12	10/13/23 11:55

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: ~~Hot Spot 3 OFW~~ DK MLPV | 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 # Madan Parsotan 321-696-6000 Devin Kehoe 919-943-3797 | Deliver Samples To: | Site-Spicific WS#15 from QAPP: 15-15

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
	VABRA-MW0011-030.0-20231012	VABRA-MW0011	20231012	0920	WG	N	G	3	3	
	VABRA-MW0012-020.0-20231012	VABRA-MW0012	20231012	0935	WG	N	G	3	3	
	VABRA-MW0013-27.5-20231012	VABRA-MW0013	20231012	0835	WG	N	G	3	3	
	VABRA-MW0014-27.5-20231012	VABRA-MW0014	20231012	0900	WG	N	G	3	3	
	MLPV-TB01	MLPV-TB01	20231012	0700	WQ	TB	G	2	2	
	MLPV-SAMW0004I-037.5-20231012	MLPV-SAMW0004I	20231011	1510	WG	N	G	3	3	
	MLPV-SAMW0004D-047.5-20231012	MLPV-SAMW0004D	20231011	1450	WG	N	G	3	3	
	MLPV-IW0043-045.0-20231011	MLPV-IW0043	20231011	1545	WG	N	G	3	3	
	MLPV-IW0036-042.5-20231011	MLPV-IW0036	20231011	1430	WG	N	G	3	3	
	MLPV-IW0037-045.0-20231011	MLPV-IW0037	20231011	1340	WG	N	G	3	3	
	MLPV-IW0062-042.5-20231012	MLPV-IW0062	20231012	1245	WG	N	G	3	3	
	MLPV-IW0061-037.5-20231012	MLPV-IW0061	20231012	1258	WG	N	G	3	3	

670-28629 Chain of Custody

***Field* Comments:** Report only per QAPP WS #15-15

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment: 2

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	10/13/23	1155	1	10-13-23	1155
2			2		
3			3		

Samples Iced?(check) Yes✓ No___ 2.4/1.9

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 phosphonc acid, **HCl <2**=Adjust to pH < 2 with hydrochlonc 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: MLPV			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 #	Caroline Bekins 714-943-9928	Devin Kehoe 919-943-3797	Deliver Samples To:		
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-IW0011I-037.5-20231011	MLPV-IW0011I	20231011	1321	WG	N	G	3	3									
	MLPV-IW0034-035.0-20231011	MLPV-IW0034	20231011	1408	WG	N	G	3	3									
	MLPV-IW0035-045.0-20231011	MLPV-IW0035	20231011	1436	WG	N	G	3	3									
	MLPV-IW0041-045.0-20231012	MLPV-IW0041	20231012	0842	WG	N	G	3	3									
	MLPV-IW0059-047.5-20231012	MLPV-IW0059	20231012	0936	WG	N	G	3	3									
	MLPV-IW0058-047.5-20231012	MLPV-IW0058	20231012	1026	WG	N	G	3	3									
	MLPV-IW0057-045.0-20231012	MLPV-IW0057	20231012	1112	WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									DK

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	[signature]	10/13/23	1155	[signature]	10-13-23	1155
2						
3						

Samples Iced?(check) Yes ✓ No ____ 2.4/0.9
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: 670-28629-3

Login Number: 28629

List Source: Eurofins Orlando

List Number: 1

Creator: Bittle, David W

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 10/24/2023 6:38:11 AM

JOB DESCRIPTION

NASA KSC MLPV - Hot Spot 2 HS2

JOB NUMBER

670-28629-2

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

myEOL

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



Generated
10/24/2023 6:38:11 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: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 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

Case Narrative

Client: AECOM Technical Services Inc. Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Job ID: 670-28629-2

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-28629-2

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/13/2023 11:55 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 1.9°C

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0043-045.0-20231011 (670-28629-8), MLPV-IW0037-045.0-20231011 (670-28629-10), MLPV-IW0041-045.0-20231012 (670-28629-16) and (670-28629-B-19). 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: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Client Sample ID: MLPV-SAMW0004I-037.5-20231011 — Lab Sample ID: 670-28629-6

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	8.4		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-SAMW0004D-047.5-20231011 — Lab Sample ID: 670-28629-7

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	0.86	I	1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	2.0		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0043-045.0-20231011 — Lab Sample ID: 670-28629-8

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	92		5.0	2.7	ug/L	5		8260D	Total/NA
Vinyl chloride - DL	200		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0036-042.5-20231011 — Lab Sample ID: 670-28629-9

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
trans-1,2-Dichloroethene	0.90	I	1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride	25		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0037-045.0-20231011 — Lab Sample ID: 670-28629-10

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	49		2.0	1.1	ug/L	2		8260D	Total/NA
Vinyl chloride - DL	180		2.0	1.4	ug/L	2		8260D	Total/NA

Client Sample ID: MLPV-IW0011I-037.5-20231011 — Lab Sample ID: 670-28629-13

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.57	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-IW0034-035.0-20231011 — Lab Sample ID: 670-28629-14

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.55	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	0.91	I	1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-IW0035-045.0-20231011 — Lab Sample ID: 670-28629-15

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.96	I	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	84		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0041-045.0-20231012 — Lab Sample ID: 670-28629-16

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	2.5		2.0	1.1	ug/L	2		8260D	Total/NA
Vinyl chloride - DL	180		2.0	1.4	ug/L	2		8260D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-SAMW0004I-037.5-20231011 — Lab Sample ID: 670-28629-6

Date Collected: 10/11/23 15:10 — **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.1**		1.0	0.53	ug/L			10/20/23 14:14	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 14:14	1
Vinyl chloride	**8.4**		1.0	0.71	ug/L			10/20/23 14:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 14:14*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*10/20/23 14:14*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 14:14*	*1*

Client Sample ID: MLPV-SAMW0004D-047.5-20231011 — Lab Sample ID: 670-28629-7

Date Collected: 10/11/23 14:50 — **Matrix: Water**
Date Received: 10/13/23 11:55

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			10/20/23 14:31	1
trans-1,2-Dichloroethene	**0.86**	**I**	1.0	0.73	ug/L			10/20/23 14:31	1
Vinyl chloride	**2.0**		1.0	0.71	ug/L			10/20/23 14:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 14:31*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 14:31*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 14:31*	*1*

Client Sample ID: MLPV-IW0043-045.0-20231011 — Lab Sample ID: 670-28629-8

Date Collected: 10/11/23 15:45 — **Matrix: Water**
Date Received: 10/13/23 11:55

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	**92**		5.0	2.7	ug/L			10/20/23 18:14	5
trans-1,2-Dichloroethene	3.7	U	5.0	3.7	ug/L			10/20/23 18:14	5
Vinyl chloride	**200**		5.0	3.6	ug/L			10/20/23 18:14	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 18:14*	*5*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 18:14*	*5*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*10/20/23 18:14*	*5*

Client Sample ID: MLPV-IW0036-042.5-20231011 — Lab Sample ID: 670-28629-9

Date Collected: 10/11/23 14:30 — **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**1.0**		1.0	0.53	ug/L			10/20/23 14:49	1
trans-1,2-Dichloroethene	**0.90**	**I**	1.0	0.73	ug/L			10/20/23 14:49	1
Vinyl chloride	**25**		1.0	0.71	ug/L			10/20/23 14:49	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 14:49*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 14:49*	*1*

Client Sample ID: MLPV-IW0036-042.5-20231011 Lab Sample ID: 670-28629-9

Date Collected: 10/11/23 14:30 **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 14:49*	*1*

Client Sample ID: MLPV-IW0037-045.0-20231011 Lab Sample ID: 670-28629-10

Date Collected: 10/11/23 13:40 **Matrix: Water**
Date Received: 10/13/23 11:55

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	**49**		2.0	1.1	ug/L			10/20/23 16:54	2
trans-1,2-Dichloroethene	1.5	U	2.0	1.5	ug/L			10/20/23 16:54	2
Vinyl chloride	**180**		2.0	1.4	ug/L			10/20/23 16:54	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 16:54*	*2*
4-Bromofluorobenzene (Surr)	*108*		*41 - 142*		*10/20/23 16:54*	*2*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 16:54*	*2*

Client Sample ID: MLPV-IW0011I-037.5-20231011 Lab Sample ID: 670-28629-13

Date Collected: 10/11/23 13:21 **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.57**	**I**	1.0	0.53	ug/L			10/20/23 15:24	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 15:24	1
Vinyl chloride	**0.72**	**I**	1.0	0.71	ug/L			10/20/23 15:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*92*		*40 - 146*		*10/20/23 15:24*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*10/20/23 15:24*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 15:24*	*1*

Client Sample ID: MLPV-IW0034-035.0-20231011 Lab Sample ID: 670-28629-14

Date Collected: 10/11/23 14:08 **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**0.55**	**I**	1.0	0.53	ug/L			10/20/23 15:41	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 15:41	1
Vinyl chloride	**0.91**	**I**	1.0	0.71	ug/L			10/20/23 15:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 15:41*	*1*
4-Bromofluorobenzene (Surr)	*104*		*41 - 142*		*10/20/23 15:41*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/20/23 15:41*	*1*

Client Sample ID: MLPV-IW0035-045.0-20231011 Lab Sample ID: 670-28629-15

Date Collected: 10/11/23 14:36 **Matrix: Water**
Date Received: 10/13/23 11:55

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.96	I	1.0	0.53	ug/L			10/20/23 15:59	1
trans-1,2-Dichloroethene	1.4		1.0	0.73	ug/L			10/20/23 15:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 15:59*	*1*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 15:59*	*1*
Dibromofluoromethane (Surr)	*101*		*53 - 146*		*10/20/23 15:59*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	84		5.0	3.6	ug/L			10/23/23 17:54	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*40 - 146*		*10/23/23 17:54*	*5*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*10/23/23 17:54*	*5*
Dibromofluoromethane (Surr)	*114*		*53 - 146*		*10/23/23 17:54*	*5*

Client Sample ID: MLPV-IW0041-045.0-20231012 Lab Sample ID: 670-28629-16

Date Collected: 10/12/23 08:42 **Matrix: Water**
Date Received: 10/13/23 11:55

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	2.5		2.0	1.1	ug/L			10/20/23 17:34	2
trans-1,2-Dichloroethene	1.5	U	2.0	1.5	ug/L			10/20/23 17:34	2
Vinyl chloride	180		2.0	1.4	ug/L			10/20/23 17:34	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*95*		*40 - 146*		*10/20/23 17:34*	*2*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*		*10/20/23 17:34*	*2*
Dibromofluoromethane (Surr)	*102*		*53 - 146*		*10/20/23 17:34*	*2*

Surrogate Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

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)
400-244855-C-1 MS	Matrix Spike	98	98	99
400-244855-C-1 MSD	Matrix Spike Duplicate	97	98	97
670-28629-6	MLPV-SAMW0004I-037.5-20231011	95	104	101
670-28629-7	MLPV-SAMW0004D-047.5-20231011	94	102	100
670-28629-8 - DL	MLPV-IW0043-045.0-20231011	94	103	103
670-28629-9	MLPV-IW0036-042.5-20231011	95	102	101
670-28629-10 - DL	MLPV-IW0037-045.0-20231011	95	108	101
670-28629-13	MLPV-IW0011I-037.5-20231011	92	104	100
670-28629-14	MLPV-IW0034-035.0-20231011	95	104	100
670-28629-15	MLPV-IW0035-045.0-20231011	95	103	101
670-28629-15 - DL	MLPV-IW0035-045.0-20231011	106	98	114
670-28629-16 - DL	MLPV-IW0041-045.0-20231012	95	103	102
670-28629-B-19 MS	Matrix Spike	94	97	99
670-28629-B-19 MSD	Matrix Spike Duplicate	95	99	101
LCS 670-59382/5	Lab Control Sample	96	99	98
LCS 670-59651/4	Lab Control Sample	100	101	104
MB 670-59382/8	Method Blank	94	102	99
MB 670-59651/7	Method Blank	103	101	106

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 670-59382/8
Matrix: Water
Analysis Batch: 59382

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			10/20/23 11:00	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/20/23 11:00	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/20/23 11:00	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*94*		*40 - 146*		*10/20/23 11:00*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*10/20/23 11:00*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/20/23 11:00*	*1*

Lab Sample ID: LCS 670-59382/5
Matrix: Water
Analysis Batch: 59382

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	19.4		ug/L		97	56 - 128		
trans-1,2-Dichloroethene			20.0	24.0		ug/L		120	54 - 134		
Trichloroethene			20.0	20.2		ug/L		101	62 - 135		
Vinyl chloride			20.0	23.0		ug/L		115	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*96*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*98*		*53 - 146*

Lab Sample ID: 670-28629-B-19 MS
Matrix: Water
Analysis Batch: 59382

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	4.1	I	100	88.5		ug/L		84	56 - 128		
trans-1,2-Dichloroethene	3.7	U	100	109		ug/L		109	54 - 134		
Trichloroethene	4.5	U	100	91.6		ug/L		92	62 - 135		
Vinyl chloride	290		100	372		ug/L		78	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*94*		*40 - 146*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*
Dibromofluoromethane (Surr)	*99*		*53 - 146*

Lab Sample ID: 670-28629-B-19 MSD
Matrix: Water
Analysis Batch: 59382

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
cis-1,2-Dichloroethene	4.1	I	100	85.7		ug/L		82	56 - 128	3	17
trans-1,2-Dichloroethene	3.7	U	100	105		ug/L		105	54 - 134	4	20
Trichloroethene	4.5	U	100	87.9		ug/L		88	62 - 135	4	20
Vinyl chloride	290		100	365		ug/L		71	20 - 167	2	24

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr)	95		40 - 146
4-Bromofluorobenzene (Surr)	99		41 - 142
Dibromofluoromethane (Surr)	101		53 - 146

Lab Sample ID: MB 670-59651/7 **Client Sample ID: Method Blank**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59651

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			10/23/23 11:02	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/23/23 11:02	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/23/23 11:02	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		40 - 146		10/23/23 11:02	1
4-Bromofluorobenzene (Surr)	101		41 - 142		10/23/23 11:02	1
Dibromofluoromethane (Surr)	106		53 - 146		10/23/23 11:02	1

Lab Sample ID: LCS 670-59651/4 **Client Sample ID: Lab Control Sample**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59651

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.82		ug/L		96	56 - 128
trans-1,2-Dichloroethene	5.00	4.65		ug/L		93	54 - 134
Trichloroethene	5.00	4.65		ug/L		93	62 - 135
Vinyl chloride	5.00	5.07		ug/L		101	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	100		40 - 146
4-Bromofluorobenzene (Surr)	101		41 - 142
Dibromofluoromethane (Surr)	104		53 - 146

Lab Sample ID: 400-244855-C-1 MS **Client Sample ID: Matrix Spike**
Matrix: Water **Prep Type: Total/NA**
Analysis Batch: 59651

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	18.7		ug/L		93	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	18.1		ug/L		91	54 - 134
Trichloroethene	0.89	U	20.0	18.9		ug/L		94	62 - 135
Vinyl chloride	0.71	U	20.0	23.6		ug/L		118	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	98		40 - 146
4-Bromofluorobenzene (Surr)	98		41 - 142
Dibromofluoromethane (Surr)	99		53 - 146

Client: AECOM Technical Services Inc.
Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 400-244855-C-1 MSD
Matrix: Water
Analysis Batch: 59651

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
cis-1,2-Dichloroethene	0.53	U	20.0	18.7		ug/L		93	56 - 128	0	17
trans-1,2-Dichloroethene	0.73	U	20.0	17.9		ug/L		90	54 - 134	1	20
Trichloroethene	0.89	U	20.0	19.8		ug/L		99	62 - 135	5	20
Vinyl chloride	0.71	U	20.0	23.1		ug/L		116	20 - 167	2	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*97*		*40 - 146*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*
Dibromofluoromethane (Surr)	*97*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

GC/MS VOA

Analysis Batch: 59382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28629-6	MLPV-SAMW0004I-037.5-20231011	Total/NA	Water	8260D	
670-28629-7	MLPV-SAMW0004D-047.5-20231011	Total/NA	Water	8260D	
670-28629-8 - DL	MLPV-IW0043-045.0-20231011	Total/NA	Water	8260D	
670-28629-9	MLPV-IW0036-042.5-20231011	Total/NA	Water	8260D	
670-28629-10 - DL	MLPV-IW0037-045.0-20231011	Total/NA	Water	8260D	
670-28629-13	MLPV-IW0011I-037.5-20231011	Total/NA	Water	8260D	
670-28629-14	MLPV-IW0034-035.0-20231011	Total/NA	Water	8260D	
670-28629-15	MLPV-IW0035-045.0-20231011	Total/NA	Water	8260D	
670-28629-16 - DL	MLPV-IW0041-045.0-20231012	Total/NA	Water	8260D	
MB 670-59382/8	Method Blank	Total/NA	Water	8260D	
LCS 670-59382/5	Lab Control Sample	Total/NA	Water	8260D	
670-28629-B-19 MS	Matrix Spike	Total/NA	Water	8260D	
670-28629-B-19 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

Analysis Batch: 59651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28629-15 - DL	MLPV-IW0035-045.0-20231011	Total/NA	Water	8260D	
MB 670-59651/7	Method Blank	Total/NA	Water	8260D	
LCS 670-59651/4	Lab Control Sample	Total/NA	Water	8260D	
400-244855-C-1 MS	Matrix Spike	Total/NA	Water	8260D	
400-244855-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc. Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Client Sample ID: MLPV-SAMW0004I-037.5-20231011 Lab Sample ID: 670-28629-6

Date Collected: 10/11/23 15:10 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 14:14

Client Sample ID: MLPV-SAMW0004D-047.5-20231011 Lab Sample ID: 670-28629-7

Date Collected: 10/11/23 14:50 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 14:31

Client Sample ID: MLPV-IW0043-045.0-20231011 Lab Sample ID: 670-28629-8

Date Collected: 10/11/23 15:45 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	5	59382	KG	EET ORL	10/20/23 18:14

Client Sample ID: MLPV-IW0036-042.5-20231011 Lab Sample ID: 670-28629-9

Date Collected: 10/11/23 14:30 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 14:49

Client Sample ID: MLPV-IW0037-045.0-20231011 Lab Sample ID: 670-28629-10

Date Collected: 10/11/23 13:40 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	2	59382	KG	EET ORL	10/20/23 16:54

Client Sample ID: MLPV-IW0011I-037.5-20231011 Lab Sample ID: 670-28629-13

Date Collected: 10/11/23 13:21 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 15:24

Client Sample ID: MLPV-IW0034-035.0-20231011 Lab Sample ID: 670-28629-14

Date Collected: 10/11/23 14:08 **Matrix: Water**
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 15:41

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Client Sample ID: MLPV-IW0035-045.0-20231011
Lab Sample ID: 670-28629-15

Date Collected: 10/11/23 14:36
Matrix: Water
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59382	KG	EET ORL	10/20/23 15:59
Total/NA	Analysis	8260D	DL	5	59651	KG	EET ORL	10/23/23 17:54

Client Sample ID: MLPV-IW0041-045.0-20231012
Lab Sample ID: 670-28629-16

Date Collected: 10/12/23 08:42
Matrix: Water
Date Received: 10/13/23 11:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	2	59382	KG	EET ORL	10/20/23 17:34

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: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 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

Method Summary

Client: AECOM Technical Services Inc.
Job ID: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

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: 670-28629-2
Project/Site: NASA KSC MLPV - Hot Spot 2 HS2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-28629-6	MLPV-SAMW0004I-037.5-20231011	Water	10/11/23 15:10	10/13/23 11:55
670-28629-7	MLPV-SAMW0004D-047.5-20231011	Water	10/11/23 14:50	10/13/23 11:55
670-28629-8	MLPV-IW0043-045.0-20231011	Water	10/11/23 15:45	10/13/23 11:55
670-28629-9	MLPV-IW0036-042.5-20231011	Water	10/11/23 14:30	10/13/23 11:55
670-28629-10	MLPV-IW0037-045.0-20231011	Water	10/11/23 13:40	10/13/23 11:55
670-28629-13	MLPV-IW0011I-037.5-20231011	Water	10/11/23 13:21	10/13/23 11:55
670-28629-14	MLPV-IW0034-035.0-20231011	Water	10/11/23 14:08	10/13/23 11:55
670-28629-15	MLPV-IW0035-045.0-20231011	Water	10/11/23 14:36	10/13/23 11:55
670-28629-16	MLPV-IW0041-045.0-20231012	Water	10/12/23 08:42	10/13/23 11:55

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of 2
Site Location: ~~Hot Spot 3 OFW~~ DK MLPV		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 # 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
		Deliver Samples To:	Site-Spicific WS#15 from QAPP: 15-15
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
	VABRA-MW0011-030.0-20231012	VABRA-MW0011	20231012	0920	WG	N	G	3	3	
	VABRA-MW0012-020.0-20231012	VABRA-MW0012	20231012	0935	WG	N	G	3	3	
	VABRA-MW0013-27.5-20231012	VABRA-MW0013	20231012	0835	WG	N	G	3	3	
	VABRA-MW0014-27.5-20231012	VABRA-MW0014	20231012	0900	WG	N	G	3	3	
	MLPV-TB01	MLPV-TB01	20231012	0700	WQ	TB	G	2	2	
	MLPV-SAMW0004I-037.5-20231012	MLPV-SAMW0004I	20231011	1510	WG	N	G	3	3	
	MLPV-SAMW0004D-047.5-20231012	MLPV-SAMW0004D	20231011	1450	WG	N	G	3	3	
	MLPV-IW0043-045.0-20231011	MLPV-IW0043	20231011	1545	WG	N	G	3	3	
	MLPV-IW0036-042.5-20231011	MLPV-IW0036	20231011	1430	WG	N	G	3	3	
	MLPV-IW0037-045.0-20231011	MLPV-IW0037	20231011	1340	WG	N	G	3	3	
	MLPV-IW0062-042.5-20231012	MLPV-IW0062	20231012	1245	WG	N	G	3	3	
	MLPV-IW0061-037.5-20231012	MLPV-IW0061	20231012	1258	WG	N	G	3	3	

670-28629 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-15

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment: 2

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		10/13/23	1155		10-13-23	1155
2						
3						

Samples Iced?(check) Yes ✓ No ___ 2.4/1.9
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 phosphonc acid, **HCl <2**=Adjust to pH < 2 with hydrochlonc 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: MLPV			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 #	Caroline Bekins 714-943-9928	Devin Kehoe 919-943-3797	Deliver Samples To:		
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-IW0011I-037.5-20231011	MLPV-IW0011I	20231011	1321	WG	N	G	3	3									
	MLPV-IW0034-035.0-20231011	MLPV-IW0034	20231011	1408	WG	N	G	3	3									
	MLPV-IW0035-045.0-20231011	MLPV-IW0035	20231011	1436	WG	N	G	3	3									
	MLPV-IW0041-045.0-20231012	MLPV-IW0041	20231012	0842	WG	N	G	3	3									
	MLPV-IW0059-047.5-20231012	MLPV-IW0059	20231012	0936	WG	N	G	3	3									
	MLPV-IW0058-047.5-20231012	MLPV-IW0058	20231012	1026	WG	N	G	3	3									
	MLPV-IW0057-045.0-20231012	MLPV-IW0057	20231012	1112	WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									
					WG	N	G	3	3									DK

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		10/13/23	1155		10-13-23	1155
2						
3						

Samples Iced?(check) Yes ✓ No____ 2.4/0.9
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: 670-28629-2

Login Number: 28629

List Source: Eurofins Orlando

List Number: 1

Creator: Bittle, David W

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

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

ANALYTICAL REPORT

PREPARED FOR

Attn: Teresa Amentt Jennings
AECOM Technical Services Inc.
150 North Orange Avenue
Suite 200
Orlando, Florida 32801

Generated 11/10/2023 8:22:58 AM

JOB DESCRIPTION

NASA KSC MLPV & IDW

JOB NUMBER

670-29101-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

myEOL

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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11/10/2023 8:22:58 AM

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
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
*	Isotope Dilution analyte is outside acceptance limits.
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
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
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-29101-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-29101-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/23/2023 1:40 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 0.6°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0044-045.0-20231023 (670-29101-15). Elevated reporting limits (RLs) are provided.

Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MLPV-MW0103-040.0-20231020 (670-29101-3), MLPV-IW0039-045.0-20231023 (670-29101-14) and MLPV-IW0044-045.0-20231023 (670-29101-15). 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.

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(s) d3-NMeFOSAA in the following sample: IDW02-20231023 (670-29101-17) is outside the QC acceptance limits. The following action was taken: This sample was re-extracted within of the required holding time and the recovery for labeled isotope(s) was within QC acceptance limits. However, the recovery for labeled isotope is outside the QC acceptance limits in the closing continuing calibration verification standard in the re-extracted sample. The data is reported.

Method PFC_IDA: The recovery for the labeled isotope: M2-4:2 FTS in the following sample: IDW02-20231023 (670-29101-17) 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.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
Method 365.4: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 670-59882 and analytical batch 670-59985 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 & IDW

Job ID: 670-29101-1

Client Sample ID: MLPV-MW0107-040.0-20231020 — Lab Sample ID: 670-29101-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.62	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	11		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0102-030.0-20231020 — Lab Sample ID: 670-29101-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.73	I	1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	7.4		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0103-040.0-20231020 — Lab Sample ID: 670-29101-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.7		1.0	0.53	ug/L	1		8260D	Total/NA
trans-1,2-Dichloroethene	0.76	I	1.0	0.73	ug/L	1		8260D	Total/NA
Vinyl chloride - DL	130		2.0	1.4	ug/L	2		8260D	Total/NA

Client Sample ID: MLPV-ASMW0006-037.5-20231020 — Lab Sample ID: 670-29101-4

No Detections.

Client Sample ID: MLPV-IW0060-045.0-20231020 — Lab Sample ID: 670-29101-5

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.4		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-ASMW0005-037.5-20231020 — Lab Sample ID: 670-29101-6

No Detections.

Client Sample ID: MLPV-ASMW0004-037.5-20231020 — Lab Sample ID: 670-29101-7

No Detections.

Client Sample ID: MLPV-IW0006IR-030.5-20231020 — Lab Sample ID: 670-29101-8

No Detections.

Client Sample ID: MLPV-IW0063-037.5-20231020 — Lab Sample ID: 670-29101-9

No Detections.

Client Sample ID: MLPV-IW0064-042.5-20231020 — Lab Sample ID: 670-29101-10

No Detections.

Client Sample ID: MLPV-IW0031-030.0-20231020 — Lab Sample ID: 670-29101-11

No Detections.

Client Sample ID: MLPV-IW0046-040.0-20231020 — Lab Sample ID: 670-29101-12

No Detections.

Client Sample ID: MLPV-IW0028I-030.5-20231020 — Lab Sample ID: 670-29101-13

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

Client Sample ID: MLPV-IW0039-045.0-20231023 — Lab Sample ID: 670-29101-14

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	3.5		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride - DL	210		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0044-045.0-20231023 — Lab Sample ID: 670-29101-15

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	100		2.0	1.1	ug/L	2		8260D	Total/NA
trans-1,2-Dichloroethene - DL	4.8		2.0	1.5	ug/L	2		8260D	Total/NA
Vinyl chloride - DL2	230		5.0	3.6	ug/L	5		8260D	Total/NA

Client Sample ID: MLPV-IW0045-045.0-20231023 — Lab Sample ID: 670-29101-16

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	16		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	100		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: IDW02-20231023 — Lab Sample ID: 670-29101-17

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.3		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	9.7		1.0	0.71	ug/L	1		8260D	Total/NA
6:2 Fluorotelomer sulfonic acid	0.0046		0.0018	0.00046	ug/L	1		537 IDA	Total/NA
Perfluorobutanesulfonic acid	0.0034		0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.010		0.0018	0.00092	ug/L	1		537 IDA	Total/NA
Perfluoroheptanesulfonic acid	0.0014	I	0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0028		0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.021		0.0018	0.00018	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0068		0.0018	0.00092	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00052	I	0.0018	0.00018	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonamide	0.00048	I	0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.095		0.0018	0.00046	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.012		0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.0035		0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0029		0.0018	0.00027	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	280		100	40	ug/L	1		365.4	Total/NA

Client Sample ID: MLPV-TB02-20231023 — Lab Sample ID: 670-29101-18

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-MW0107-040.0-20231020 Lab Sample ID: 670-29101-1

Date Collected: 10/20/23 09:02 **Matrix: Water**
Date Received: 10/23/23 13:40

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.62	I	1.0	0.53	ug/L			10/31/23 12:10	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 12:10	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 12:10	1
Vinyl chloride	11		1.0	0.71	ug/L			10/31/23 12:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*40 - 146*		*10/31/23 12:10*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*10/31/23 12:10*	*1*
Dibromofluoromethane (Surr)	*103*		*53 - 146*		*10/31/23 12:10*	*1*

Client Sample ID: MLPV-MW0102-030.0-20231020 Lab Sample ID: 670-29101-2

Date Collected: 10/20/23 09:27 **Matrix: Water**
Date Received: 10/23/23 13:40

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.73	I	1.0	0.53	ug/L			10/31/23 13:23	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 13:23	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 13:23	1
Vinyl chloride	7.4		1.0	0.71	ug/L			10/31/23 13:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*40 - 146*		*10/31/23 13:23*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*10/31/23 13:23*	*1*
Dibromofluoromethane (Surr)	*94*		*53 - 146*		*10/31/23 13:23*	*1*

Client Sample ID: MLPV-MW0103-040.0-20231020 Lab Sample ID: 670-29101-3

Date Collected: 10/20/23 09:48 **Matrix: Water**
Date Received: 10/23/23 13:40

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	3.7		1.0	0.53	ug/L			10/31/23 13:41	1
trans-1,2-Dichloroethene	0.76	I	1.0	0.73	ug/L			10/31/23 13:41	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 13:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*40 - 146*		*10/31/23 13:41*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*10/31/23 13:41*	*1*
Dibromofluoromethane (Surr)	*85*		*53 - 146*		*10/31/23 13:41*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	130		2.0	1.4	ug/L			11/02/23 12:58	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*40 - 146*		*11/02/23 12:58*	*2*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*11/02/23 12:58*	*2*
Dibromofluoromethane (Surr)	*95*		*53 - 146*		*11/02/23 12:58*	*2*

Client Sample ID: MLPV-ASMW0006-037.5-20231020
Lab Sample ID: 670-29101-4

Date Collected: 10/20/23 10:42
Matrix: Water
Date Received: 10/23/23 13:40

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			10/31/23 14:00	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 14:00	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 14:00	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 14:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*111*		*40 - 146*		*10/31/23 14:00*	*1*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*		*10/31/23 14:00*	*1*
Dibromofluoromethane (Surr)	*97*		*53 - 146*		*10/31/23 14:00*	*1*

Client Sample ID: MLPV-IW0060-045.0-20231020
Lab Sample ID: 670-29101-5

Date Collected: 10/20/23 10:40
Matrix: Water
Date Received: 10/23/23 13:40

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			10/31/23 14:18	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 14:18	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 14:18	1
Vinyl chloride	**2.4**		1.0	0.71	ug/L			10/31/23 14:18	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*40 - 146*		*10/31/23 14:18*	*1*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*		*10/31/23 14:18*	*1*
Dibromofluoromethane (Surr)	*91*		*53 - 146*		*10/31/23 14:18*	*1*

Client Sample ID: MLPV-ASMW0005-037.5-20231020
Lab Sample ID: 670-29101-6

Date Collected: 10/20/23 11:10
Matrix: Water
Date Received: 10/23/23 13:40

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			10/31/23 14:36	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 14:36	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 14:36	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 14:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*112*		*40 - 146*		*10/31/23 14:36*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*10/31/23 14:36*	*1*
Dibromofluoromethane (Surr)	*89*		*53 - 146*		*10/31/23 14:36*	*1*

Client Sample ID: MLPV-ASMW0004-037.5-20231020
Lab Sample ID: 670-29101-7

Date Collected: 10/20/23 11:35
Matrix: Water
Date Received: 10/23/23 13:40

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			10/31/23 14:54	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 14:54	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 14:54	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 14:54	1

Client Sample ID: MLPV-ASMW0004-037.5-20231020 Lab Sample ID: 670-29101-7

Date Collected: 10/20/23 11:35 **Matrix: Water**
Date Received: 10/23/23 13:40

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*108*		*40 - 146*		*10/31/23 14:54*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*10/31/23 14:54*	*1*
Dibromofluoromethane (Surr)	*92*		*53 - 146*		*10/31/23 14:54*	*1*

Client Sample ID: MLPV-IW0006IR-030.5-20231020 Lab Sample ID: 670-29101-8

Date Collected: 10/20/23 11:57 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 15:13	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 15:13	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 15:13	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 15:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*111*		*40 - 146*		*10/31/23 15:13*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*10/31/23 15:13*	*1*
Dibromofluoromethane (Surr)	*90*		*53 - 146*		*10/31/23 15:13*	*1*

Client Sample ID: MLPV-IW0063-037.5-20231020 Lab Sample ID: 670-29101-9

Date Collected: 10/20/23 12:40 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 15:31	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 15:31	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 15:31	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 15:31	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*115*		*40 - 146*		*10/31/23 15:31*	*1*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*10/31/23 15:31*	*1*
Dibromofluoromethane (Surr)	*90*		*53 - 146*		*10/31/23 15:31*	*1*

Client Sample ID: MLPV-IW0064-042.5-20231020 Lab Sample ID: 670-29101-10

Date Collected: 10/20/23 12:39 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 15:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 15:50	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 15:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 15:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*113*		*40 - 146*		*10/31/23 15:50*	*1*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*		*10/31/23 15:50*	*1*
Dibromofluoromethane (Surr)	*89*		*53 - 146*		*10/31/23 15:50*	*1*

Client Sample ID: MLPV-IW0031-030.0-20231020 Lab Sample ID: 670-29101-11

Date Collected: 10/20/23 13:09 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 16:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 16:08	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 16:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 16:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*113*		*40 - 146*		*10/31/23 16:08*	*1*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*		*10/31/23 16:08*	*1*
Dibromofluoromethane (Surr)	*86*		*53 - 146*		*10/31/23 16:08*	*1*

Client Sample ID: MLPV-IW0046-040.0-20231020 Lab Sample ID: 670-29101-12

Date Collected: 10/20/23 13:38 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 16:26	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 16:26	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 16:26	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 16:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*111*		*40 - 146*		*10/31/23 16:26*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*10/31/23 16:26*	*1*
Dibromofluoromethane (Surr)	*88*		*53 - 146*		*10/31/23 16:26*	*1*

Client Sample ID: MLPV-IW0028I-030.5-20231020 Lab Sample ID: 670-29101-13

Date Collected: 10/20/23 13:34 **Matrix: Water**
Date Received: 10/23/23 13:40

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			10/31/23 16:45	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 16:45	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 16:45	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 16:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*110*		*40 - 146*		*10/31/23 16:45*	*1*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*		*10/31/23 16:45*	*1*
Dibromofluoromethane (Surr)	*96*		*53 - 146*		*10/31/23 16:45*	*1*

Client Sample ID: MLPV-IW0039-045.0-20231023 Lab Sample ID: 670-29101-14

Date Collected: 10/23/23 10:15 **Matrix: Water**
Date Received: 10/23/23 13:40

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**3.5**		1.0	0.53	ug/L			10/31/23 17:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 17:03	1

Client Sample ID: MLPV-IW0039-045.0-20231023 Lab Sample ID: 670-29101-14

Date Collected: 10/23/23 10:15 **Matrix: Water**
Date Received: 10/23/23 13:40

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	114		40 - 146		10/31/23 17:03	1
4-Bromofluorobenzene (Surr)	94		41 - 142		10/31/23 17:03	1
Dibromofluoromethane (Surr)	95		53 - 146		10/31/23 17:03	1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	210		5.0	3.6	ug/L			11/02/23 13:19	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	114		40 - 146		11/02/23 13:19	5
4-Bromofluorobenzene (Surr)	90		41 - 142		11/02/23 13:19	5
Dibromofluoromethane (Surr)	93		53 - 146		11/02/23 13:19	5

Client Sample ID: MLPV-IW0044-045.0-20231023 Lab Sample ID: 670-29101-15

Date Collected: 10/23/23 10:27 **Matrix: Water**
Date Received: 10/23/23 13:40

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	100		2.0	1.1	ug/L			10/31/23 18:39	2
trans-1,2-Dichloroethene	4.8		2.0	1.5	ug/L			10/31/23 18:39	2

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	113		40 - 146		10/31/23 18:39	2
4-Bromofluorobenzene (Surr)	91		41 - 142		10/31/23 18:39	2
Dibromofluoromethane (Surr)	94		53 - 146		10/31/23 18:39	2

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - DL2

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	230		5.0	3.6	ug/L			11/02/23 13:41	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	115		40 - 146		11/02/23 13:41	5
4-Bromofluorobenzene (Surr)	92		41 - 142		11/02/23 13:41	5
Dibromofluoromethane (Surr)	98		53 - 146		11/02/23 13:41	5

Client Sample ID: MLPV-IW0045-045.0-20231023 Lab Sample ID: 670-29101-16

Date Collected: 10/23/23 11:17 **Matrix: Water**
Date Received: 10/23/23 13:40

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	16		1.0	0.53	ug/L			10/31/23 17:22	1
trans-1,2-Dichloroethene	1.6		1.0	0.73	ug/L			10/31/23 17:22	1
Vinyl chloride	100		1.0	0.71	ug/L			10/31/23 17:22	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	114		40 - 146		10/31/23 17:22	1
4-Bromofluorobenzene (Surr)	95		41 - 142		10/31/23 17:22	1
Dibromofluoromethane (Surr)	90		53 - 146		10/31/23 17:22	1

Client Sample ID: IDW02-20231023
Date Collected: 10/23/23 11:35
Date Received: 10/23/23 13:40

Lab Sample ID: 670-29101-17
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	**2.3**		1.0	0.53	ug/L			10/31/23 17:40	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 17:40	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 17:40	1
Vinyl chloride	**9.7**		1.0	0.71	ug/L			10/31/23 17:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*94*		*41 - 142*		*10/31/23 17:40*	*1*
Dibromofluoromethane (Surr)	*90*		*53 - 146*		*10/31/23 17:40*	*1*
Toluene-d8 (Surr)	*114*		*40 - 146*		*10/31/23 17:40*	*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			10/23/23 17:11	1

Method: EPA 537 IDA - EPA 537 Isotope Dilution

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00046	U	0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
4:2 Fluorotelomer sulfonic acid	0.00046	U	0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
6:2 Fluorotelomer sulfonic acid	**0.0046**		0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
8:2 Fluorotelomer sulfonic acid	0.00055	U	0.0018	0.00055	ug/L		10/27/23 14:09	11/04/23 11:44	1
9Cl-PF3ONS	0.00046	U	0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
DONA	0.00046	U	0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
HFPODA	0.00037	U	0.0018	0.00037	ug/L		10/27/23 14:09	11/04/23 11:44	1
NEtFOSAA	0.00046	U	0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
NMeFOSAA	0.00037	U	0.0018	0.00037	ug/L		10/27/23 14:09	11/04/23 11:44	1
NMeFOSA	0.00064	U	0.0018	0.00064	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorobutanesulfonic acid	**0.0034**		0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorobutanoic acid	**0.010**		0.0018	0.00092	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorodecanesulfonic acid	0.00027	U	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorodecanoic acid	0.00027	U	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorododecanoic acid	0.00037	U	0.0018	0.00037	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluoroheptanesulfonic acid	**0.0014**	**I**	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluoroheptanoic acid	**0.0028**		0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorohexanesulfonic acid	**0.021**		0.0018	0.00018	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorohexanoic acid	**0.0068**		0.0018	0.00092	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorononanesulfonic acid	0.00027	U	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorononanoic acid	**0.00052**	**I**	0.0018	0.00018	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorooctanesulfonamide	**0.00048**	**I**	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorooctanesulfonic acid	**0.095**		0.0018	0.00046	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorooctanoic acid	**0.012**		0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluoropentanesulfonic acid	**0.0035**		0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluoropentanoic acid	**0.0029**		0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorotetradecanoic acid	0.00037	U	0.0018	0.00037	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluorotridecanoic acid	0.00037	U	0.0018	0.00037	ug/L		10/27/23 14:09	11/04/23 11:44	1
Perfluoroundecanoic acid	0.00027	U	0.0018	0.00027	ug/L		10/27/23 14:09	11/04/23 11:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*241*	*	*35 - 200*	*10/27/23 14:09*	*11/04/23 11:44*	*1*
M2-6:2 FTS	*181*		*40 - 200*	*10/27/23 14:09*	*11/04/23 11:44*	*1*
M2-8:2 FTS	*170*		*37 - 200*	*10/27/23 14:09*	*11/04/23 11:44*	*1*
13C2 PFTeDA	*116*		*10 - 171*	*10/27/23 14:09*	*11/04/23 11:44*	*1*

Client Sample ID: IDW02-20231023

Lab Sample ID: 670-29101-17

Date Collected: 10/23/23 11:35

Matrix: Water

Date Received: 10/23/23 13:40

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	111		13 - 170	10/27/23 14:09	11/04/23 11:44	1
13C3 PFBS	161		34 - 200	10/27/23 14:09	11/04/23 11:44	1
13C4 PFBA	5	*	22 - 174	10/27/23 14:09	11/04/23 11:44	1
13C4 PFHpA	117		40 - 165	10/27/23 14:09	11/04/23 11:44	1
13C5 PFPeA	143		33 - 196	10/27/23 14:09	11/04/23 11:44	1
13C8 PFOA	116		52 - 153	10/27/23 14:09	11/04/23 11:44	1
13C8 PFOS	112		59 - 155	10/27/23 14:09	11/04/23 11:44	1
d3-NMeFOSAA	134		38 - 168	10/27/23 14:09	11/04/23 11:44	1
d5-NEtFOSAA	136		34 - 181	10/27/23 14:09	11/04/23 11:44	1
13C3 PFHxS	117		48 - 169	10/27/23 14:09	11/04/23 11:44	1
13C5 PFHxA	109		28 - 166	10/27/23 14:09	11/04/23 11:44	1
13C6 PFDA	115		53 - 151	10/27/23 14:09	11/04/23 11:44	1
13C7 PFUnA	120		41 - 163	10/27/23 14:09	11/04/23 11:44	1
d3-NMePFOSA	7	*	10 - 130	10/27/23 14:09	11/04/23 11:44	1
13C8 FOSA	104		10 - 155	10/27/23 14:09	11/04/23 11:44	1
13C2-PFDoDA	118		22 - 165	10/27/23 14:09	11/04/23 11:44	1
13C9 PFNA	119		52 - 168	10/27/23 14:09	11/04/23 11:44	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	280		100	40	ug/L		10/24/23 09:31	10/24/23 15:11	1

Client Sample ID: MLPV-TB02-20231023

Lab Sample ID: 670-29101-18

Date Collected: 10/23/23 00:00

Matrix: Water

Date Received: 10/23/23 13:40

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			10/31/23 17:59	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 17:59	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 17:59	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 17:59	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	111		40 - 146		10/31/23 17:59	1
4-Bromofluorobenzene (Surr)	93		41 - 142		10/31/23 17:59	1
Dibromofluoromethane (Surr)	90		53 - 146		10/31/23 17:59	1

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

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)
670-29101-1	MLPV-MW0107-040.0-20231020	108	95	103
670-29101-1 MS	MLPV-MW0107-040.0-20231020	102	91	97
670-29101-1 MSD	MLPV-MW0107-040.0-20231020	101	92	98
670-29101-2	MLPV-MW0102-030.0-20231020	106	98	94
670-29101-3	MLPV-MW0103-040.0-20231020	110	93	85
670-29101-3 - DL	MLPV-MW0103-040.0-20231020	112	92	95
670-29101-4	MLPV-ASMW0006-037.5-20231020	111	96	97
670-29101-5	MLPV-IW0060-045.0-20231020	110	93	91
670-29101-6	MLPV-ASMW0005-037.5-20231020	112	94	89
670-29101-7	MLPV-ASMW0004-037.5-20231020	108	94	92
670-29101-8	MLPV-IW0006IR-030.5-20231020	111	97	90
670-29101-9	MLPV-IW0063-037.5-20231020	115	94	90
670-29101-10	MLPV-IW0064-042.5-20231020	113	95	89
670-29101-11	MLPV-IW0031-030.0-20231020	113	91	86
670-29101-12	MLPV-IW0046-040.0-20231020	111	92	88
670-29101-13	MLPV-IW0028I-030.5-20231020	110	92	96
670-29101-14	MLPV-IW0039-045.0-20231023	114	94	95
670-29101-14 - DL	MLPV-IW0039-045.0-20231023	114	90	93
670-29101-15 - DL	MLPV-IW0044-045.0-20231023	113	91	94
670-29101-15 - DL2	MLPV-IW0044-045.0-20231023	115	92	98
670-29101-16	MLPV-IW0045-045.0-20231023	114	95	90
670-29101-17	IDW02-20231023	114	94	90
670-29101-18	MLPV-TB02-20231023	111	93	90
LB 670-60897/1-A - DL	Method Blank	111	94	92
LCS 670-60963/5	Lab Control Sample	98	96	95
LCS 670-61389/4	Lab Control Sample	99	95	92
MB 670-60963/8	Method Blank	108	99	100
MB 670-61389/7	Method Blank	114	98	94

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: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
660-132526-C-1-A MS	Matrix Spike	98	93	86
660-132526-C-1-A MSD	Matrix Spike Duplicate	101	92	90

Surrogate Summary

Client: AECOM Technical Services Inc.
Job ID: 670-29101-1
Project/Site: NASA KSC MLPV & IDW

Surrogate Legend

TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	PFTDA	HFPODA	C3PFBS	PFBA	C4PFHA
Lab Sample ID	Client Sample ID	(35-200)	(40-200)	(37-200)	(10-171)	(13-170)	(34-200)	(22-174)	(40-165)
670-29101-17	IDW02-20231023	241 *	181	170	116	111	161	5 *	117
LCS 410-436639/2-A	Lab Control Sample	105	99	104	95	96	99	101	103
LCSD 410-436639/3-A	Lab Control Sample Dup	113	105	117	102	96	112	105	108
MB 410-436639/1-A	Method Blank	111	106	124	111	106	101	101	108

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFPeA	C8PFOA	C8PFOS	d3NMFOS	d5NEFOS	C3PFHS	13C5PHA	C6PFDA
Lab Sample ID	Client Sample ID	(33-196)	(52-153)	(59-155)	(38-168)	(34-181)	(48-169)	(28-166)	(53-151)
670-29101-17	IDW02-20231023	143	116	112	134	136	117	109	115
LCS 410-436639/2-A	Lab Control Sample	99	94	93	104	112	100	96	91
LCSD 410-436639/3-A	Lab Control Sample Dup	110	103	105	119	118	106	102	102
MB 410-436639/1-A	Method Blank	99	103	96	118	123	103	101	105

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		13C7PUA	d3NMFSA	PFOSA	PFDoDA	C9PFNA			
Lab Sample ID	Client Sample ID	(41-163)	(10-130)	(10-155)	(22-165)	(52-168)			
670-29101-17	IDW02-20231023	120	7 *	104	118	119			
LCS 410-436639/2-A	Lab Control Sample	94	40	91	95	97			
LCSD 410-436639/3-A	Lab Control Sample Dup	104	58	100	102	107			
MB 410-436639/1-A	Method Blank	111	61	109	108	104			

Surrogate Legend

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
PFTDA = 13C2 PFTeDA
HFPODA = 13C3 HFPO-DA
C3PFBS = 13C3 PFBS
PFBA = 13C4 PFBA
C4PFHA = 13C4 PFHpA
PFPeA = 13C5 PFPeA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
C3PFHS = 13C3 PFHxS
13C5PHA = 13C5 PFHxA
C6PFDA = 13C6 PFDA
13C7PUA = 13C7 PFUnA
d3NMFSA = d3-NMePFOSA
PFOSA = 13C8 FOSA
PFDoDA = 13C2-PFDoDA
C9PFNA = 13C9 PFNA

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-60963/8
Matrix: Water
Analysis Batch: 60963

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			10/31/23 11:51	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/31/23 11:51	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/31/23 11:51	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/31/23 11:51	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*40 - 146*		*10/31/23 11:51*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*10/31/23 11:51*	*1*
Dibromofluoromethane (Surr)	*100*		*53 - 146*		*10/31/23 11:51*	*1*

Lab Sample ID: LCS 670-60963/5
Matrix: Water
Analysis Batch: 60963

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	17.6		ug/L		88	56 - 128		
trans-1,2-Dichloroethene			20.0	18.8		ug/L		94	54 - 134		
Trichloroethene			20.0	19.8		ug/L		99	62 - 135		
Vinyl chloride			20.0	17.9		ug/L		90	20 - 167		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*98*		*40 - 146*
4-Bromofluorobenzene (Surr)	*96*		*41 - 142*
Dibromofluoromethane (Surr)	*95*		*53 - 146*

Lab Sample ID: 670-29101-1 MS
Matrix: Water
Analysis Batch: 60963

Client Sample ID: MLPV-MW0107-040.0-20231020
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene	0.62	I	20.0	19.3		ug/L		94	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	18.2		ug/L		91	54 - 134		
Trichloroethene	0.89	U	20.0	21.5		ug/L		108	62 - 135		
Vinyl chloride	11		20.0	29.6		ug/L		94	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*102*		*40 - 146*
4-Bromofluorobenzene (Surr)	*91*		*41 - 142*
Dibromofluoromethane (Surr)	*97*		*53 - 146*

Lab Sample ID: 670-29101-1 MSD
Matrix: Water
Analysis Batch: 60963

Client Sample ID: MLPV-MW0107-040.0-20231020
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	0.62	I	20.0	19.1		ug/L		92	56 - 128	1	17
trans-1,2-Dichloroethene	0.73	U	20.0	18.6		ug/L		93	54 - 134	2	20
Trichloroethene	0.89	U	20.0	21.4		ug/L		107	62 - 135	0	20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-29101-1 MSD
Matrix: Water
Analysis Batch: 60963

Client Sample ID: MLPV-MW0107-040.0-20231020
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Vinyl chloride	11		20.0	31.1		ug/L		101	20 - 167	5	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*
Dibromofluoromethane (Surr)	*98*		*53 - 146*

Lab Sample ID: MB 670-61389/7
Matrix: Water
Analysis Batch: 61389

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			11/02/23 11:48	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/02/23 11:48	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/02/23 11:48	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/02/23 11:48	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*114*		*40 - 146*		*11/02/23 11:48*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*11/02/23 11:48*	*1*
Dibromofluoromethane (Surr)	*94*		*53 - 146*		*11/02/23 11:48*	*1*

Lab Sample ID: LCS 670-61389/4
Matrix: Water
Analysis Batch: 61389

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	18.0		ug/L		90	56 - 128
trans-1,2-Dichloroethene	20.0	19.1		ug/L		96	54 - 134
Trichloroethene	20.0	21.0		ug/L		105	62 - 135
Vinyl chloride	20.0	19.9		ug/L		99	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*95*		*41 - 142*
Dibromofluoromethane (Surr)	*92*		*53 - 146*

Lab Sample ID: 660-132526-C-1-A MS
Matrix: Water
Analysis Batch: 61389

Client Sample ID: Matrix Spike
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	53	U	2000	1560		ug/L		78	56 - 128
trans-1,2-Dichloroethene	73	U	2000	1640		ug/L		82	54 - 134
Trichloroethene	89	U	2000	1980		ug/L		99	62 - 135
Vinyl chloride	71	U	2000	1760		ug/L		88	20 - 167

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 660-132526-C-1-A MS
Matrix: Water
Analysis Batch: 61389

Client Sample ID: Matrix Spike
Prep Type: TCLP

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*98*		*40 - 146*
4-Bromofluorobenzene (Surr)	*93*		*41 - 142*
Dibromofluoromethane (Surr)	*86*		*53 - 146*

Lab Sample ID: 660-132526-C-1-A MSD
Matrix: Water
Analysis Batch: 61389

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	53	U	2000	1580		ug/L		79	56 - 128	1	17
trans-1,2-Dichloroethene	73	U	2000	1590		ug/L		79	54 - 134	4	20
Trichloroethene	89	U	2000	2150		ug/L		107	62 - 135	8	20
Vinyl chloride	71	U	2000	1730		ug/L		87	20 - 167	2	24

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*92*		*41 - 142*
Dibromofluoromethane (Surr)	*90*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: LB 670-60897/1-A
Matrix: Water
Analysis Batch: 61389

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene - DL	53	U	100	53	ug/L			11/02/23 16:06	100
trans-1,2-Dichloroethene - DL	73	U	100	73	ug/L			11/02/23 16:06	100
Trichloroethene - DL	89	U	100	89	ug/L			11/02/23 16:06	100
Vinyl chloride - DL	71	U	100	71	ug/L			11/02/23 16:06	100

Surrogate	LB %Recovery	LB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr) - DL	*111*		*40 - 146*		*11/02/23 16:06*	*100*
4-Bromofluorobenzene (Surr) - DL	*94*		*41 - 142*		*11/02/23 16:06*	*100*
Dibromofluoromethane (Surr) - DL	*92*		*53 - 146*		*11/02/23 16:06*	*100*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-59704/11
Matrix: Water
Analysis Batch: 59704

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			10/23/23 14:47	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 670-59704/9
Matrix: Water
Analysis Batch: 59704

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	3890		ug/L		97	90 - 110		

Lab Sample ID: LCSD 670-59704/10
Matrix: Water
Analysis Batch: 59704

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	3900		ug/L		98	90 - 110	0	20

Lab Sample ID: 240-193962-A-2 MS
Matrix: Water
Analysis Batch: 59704

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	4960		ug/L		99	80 - 120		

Lab Sample ID: 240-193962-A-2 MSD
Matrix: Water
Analysis Batch: 59704

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	4920		ug/L		98	80 - 120	1	20

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-436639/1-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 436639

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
6:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
8:2 Fluorotelomer sulfonic acid	0.00060	U	0.0020	0.00060	ug/L		10/27/23 14:09	11/04/23 07:29	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
DONA	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
HFPODA	0.00040	U	0.0020	0.00040	ug/L		10/27/23 14:09	11/04/23 07:29	1
NEtFOSAA	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
NMeFOSAA	0.00040	U	0.0020	0.00040	ug/L		10/27/23 14:09	11/04/23 07:29	1
NMeFOSA	0.00070	U	0.0020	0.00070	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorobutanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorobutanoic acid	0.0010	U	0.0020	0.0010	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorodecanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorodecanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorododecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluoroheptanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluoroheptanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorohexanesulfonic acid	0.00020	U	0.0020	0.00020	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorohexanoic acid	0.0010	U	0.0020	0.0010	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorononanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-436639/1-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 436639

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid	0.00020	U	0.0020	0.00020	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorooctanesulfonamide	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorooctanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorooctanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluoropentanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluoropentanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorotetradecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluorotridecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/27/23 14:09	11/04/23 07:29	1
Perfluoroundecanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/27/23 14:09	11/04/23 07:29	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*111*		*35 - 200*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
M2-6:2 FTS	*106*		*40 - 200*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
M2-8:2 FTS	*124*		*37 - 200*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C2 PFTeDA	*111*		*10 - 171*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C3 HFPO-DA	*106*		*13 - 170*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C3 PFBS	*101*		*34 - 200*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C4 PFBA	*101*		*22 - 174*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C4 PFHpA	*108*		*40 - 165*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C5 PFPeA	*99*		*33 - 196*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C8 PFOA	*103*		*52 - 153*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C8 PFOS	*96*		*59 - 155*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
d3-NMeFOSAA	*118*		*38 - 168*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
d5-NEtFOSAA	*123*		*34 - 181*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C3 PFHxS	*103*		*48 - 169*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C5 PFHxA	*101*		*28 - 166*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C6 PFDA	*105*		*53 - 151*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C7 PFUnA	*111*		*41 - 163*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
d3-NMePFOSA	*61*		*10 - 130*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C8 FOSA	*109*		*10 - 155*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C2-PFDoDA	*108*		*22 - 165*	*10/27/23 14:09*	*11/04/23 07:29*	*1*
13C9 PFNA	*104*		*52 - 168*	*10/27/23 14:09*	*11/04/23 07:29*	*1*

Lab Sample ID: LCS 410-436639/2-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 436639

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0217		ug/L		91	57 - 130
4:2 Fluorotelomer sulfonic acid	0.0239	0.0232		ug/L		97	61 - 131
6:2 Fluorotelomer sulfonic acid	0.0243	0.0254		ug/L		104	61 - 132
8:2 Fluorotelomer sulfonic acid	0.0245	0.0231		ug/L		94	55 - 134
9Cl-PF3ONS	0.0238	0.0217		ug/L		91	60 - 130
DONA	0.0242	0.0226		ug/L		94	61 - 130
HFPODA	0.0256	0.0234		ug/L		91	53 - 131
NEtFOSAA	0.0256	0.0231		ug/L		90	63 - 130
NMeFOSAA	0.0256	0.0232		ug/L		91	62 - 131
NMeFOSA	0.0256	0.0253		ug/L		99	53 - 167
Perfluorobutanesulfonic acid	0.0227	0.0220		ug/L		97	64 - 132

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-436639/2-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 436639

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorobutanoic acid	0.0256	0.0233		ug/L		91	58 - 130
Perfluorodecanesulfonic acid	0.0247	0.0245		ug/L		99	55 - 130
Perfluorodecanoic acid	0.0256	0.0261		ug/L		102	62 - 133
Perfluorododecanoic acid	0.0256	0.0244		ug/L		95	61 - 132
Perfluoroheptanesulfonic acid	0.0244	0.0228		ug/L		94	59 - 130
Perfluoroheptanoic acid	0.0256	0.0241		ug/L		94	64 - 130
Perfluorohexanesulfonic acid	0.0233	0.0219		ug/L		94	62 - 130
Perfluorohexanoic acid	0.0256	0.0228		ug/L		89	59 - 130
Perfluorononanesulfonic acid	0.0246	0.0242		ug/L		98	56 - 130
Perfluorononanoic acid	0.0256	0.0240		ug/L		94	63 - 133
Perfluorooctanesulfonamide	0.0256	0.0256		ug/L		100	67 - 132
Perfluorooctanesulfonic acid	0.0237	0.0223		ug/L		94	62 - 130
Perfluorooctanoic acid	0.0256	0.0252		ug/L		99	58 - 132
Perfluoropentanesulfonic acid	0.0240	0.0236		ug/L		98	64 - 132
Perfluoropentanoic acid	0.0256	0.0251		ug/L		98	60 - 130
Perfluorotetradecanoic acid	0.0256	0.0228		ug/L		89	62 - 131
Perfluorotridecanoic acid	0.0256	0.0234		ug/L		91	59 - 136
Perfluoroundecanoic acid	0.0256	0.0252		ug/L		98	62 - 131

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-4:2 FTS	*105*		*35 - 200*
M2-6:2 FTS	*99*		*40 - 200*
M2-8:2 FTS	*104*		*37 - 200*
13C2 PFTeDA	*95*		*10 - 171*
13C3 HFPO-DA	*96*		*13 - 170*
13C3 PFBS	*99*		*34 - 200*
13C4 PFBA	*101*		*22 - 174*
13C4 PFHpA	*103*		*40 - 165*
13C5 PFPeA	*99*		*33 - 196*
13C8 PFOA	*94*		*52 - 153*
13C8 PFOS	*93*		*59 - 155*
d3-NMeFOSAA	*104*		*38 - 168*
d5-NEtFOSAA	*112*		*34 - 181*
13C3 PFHxS	*100*		*48 - 169*
13C5 PFHxA	*96*		*28 - 166*
13C6 PFDA	*91*		*53 - 151*
13C7 PFUnA	*94*		*41 - 163*
d3-NMePFOSA	*40*		*10 - 130*
13C8 FOSA	*91*		*10 - 155*
13C2-PFDoDA	*95*		*22 - 165*
13C9 PFNA	*97*		*52 - 168*

Lab Sample ID: LCSD 410-436639/3-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 436639

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS	0.0238	0.0215		ug/L		90	57 - 130	1	30
4:2 Fluorotelomer sulfonic acid	0.0239	0.0222		ug/L		93	61 - 131	4	30

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-436639/3-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 436639

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
6:2 Fluorotelomer sulfonic acid			0.0243	0.0243		ug/L		100	61 - 132	4	30
8:2 Fluorotelomer sulfonic acid			0.0245	0.0220		ug/L		90	55 - 134	5	30
9Cl-PF3ONS			0.0238	0.0218		ug/L		92	60 - 130	0	30
DONA			0.0242	0.0226		ug/L		93	61 - 130	0	30
HFPODA			0.0256	0.0234		ug/L		92	53 - 131	0	30
NEtFOSAA			0.0256	0.0226		ug/L		88	63 - 130	2	30
NMeFOSAA			0.0256	0.0227		ug/L		89	62 - 131	2	30
NMeFOSA			0.0256	0.0245		ug/L		96	53 - 167	3	30
Perfluorobutanesulfonic acid			0.0227	0.0214		ug/L		94	64 - 132	3	30
Perfluorobutanoic acid			0.0256	0.0221		ug/L		86	58 - 130	5	30
Perfluorodecanesulfonic acid			0.0247	0.0237		ug/L		96	55 - 130	3	30
Perfluorodecanoic acid			0.0256	0.0251		ug/L		98	62 - 133	4	30
Perfluorododecanoic acid			0.0256	0.0245		ug/L		96	61 - 132	0	30
Perfluoroheptanesulfonic acid			0.0244	0.0227		ug/L		93	59 - 130	0	30
Perfluoroheptanoic acid			0.0256	0.0244		ug/L		95	64 - 130	1	30
Perfluorohexanesulfonic acid			0.0233	0.0213		ug/L		91	62 - 130	2	30
Perfluorohexanoic acid			0.0256	0.0221		ug/L		86	59 - 130	3	30
Perfluorononanesulfonic acid			0.0246	0.0251		ug/L		102	56 - 130	4	30
Perfluorononanoic acid			0.0256	0.0242		ug/L		95	63 - 133	1	30
Perfluorooctanesulfonamide			0.0256	0.0256		ug/L		100	67 - 132	0	30
Perfluorooctanesulfonic acid			0.0237	0.0218		ug/L		92	62 - 130	2	30
Perfluorooctanoic acid			0.0256	0.0242		ug/L		94	58 - 132	4	30
Perfluoropentanesulfonic acid			0.0240	0.0225		ug/L		94	64 - 132	5	30
Perfluoropentanoic acid			0.0256	0.0236		ug/L		92	60 - 130	6	30
Perfluorotetradecanoic acid			0.0256	0.0231		ug/L		90	62 - 131	1	30
Perfluorotridecanoic acid			0.0256	0.0232		ug/L		91	59 - 136	1	30
Perfluoroundecanoic acid			0.0256	0.0248		ug/L		97	62 - 131	1	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
M2-4:2 FTS	*113*		*35 - 200*
M2-6:2 FTS	*105*		*40 - 200*
M2-8:2 FTS	*117*		*37 - 200*
13C2 PFTeDA	*102*		*10 - 171*
13C3 HFPO-DA	*96*		*13 - 170*
13C3 PFBS	*112*		*34 - 200*
13C4 PFBA	*105*		*22 - 174*
13C4 PFHpA	*108*		*40 - 165*
13C5 PFPeA	*110*		*33 - 196*
13C8 PFOA	*103*		*52 - 153*
13C8 PFOS	*105*		*59 - 155*
d3-NMeFOSAA	*119*		*38 - 168*
d5-NEtFOSAA	*118*		*34 - 181*
13C3 PFHxS	*106*		*48 - 169*
13C5 PFHxA	*102*		*28 - 166*
13C6 PFDA	*102*		*53 - 151*
13C7 PFUnA	*104*		*41 - 163*
d3-NMePFOSA	*58*		*10 - 130*
13C8 FOSA	*100*		*10 - 155*
13C2-PFDoDA	*102*		*22 - 165*

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-436639/3-A
Matrix: Water
Analysis Batch: 439544

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 436639

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C9 PFNA	*107*		*52 - 168*

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-59882/12-A
Matrix: Water
Analysis Batch: 59985

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 59882

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		10/24/23 09:31	10/24/23 14:59	1

Lab Sample ID: LCS 670-59882/11-A
Matrix: Water
Analysis Batch: 59985

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 59882

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Phosphorus as P			1500	1610		ug/L		107	90 - 110		

Lab Sample ID: 674-6396-B-2-A MS
Matrix: Water
Analysis Batch: 59985

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 59882

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Phosphorus as P	240	J3	1500	2020	J3	ug/L		118	85 - 115		

Lab Sample ID: 674-6396-B-2-B MSD
Matrix: Water
Analysis Batch: 59985

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 59882

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	240	J3	1500	2020	J3	ug/L		118	85 - 115	0	20

GC/MS VOA

Leach Batch: 60897

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 670-60897/1-A - DL	Method Blank	Total/NA	Water	1311	
660-132526-C-1-A MS	Matrix Spike	TCLP	Water	1311	
660-132526-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	1311	

Analysis Batch: 60963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-1	MLPV-MW0107-040.0-20231020	Total/NA	Water	8260D	
670-29101-2	MLPV-MW0102-030.0-20231020	Total/NA	Water	8260D	
670-29101-3	MLPV-MW0103-040.0-20231020	Total/NA	Water	8260D	
670-29101-4	MLPV-ASMW0006-037.5-20231020	Total/NA	Water	8260D	
670-29101-5	MLPV-IW0060-045.0-20231020	Total/NA	Water	8260D	
670-29101-6	MLPV-ASMW0005-037.5-20231020	Total/NA	Water	8260D	
670-29101-7	MLPV-ASMW0004-037.5-20231020	Total/NA	Water	8260D	
670-29101-8	MLPV-IW0006IR-030.5-20231020	Total/NA	Water	8260D	
670-29101-9	MLPV-IW0063-037.5-20231020	Total/NA	Water	8260D	
670-29101-10	MLPV-IW0064-042.5-20231020	Total/NA	Water	8260D	
670-29101-11	MLPV-IW0031-030.0-20231020	Total/NA	Water	8260D	
670-29101-12	MLPV-IW0046-040.0-20231020	Total/NA	Water	8260D	
670-29101-13	MLPV-IW0028I-030.5-20231020	Total/NA	Water	8260D	
670-29101-14	MLPV-IW0039-045.0-20231023	Total/NA	Water	8260D	
670-29101-15 - DL	MLPV-IW0044-045.0-20231023	Total/NA	Water	8260D	
670-29101-16	MLPV-IW0045-045.0-20231023	Total/NA	Water	8260D	
670-29101-17	IDW02-20231023	Total/NA	Water	8260D	
670-29101-18	MLPV-TB02-20231023	Total/NA	Water	8260D	
MB 670-60963/8	Method Blank	Total/NA	Water	8260D	
LCS 670-60963/5	Lab Control Sample	Total/NA	Water	8260D	
670-29101-1 MS	MLPV-MW0107-040.0-20231020	Total/NA	Water	8260D	
670-29101-1 MSD	MLPV-MW0107-040.0-20231020	Total/NA	Water	8260D	

Analysis Batch: 61389

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-3 - DL	MLPV-MW0103-040.0-20231020	Total/NA	Water	8260D	
670-29101-14 - DL	MLPV-IW0039-045.0-20231023	Total/NA	Water	8260D	
670-29101-15 - DL2	MLPV-IW0044-045.0-20231023	Total/NA	Water	8260D	
LB 670-60897/1-A - DL	Method Blank	Total/NA	Water	8260D	60897
MB 670-61389/7	Method Blank	Total/NA	Water	8260D	
LCS 670-61389/4	Lab Control Sample	Total/NA	Water	8260D	
660-132526-C-1-A MS	Matrix Spike	TCLP	Water	8260D	60897
660-132526-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	8260D	60897

HPLC/IC

Analysis Batch: 59704

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17	IDW02-20231023	Total/NA	Water	300.0	
MB 670-59704/11	Method Blank	Total/NA	Water	300.0	
LCS 670-59704/9	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-59704/10	Lab Control Sample Dup	Total/NA	Water	300.0	
240-193962-A-2 MS	Matrix Spike	Total/NA	Water	300.0	
240-193962-A-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 436639

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17	IDW02-20231023	Total/NA	Water	SPE	
MB 410-436639/1-A	Method Blank	Total/NA	Water	SPE	
LCS 410-436639/2-A	Lab Control Sample	Total/NA	Water	SPE	
LCSD 410-436639/3-A	Lab Control Sample Dup	Total/NA	Water	SPE	

Analysis Batch: 439544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17	IDW02-20231023	Total/NA	Water	537 IDA	436639
MB 410-436639/1-A	Method Blank	Total/NA	Water	537 IDA	436639
LCS 410-436639/2-A	Lab Control Sample	Total/NA	Water	537 IDA	436639
LCSD 410-436639/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	436639

Prep Batch: 441189

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17 - RE	IDW02-20231023	Total/NA	Water	SPE	
MB 410-441189/1-A	Method Blank	Total/NA	Water	SPE	
LCS 410-441189/2-A	Lab Control Sample	Total/NA	Water	SPE	
410-147714-B-4-B MS	Matrix Spike	Total/NA	Water	SPE	
410-147714-B-4-C MSD	Matrix Spike Duplicate	Total/NA	Water	SPE	

Analysis Batch: 441560

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17 - RE	IDW02-20231023	Total/NA	Water	537 IDA	441189
MB 410-441189/1-A	Method Blank	Total/NA	Water	537 IDA	441189
LCS 410-441189/2-A	Lab Control Sample	Total/NA	Water	537 IDA	441189
410-147714-B-4-B MS	Matrix Spike	Total/NA	Water	537 IDA	441189
410-147714-B-4-C MSD	Matrix Spike Duplicate	Total/NA	Water	537 IDA	441189

General Chemistry

Prep Batch: 59882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17	IDW02-20231023	Total/NA	Water	365.2/365.3/365	
MB 670-59882/12-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-59882/11-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
674-6396-B-2-A MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
674-6396-B-2-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 59985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-29101-17	IDW02-20231023	Total/NA	Water	365.4	59882
MB 670-59882/12-A	Method Blank	Total/NA	Water	365.4	59882
LCS 670-59882/11-A	Lab Control Sample	Total/NA	Water	365.4	59882
674-6396-B-2-A MS	Matrix Spike	Total/NA	Water	365.4	59882
674-6396-B-2-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	59882

Client Sample ID: MLPV-MW0107-040.0-20231020
Lab Sample ID: 670-29101-1

Date Collected: 10/20/23 09:02
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 12:10

Client Sample ID: MLPV-MW0102-030.0-20231020
Lab Sample ID: 670-29101-2

Date Collected: 10/20/23 09:27
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 13:23

Client Sample ID: MLPV-MW0103-040.0-20231020
Lab Sample ID: 670-29101-3

Date Collected: 10/20/23 09:48
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 13:41
Total/NA	Analysis	8260D	DL	2	61389	AAM	EET ORL	11/02/23 12:58

Client Sample ID: MLPV-ASMW0006-037.5-20231020
Lab Sample ID: 670-29101-4

Date Collected: 10/20/23 10:42
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 14:00

Client Sample ID: MLPV-IW0060-045.0-20231020
Lab Sample ID: 670-29101-5

Date Collected: 10/20/23 10:40
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 14:18

Client Sample ID: MLPV-ASMW0005-037.5-20231020
Lab Sample ID: 670-29101-6

Date Collected: 10/20/23 11:10
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 14:36

Client Sample ID: MLPV-ASMW0004-037.5-20231020
Lab Sample ID: 670-29101-7

Date Collected: 10/20/23 11:35
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 14:54

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

Client Sample ID: MLPV-IW0006IR-030.5-20231020
Lab Sample ID: 670-29101-8

Date Collected: 10/20/23 11:57
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 15:13

Client Sample ID: MLPV-IW0063-037.5-20231020
Lab Sample ID: 670-29101-9

Date Collected: 10/20/23 12:40
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 15:31

Client Sample ID: MLPV-IW0064-042.5-20231020
Lab Sample ID: 670-29101-10

Date Collected: 10/20/23 12:39
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 15:50

Client Sample ID: MLPV-IW0031-030.0-20231020
Lab Sample ID: 670-29101-11

Date Collected: 10/20/23 13:09
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 16:08

Client Sample ID: MLPV-IW0046-040.0-20231020
Lab Sample ID: 670-29101-12

Date Collected: 10/20/23 13:38
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 16:26

Client Sample ID: MLPV-IW0028I-030.5-20231020
Lab Sample ID: 670-29101-13

Date Collected: 10/20/23 13:34
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 16:45

Client Sample ID: MLPV-IW0039-045.0-20231023
Lab Sample ID: 670-29101-14

Date Collected: 10/23/23 10:15
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 17:03
Total/NA	Analysis	8260D	DL	5	61389	AAM	EET ORL	11/02/23 13:19

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

Client Sample ID: MLPV-IW0044-045.0-20231023

Lab Sample ID: 670-29101-15

Date Collected: 10/23/23 10:27
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	2	60963	AAM	EET ORL	10/31/23 18:39
Total/NA	Analysis	8260D	DL2	5	61389	AAM	EET ORL	11/02/23 13:41

Client Sample ID: MLPV-IW0045-045.0-20231023

Lab Sample ID: 670-29101-16

Date Collected: 10/23/23 11:17
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 17:22

Client Sample ID: IDW02-20231023

Lab Sample ID: 670-29101-17

Date Collected: 10/23/23 11:35
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 17:40
Total/NA	Analysis	300.0		1	59704	YS	EET ORL	10/23/23 17:11
Total/NA	Prep	SPE			436639	HAT6	ELLE	10/27/23 14:09
Total/NA	Analysis	537 IDA		1	439544	I5JH	ELLE	11/04/23 11:44
Total/NA	Prep	SPE	RE		441189	HAT6	ELLE	11/08/23 16:19
Total/NA	Analysis	537 IDA	RE	1	441560	DQV6	ELLE	11/09/23 20:07
Total/NA	Prep	365.2/365.3/365			59882	JA	EET ORL	10/24/23 09:31
Total/NA	Analysis	365.4		1	59985	JA	EET ORL	10/24/23 15:11

Client Sample ID: MLPV-TB02-20231023

Lab Sample ID: 670-29101-18

Date Collected: 10/23/23 00:00
Matrix: Water
Date Received: 10/23/23 13:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	60963	AAM	EET ORL	10/31/23 17:59

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: 670-29101-1
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	06-30-24

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	06-30-24

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV & IDW

Job ID: 670-29101-1

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
SPE	PFAS by SPE	Lab SOP	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Lab SOP = Laboratory Standard Operating Procedure

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: 670-29101-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-29101-1	MLPV-MW0107-040.0-20231020	Water	10/20/23 09:02	10/23/23 13:40
670-29101-2	MLPV-MW0102-030.0-20231020	Water	10/20/23 09:27	10/23/23 13:40
670-29101-3	MLPV-MW0103-040.0-20231020	Water	10/20/23 09:48	10/23/23 13:40
670-29101-4	MLPV-ASMW0006-037.5-20231020	Water	10/20/23 10:42	10/23/23 13:40
670-29101-5	MLPV-IW0060-045.0-20231020	Water	10/20/23 10:40	10/23/23 13:40
670-29101-6	MLPV-ASMW0005-037.5-20231020	Water	10/20/23 11:10	10/23/23 13:40
670-29101-7	MLPV-ASMW0004-037.5-20231020	Water	10/20/23 11:35	10/23/23 13:40
670-29101-8	MLPV-IW0006IR-030.5-20231020	Water	10/20/23 11:57	10/23/23 13:40
670-29101-9	MLPV-IW0063-037.5-20231020	Water	10/20/23 12:40	10/23/23 13:40
670-29101-10	MLPV-IW0064-042.5-20231020	Water	10/20/23 12:39	10/23/23 13:40
670-29101-11	MLPV-IW0031-030.0-20231020	Water	10/20/23 13:09	10/23/23 13:40
670-29101-12	MLPV-IW0046-040.0-20231020	Water	10/20/23 13:38	10/23/23 13:40
670-29101-13	MLPV-IW0028I-030.5-20231020	Water	10/20/23 13:34	10/23/23 13:40
670-29101-14	MLPV-IW0039-045.0-20231023	Water	10/23/23 10:15	10/23/23 13:40
670-29101-15	MLPV-IW0044-045.0-20231023	Water	10/23/23 10:27	10/23/23 13:40
670-29101-16	MLPV-IW0045-045.0-20231023	Water	10/23/23 11:17	10/23/23 13:40
670-29101-17	IDW02-20231023	Water	10/23/23 11:35	10/23/23 13:40
670-29101-18	MLPV-TB02-20231023	Water	10/23/23 00:00	10/23/23 13:40

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of 2	
Site Location: KSC Merritt Island FL	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 — Devin Kehoe 919-943-3797 — Patrick Bendl 724 591 6324 — Mateo Posada	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:		

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-MW0107-040.0-20231020	MLPV-MW0107	10/20/23	902	WG	N	G	3	3										
	MLPV-MW0102-030.0-20231020	MLPV-MW0102	10/20/23	927	WG	N	G	3	3										
	MLPV-MW0103-040.0-20231020	MLPV-MW0103	10/20/23	948	WG	N	G	3	3										
	MLPV-ASMW0006-037.5-20231020	MLPV-ASMW0006	10/20/23	1042	WG	N	G	3	3										
	MLPV-IW0060-045.0-20231020	MLPV-IW0060	10/20/23	1040	WG	N	G	3	3										
	MLPV-ASMW0005-037.5-20231020	MLPV-ASMW0005	10/20/23	1110	WG	N	G	3	3										
	MLPV-ASMW-0004-037.5-20231020	MLPV-ASMW0004	10/20/23	1135	WG	N	G	3	3										
	MLPV-IW0062R-030.5-20231020	MLPV-IW0062R	10/20/23	1157	WG	N	G	3	3										
	MLPV-IW0063-037.5-20231020	MLPV-IW0063	10/20/23	1240	WG	N	G	3	3										
	MLPV-IW0064-042.5-20231020	MLPV-IW0064	10/20/23	1239	WG	N	G	3	3										
	MLPV-IW0031-030.0-20231020	MLPV-IW0031	10/20/23	1309	WG	N	G	3	3										
	MLPV-IW0046-040.0-20231020	MLPV-IW0046	10/20/23	1338	WG	N	G	3	3										

670-29101 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #13-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1			1	10/20/23	0700
2 M. Parsons	10/23/23	1340	2	10/23	1340
3			3		

Samples Iced?(check) Yes X No
Shipping Company: 0.8/0.6 596
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**

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 2 of 2	
Site Location:			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 / Devin Kehoe 919-943-3797 / Patrick Beal 214-384-6324 / Mark Parsons		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:		

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-1W00251-030.5-20231020	MLPV-1W00251	10/20/23	1334	WG	N	G	3	3	
	MLPV-1W0039-045.0-20231023	MLPV-1W0039	10/23/23	1015	WG	N	G	3	3	
	MLPV-1W0044-045.0-20231023	MLPV-1W0044	10/23/23	1027	WG	N	G	3	3	
	MLPV-1W0045.0-045.0-20231023	MLPV-1W0045	10/23/23	1117	WG	N	G	3	3	
	IDW02-20231023	IDW	10/23/23	1135	WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					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:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1			1	10.20.23	0700
2 M. Parsons	10/23/23	1340	2	10/23	1340
3			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

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: 670-17487.1
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 #: 670-29101-1
Address: 2425 New Holland Pike, ,	Due Date Requested: 11/8/2023			
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/PFAS_W_Prep (MOD) PFAs WS#15-2 non DOD	PRE_SCREEN_PFAS/PFAS_PreScn_W_P	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
IDW02-20231023 (670-29101-17)	10/23/23	11:35 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 *Unconfirmed*	***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) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time: 10/23 1537	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: 10/24/23 1026	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 1.2 - 0.2 C: 0.3

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-29101-1

Login Number: 29101

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.	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.	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: 670-29101-1

Login Number: 29101
List Number: 2
Creator: Arroyo, Haley

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC
List Creation: 10/24/23 03:10 PM

Question	Answer	Comment
The cooler's custody seal is 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 acceptable,where thermal pres is required(</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV:Container Temp acceptable,where thermal pres is required (</=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 11/1/2023 1:15:55 PM

JOB DESCRIPTION

NASA KSC MLPV - IDW

JOB NUMBER

670-28589-1

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.

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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11/1/2023 1:15:55 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: 670-28589-1
Project/Site: NASA KSC MLPV - IDW

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
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
*	Isotope Dilution analyte is outside acceptance limits.
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
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
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Job ID: 670-28589-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-28589-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The sample was received on 10/13/2023 11:55 AM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.7°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: 670-28589-1

Client Sample ID: MLPV-IDW01-20231012

Lab Sample ID: 670-28589-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	11		1.0	0.71	ug/L	1		8260D	Total/NA
cis-1,2-Dichloroethene	3.5		1.0	0.53	ug/L	1		8260D	Total/NA
6:2 Fluorotelomer sulfonic acid	0.0080		0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorobutanesulfonic acid	0.0053		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0065		0.0019	0.00096	ug/L	1		537 IDA	Total/NA
Perfluoroheptanesulfonic acid	0.0019		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0029		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.031		0.0019	0.00019	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0064		0.0019	0.00096	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00054	I	0.0019	0.00019	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonamide	0.00091	I	0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.15		0.0019	0.00048	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.013		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluoropentanesulfonic acid	0.0050		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0042		0.0019	0.00029	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	530		100	40	ug/L	1		365.4	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IDW01-20231012

Date Collected: 10/12/23 13:25
Date Received: 10/13/23 11:55

Lab Sample ID: 670-28589-1

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/19/23 19:07	1
Vinyl chloride	**11**		1.0	0.71	ug/L			10/19/23 19:07	1
cis-1,2-Dichloroethene	**3.5**		1.0	0.53	ug/L			10/19/23 19:07	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/19/23 19:07	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*85*		*41 - 142*		*10/19/23 19:07*	*1*
Toluene-d8 (Surr)	*99*		*40 - 146*		*10/19/23 19:07*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/19/23 19:07*	*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			10/14/23 03:47	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		10/20/23 07:30	10/24/23 18:19	1
4:2 Fluorotelomer sulfonic acid	0.00048	U	0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
6:2 Fluorotelomer sulfonic acid	**0.0080**		0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
8:2 Fluorotelomer sulfonic acid	0.00058	U	0.0019	0.00058	ug/L		10/20/23 07:30	10/24/23 18:19	1
9Cl-PF3ONS	0.00048	U	0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
DONA	0.00048	U	0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
HFPODA	0.00038	U	0.0019	0.00038	ug/L		10/20/23 07:30	10/24/23 18:19	1
NEtFOSAA	0.00048	U	0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
NMeFOSAA	0.00038	U	0.0019	0.00038	ug/L		10/20/23 07:30	10/24/23 18:19	1
NMeFOSA	0.00067	U	0.0019	0.00067	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorobutanesulfonic acid	**0.0053**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorobutanoic acid	**0.0065**		0.0019	0.00096	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorodecanesulfonic acid	0.00029	U	0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorodecanoic acid	0.00029	U	0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorododecanoic acid	0.00038	U	0.0019	0.00038	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluoroheptanesulfonic acid	**0.0019**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluoroheptanoic acid	**0.0029**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorohexanesulfonic acid	**0.031**		0.0019	0.00019	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorohexanoic acid	**0.0064**		0.0019	0.00096	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorononanesulfonic acid	0.00029	U	0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorononanoic acid	**0.00054**	**I**	0.0019	0.00019	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorooctanesulfonamide	**0.00091**	**I**	0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorooctanesulfonic acid	**0.15**		0.0019	0.00048	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorooctanoic acid	**0.013**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluoropentanesulfonic acid	**0.0050**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluoropentanoic acid	**0.0042**		0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorotetradecanoic acid	0.00038	U	0.0019	0.00038	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluorotridecanoic acid	0.00038	U	0.0019	0.00038	ug/L		10/20/23 07:30	10/24/23 18:19	1
Perfluoroundecanoic acid	0.00029	U	0.0019	0.00029	ug/L		10/20/23 07:30	10/24/23 18:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*264*	*	*35 - 200*	*10/20/23 07:30*	*10/24/23 18:19*	*1*
M2-6:2 FTS	*197*		*40 - 200*	*10/20/23 07:30*	*10/24/23 18:19*	*1*
M2-8:2 FTS	*149*		*37 - 200*	*10/20/23 07:30*	*10/24/23 18:19*	*1*
13C2 PFTeDA	*78*		*10 - 171*	*10/20/23 07:30*	*10/24/23 18:19*	*1*

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - IDW

Job ID: 670-28589-1

Client Sample ID: MLPV-IDW01-20231012
Date Collected: 10/12/23 13:25
Date Received: 10/13/23 11:55

Lab Sample ID: 670-28589-1
Matrix: Water

Method: EPA 537 IDA - EPA 537 Isotope Dilution (Continued)

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 HFPO-DA	92		13 - 170	10/20/23 07:30	10/24/23 18:19	1
13C3 PFBS	216	*	34 - 200	10/20/23 07:30	10/24/23 18:19	1
13C4 PFBA	13	*	22 - 174	10/20/23 07:30	10/24/23 18:19	1
13C4 PFHpA	113		40 - 165	10/20/23 07:30	10/24/23 18:19	1
13C5 PFPeA	138		33 - 196	10/20/23 07:30	10/24/23 18:19	1
13C8 PFOA	114		52 - 153	10/20/23 07:30	10/24/23 18:19	1
13C8 PFOS	106		59 - 155	10/20/23 07:30	10/24/23 18:19	1
d3-NMeFOSAA	114		38 - 168	10/20/23 07:30	10/24/23 18:19	1
d5-NEtFOSAA	133		34 - 181	10/20/23 07:30	10/24/23 18:19	1
13C3 PFHxS	111		48 - 169	10/20/23 07:30	10/24/23 18:19	1
13C5 PFHxA	102		28 - 166	10/20/23 07:30	10/24/23 18:19	1
13C6 PFDA	106		53 - 151	10/20/23 07:30	10/24/23 18:19	1
13C7 PFUnA	98		41 - 163	10/20/23 07:30	10/24/23 18:19	1
d3-NMePFOSA	104		10 - 130	10/20/23 07:30	10/24/23 18:19	1
13C8 FOSA	95		10 - 155	10/20/23 07:30	10/24/23 18:19	1
13C2-PFDoDA	90		22 - 165	10/20/23 07:30	10/24/23 18:19	1
13C9 PFNA	116		52 - 168	10/20/23 07:30	10/24/23 18:19	1

General Chemistry

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	530		100	40	ug/L		10/17/23 09:14	10/17/23 15:24	1

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - IDW

Job ID: 670-28589-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	TOL	DBFM
Lab Sample ID	Client Sample ID	(41-142)	(40-146)	(53-146)
670-28589-1	MLPV-IDW01-20231012	85	99	99
678-14050-D-1 MS	Matrix Spike	82	99	100
678-14050-D-1 MSD	Matrix Spike Duplicate	82	100	102
LCS 670-59240/4	Lab Control Sample	76	100	103
MB 670-59240/7	Method Blank	81	100	99

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Isotope Dilution Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - IDW

Job ID: 670-28589-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		M242FTS	M262FTS	M282FTS	PFTDA	HFPODA	C3PFBS	PFBA	C4PFHA
Lab Sample ID	Client Sample ID	(35-200)	(40-200)	(37-200)	(10-171)	(13-170)	(34-200)	(22-174)	(40-165)
670-28589-1	MLPV-IDW01-20231012	264 *	197	149	78	92	216 *	13 *	113
LCS 410-433641/2-A	Lab Control Sample	108	106	107	103	103	111	86	111
LCSD 410-433641/3-A	Lab Control Sample Dup	105	100	109	117	106	116	98	116
MB 410-433641/1-A	Method Blank	87	92	91	80	86	100	81	94

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		PFPeA	C8PFOA	C8PFOS	d3NMFOS	d5NEFOS	C3PFHS	13C5PHA	C6PFDA
Lab Sample ID	Client Sample ID	(33-196)	(52-153)	(59-155)	(38-168)	(34-181)	(48-169)	(28-166)	(53-151)
670-28589-1	MLPV-IDW01-20231012	138	114	106	114	133	111	102	106
LCS 410-433641/2-A	Lab Control Sample	98	110	104	132	140	106	111	101
LCSD 410-433641/3-A	Lab Control Sample Dup	112	109	105	136	155	107	110	120
MB 410-433641/1-A	Method Blank	92	92	86	99	107	90	89	87

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		13C7PUA	d3NMFSA	PFOSA	PFDoDA	C9PFNA			
Lab Sample ID	Client Sample ID	(41-163)	(10-130)	(10-155)	(22-165)	(52-168)			
670-28589-1	MLPV-IDW01-20231012	98	104	95	90	116			
LCS 410-433641/2-A	Lab Control Sample	110	74	97	109	101			
LCSD 410-433641/3-A	Lab Control Sample Dup	121	86	104	129	105			
MB 410-433641/1-A	Method Blank	88	63	82	82	88			

Surrogate Legend

M242FTS = M2-4:2 FTS
M262FTS = M2-6:2 FTS
M282FTS = M2-8:2 FTS
PFTDA = 13C2 PFTeDA
HFPODA = 13C3 HFPO-DA
C3PFBS = 13C3 PFBS
PFBA = 13C4 PFBA
C4PFHA = 13C4 PFHpA
PFPeA = 13C5 PFPeA
C8PFOA = 13C8 PFOA
C8PFOS = 13C8 PFOS
d3NMFOS = d3-NMeFOSAA
d5NEFOS = d5-NEtFOSAA
C3PFHS = 13C3 PFHxS
13C5PHA = 13C5 PFHxA
C6PFDA = 13C6 PFDA
13C7PUA = 13C7 PFUnA
d3NMFSA = d3-NMePFOSA
PFOSA = 13C8 FOSA
PFDoDA = 13C2-PFDoDA
C9PFNA = 13C9 PFNA

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 670-59240/7
Matrix: Water
Analysis Batch: 59240

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	0.89	U	1.0	0.89	ug/L			10/19/23 13:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			10/19/23 13:08	1
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			10/19/23 13:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			10/19/23 13:08	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*81*		*41 - 142*		*10/19/23 13:08*	*1*
Toluene-d8 (Surr)	*100*		*40 - 146*		*10/19/23 13:08*	*1*
Dibromofluoromethane (Surr)	*99*		*53 - 146*		*10/19/23 13:08*	*1*

Lab Sample ID: LCS 670-59240/4
Matrix: Water
Analysis Batch: 59240

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Trichloroethene			20.0	19.8		ug/L		99	62 - 135		
Vinyl chloride			20.0	21.4		ug/L		107	20 - 167		
cis-1,2-Dichloroethene			20.0	18.3		ug/L		92	56 - 128		
trans-1,2-Dichloroethene			20.0	19.4		ug/L		97	54 - 134		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*76*		*41 - 142*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*103*		*53 - 146*

Lab Sample ID: 678-14050-D-1 MS
Matrix: Water
Analysis Batch: 59240

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		
Trichloroethene	0.89	U	20.0	21.1		ug/L		106	62 - 135		
Vinyl chloride	0.71	U	20.0	22.8		ug/L		114	20 - 167		
cis-1,2-Dichloroethene	0.53	U	20.0	19.2		ug/L		96	56 - 128		
trans-1,2-Dichloroethene	0.73	U	20.0	21.0		ug/L		105	54 - 134		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*82*		*41 - 142*
Toluene-d8 (Surr)	*99*		*40 - 146*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

Lab Sample ID: 678-14050-D-1 MSD
Matrix: Water
Analysis Batch: 59240

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
Trichloroethene	0.89	U	20.0	21.4		ug/L		107	62 - 135	1	20
Vinyl chloride	0.71	U	20.0	24.1		ug/L		121	20 - 167	6	24
cis-1,2-Dichloroethene	0.53	U	20.0	20.4		ug/L		102	56 - 128	6	17

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 678-14050-D-1 MSD
Matrix: Water
Analysis Batch: 59240

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
trans-1,2-Dichloroethene	0.73	U	20.0	20.4		ug/L		102	54 - 134	3	20

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*82*		*41 - 142*
Toluene-d8 (Surr)	*100*		*40 - 146*
Dibromofluoromethane (Surr)	*102*		*53 - 146*

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-58241/37
Matrix: Water
Analysis Batch: 58241

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			10/13/23 18:59	1

Lab Sample ID: MB 670-58241/6
Matrix: Water
Analysis Batch: 58241

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			10/13/23 10:36	1

Lab Sample ID: MB 670-58241/70
Matrix: Water
Analysis Batch: 58241

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			10/14/23 02:46	1

Lab Sample ID: LCS 670-58241/4
Matrix: Water
Analysis Batch: 58241

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	3730		ug/L		93	90 - 110

Lab Sample ID: LCS 670-58241/68
Matrix: Water
Analysis Batch: 58241

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	3730		ug/L		93	90 - 110

Lab Sample ID: LCSD 670-58241/5
Matrix: Water
Analysis Batch: 58241

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	3740		ug/L		93	90 - 110	0	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: LCSD 670-58241/69
Matrix: Water
Analysis Batch: 58241

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	3730		ug/L		93	90 - 110	0	20

Lab Sample ID: 762-2624-E-1 MS
Matrix: Water
Analysis Batch: 58241

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	5570		ug/L		111	80 - 120		

Lab Sample ID: 762-2624-E-1 MSD
Matrix: Water
Analysis Batch: 58241

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	5580		ug/L		112	80 - 120	0	20

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-433641/1-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433641

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
6:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
8:2 Fluorotelomer sulfonic acid	0.00060	U	0.0020	0.00060	ug/L		10/20/23 07:30	10/23/23 18:27	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
DONA	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
HFPODA	0.00040	U	0.0020	0.00040	ug/L		10/20/23 07:30	10/23/23 18:27	1
NEtFOSAA	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
NMeFOSAA	0.00040	U	0.0020	0.00040	ug/L		10/20/23 07:30	10/23/23 18:27	1
NMeFOSA	0.00070	U	0.0020	0.00070	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorobutanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorobutanoic acid	0.0010	U	0.0020	0.0010	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorodecanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorodecanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorododecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluoroheptanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluoroheptanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorohexanesulfonic acid	0.00020	U	0.0020	0.00020	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorohexanoic acid	0.0010	U	0.0020	0.0010	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorononanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorononanoic acid	0.00020	U	0.0020	0.00020	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorooctanesulfonamide	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorooctanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorooctanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluoropentanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluoropentanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: MB 410-433641/1-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 433641

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluorotridecanoic acid	0.00040	U	0.0020	0.00040	ug/L		10/20/23 07:30	10/23/23 18:27	1
Perfluoroundecanoic acid	0.00030	U	0.0020	0.00030	ug/L		10/20/23 07:30	10/23/23 18:27	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
M2-4:2 FTS	*87*		*35 - 200*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
M2-6:2 FTS	*92*		*40 - 200*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
M2-8:2 FTS	*91*		*37 - 200*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C2 PFTeDA	*80*		*10 - 171*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C3 HFPO-DA	*86*		*13 - 170*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C3 PFBS	*100*		*34 - 200*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C4 PFBA	*81*		*22 - 174*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C4 PFHpA	*94*		*40 - 165*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C5 PFPeA	*92*		*33 - 196*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C8 PFOA	*92*		*52 - 153*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C8 PFOS	*86*		*59 - 155*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
d3-NMeFOSAA	*99*		*38 - 168*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
d5-NEtFOSAA	*107*		*34 - 181*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C3 PFHxS	*90*		*48 - 169*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C5 PFHxA	*89*		*28 - 166*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C6 PFDA	*87*		*53 - 151*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C7 PFUnA	*88*		*41 - 163*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
d3-NMePFOSA	*63*		*10 - 130*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C8 FOSA	*82*		*10 - 155*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C2-PFDoDA	*82*		*22 - 165*	*10/20/23 07:30*	*10/23/23 18:27*	*1*
13C9 PFNA	*88*		*52 - 168*	*10/20/23 07:30*	*10/23/23 18:27*	*1*

Lab Sample ID: LCS 410-433641/2-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433641

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0189		ug/L		79	57 - 130
4:2 Fluorotelomer sulfonic acid	0.0239	0.0182		ug/L		76	61 - 131
6:2 Fluorotelomer sulfonic acid	0.0243	0.0190		ug/L		78	61 - 132
8:2 Fluorotelomer sulfonic acid	0.0245	0.0179		ug/L		73	55 - 134
9Cl-PF3ONS	0.0238	0.0188		ug/L		79	60 - 130
DONA	0.0242	0.0189		ug/L		78	61 - 130
HFPODA	0.0256	0.0209		ug/L		82	53 - 131
NEtFOSAA	0.0256	0.0190		ug/L		74	63 - 130
NMeFOSAA	0.0256	0.0189		ug/L		74	62 - 131
NMeFOSA	0.0256	0.0223		ug/L		87	53 - 167
Perfluorobutanesulfonic acid	0.0227	0.0183		ug/L		81	64 - 132
Perfluorobutanoic acid	0.0256	0.0202		ug/L		79	58 - 130
Perfluorodecanesulfonic acid	0.0247	0.0197		ug/L		80	55 - 130
Perfluorodecanoic acid	0.0256	0.0221		ug/L		86	62 - 133
Perfluorododecanoic acid	0.0256	0.0198		ug/L		78	61 - 132
Perfluoroheptanesulfonic acid	0.0244	0.0200		ug/L		82	59 - 130
Perfluoroheptanoic acid	0.0256	0.0205		ug/L		80	64 - 130

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-433641/2-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 433641

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanesulfonic acid	0.0233	0.0194		ug/L		83	62 - 130
Perfluorohexanoic acid	0.0256	0.0201		ug/L		79	59 - 130
Perfluorononanesulfonic acid	0.0246	0.0206		ug/L		84	56 - 130
Perfluorononanoic acid	0.0256	0.0207		ug/L		81	63 - 133
Perfluorooctanesulfonamide	0.0256	0.0222		ug/L		87	67 - 132
Perfluorooctanesulfonic acid	0.0237	0.0185		ug/L		78	62 - 130
Perfluorooctanoic acid	0.0256	0.0198		ug/L		77	58 - 132
Perfluoropentanesulfonic acid	0.0240	0.0210		ug/L		87	64 - 132
Perfluoropentanoic acid	0.0256	0.0218		ug/L		85	60 - 130
Perfluorotetradecanoic acid	0.0256	0.0202		ug/L		79	62 - 131
Perfluorotridecanoic acid	0.0256	0.0206		ug/L		81	59 - 136
Perfluoroundecanoic acid	0.0256	0.0208		ug/L		81	62 - 131

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
M2-4:2 FTS	*108*		*35 - 200*
M2-6:2 FTS	*106*		*40 - 200*
M2-8:2 FTS	*107*		*37 - 200*
13C2 PFTeDA	*103*		*10 - 171*
13C3 HFPO-DA	*103*		*13 - 170*
13C3 PFBS	*111*		*34 - 200*
13C4 PFBA	*86*		*22 - 174*
13C4 PFHpA	*111*		*40 - 165*
13C5 PFPeA	*98*		*33 - 196*
13C8 PFOA	*110*		*52 - 153*
13C8 PFOS	*104*		*59 - 155*
d3-NMeFOSAA	*132*		*38 - 168*
d5-NEtFOSAA	*140*		*34 - 181*
13C3 PFHxS	*106*		*48 - 169*
13C5 PFHxA	*111*		*28 - 166*
13C6 PFDA	*101*		*53 - 151*
13C7 PFUnA	*110*		*41 - 163*
d3-NMePFOSA	*74*		*10 - 130*
13C8 FOSA	*97*		*10 - 155*
13C2-PFDoDA	*109*		*22 - 165*
13C9 PFNA	*101*		*52 - 168*

Lab Sample ID: LCSD 410-433641/3-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 433641

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
11Cl-PF3OUdS	0.0238	0.0190		ug/L		80	57 - 130	1	30
4:2 Fluorotelomer sulfonic acid	0.0239	0.0216		ug/L		90	61 - 131	17	30
6:2 Fluorotelomer sulfonic acid	0.0243	0.0212		ug/L		87	61 - 132	11	30
8:2 Fluorotelomer sulfonic acid	0.0245	0.0203		ug/L		83	55 - 134	12	30
9Cl-PF3ONS	0.0238	0.0184		ug/L		77	60 - 130	2	30
DONA	0.0242	0.0177		ug/L		73	61 - 130	7	30
HFPODA	0.0256	0.0196		ug/L		77	53 - 131	6	30
NEtFOSAA	0.0256	0.0199		ug/L		78	63 - 130	4	30

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-433641/3-A
Matrix: Water
Analysis Batch: 434592

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 433641

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NMeFOSAA			0.0256	0.0213		ug/L		83	62 - 131	12	30
NMeFOSA			0.0256	0.0224		ug/L		88	53 - 167	0	30
Perfluorobutanesulfonic acid			0.0227	0.0187		ug/L		83	64 - 132	2	30
Perfluorobutanoic acid			0.0256	0.0201		ug/L		78	58 - 130	1	30
Perfluorodecanesulfonic acid			0.0247	0.0201		ug/L		82	55 - 130	2	30
Perfluorodecanoic acid			0.0256	0.0218		ug/L		85	62 - 133	1	30
Perfluorododecanoic acid			0.0256	0.0190		ug/L		74	61 - 132	4	30
Perfluoroheptanesulfonic acid			0.0244	0.0198		ug/L		81	59 - 130	1	30
Perfluoroheptanoic acid			0.0256	0.0204		ug/L		80	64 - 130	1	30
Perfluorohexanesulfonic acid			0.0233	0.0190		ug/L		81	62 - 130	2	30
Perfluorohexanoic acid			0.0256	0.0188		ug/L		73	59 - 130	7	30
Perfluorononanesulfonic acid			0.0246	0.0201		ug/L		82	56 - 130	2	30
Perfluorononanoic acid			0.0256	0.0211		ug/L		82	63 - 133	2	30
Perfluorooctanesulfonamide			0.0256	0.0222		ug/L		87	67 - 132	0	30
Perfluorooctanesulfonic acid			0.0237	0.0192		ug/L		81	62 - 130	3	30
Perfluorooctanoic acid			0.0256	0.0214		ug/L		84	58 - 132	8	30
Perfluoropentanesulfonic acid			0.0240	0.0195		ug/L		81	64 - 132	7	30
Perfluoropentanoic acid			0.0256	0.0203		ug/L		79	60 - 130	7	30
Perfluorotetradecanoic acid			0.0256	0.0209		ug/L		81	62 - 131	3	30
Perfluorotridecanoic acid			0.0256	0.0194		ug/L		76	59 - 136	6	30
Perfluoroundecanoic acid			0.0256	0.0211		ug/L		82	62 - 131	2	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
M2-4:2 FTS	*105*		*35 - 200*
M2-6:2 FTS	*100*		*40 - 200*
M2-8:2 FTS	*109*		*37 - 200*
13C2 PFTeDA	*117*		*10 - 171*
13C3 HFPO-DA	*106*		*13 - 170*
13C3 PFBS	*116*		*34 - 200*
13C4 PFBA	*98*		*22 - 174*
13C4 PFHpA	*116*		*40 - 165*
13C5 PFPeA	*112*		*33 - 196*
13C8 PFOA	*109*		*52 - 153*
13C8 PFOS	*105*		*59 - 155*
d3-NMeFOSAA	*136*		*38 - 168*
d5-NEtFOSAA	*155*		*34 - 181*
13C3 PFHxS	*107*		*48 - 169*
13C5 PFHxA	*110*		*28 - 166*
13C6 PFDA	*120*		*53 - 151*
13C7 PFUnA	*121*		*41 - 163*
d3-NMePFOSA	*86*		*10 - 130*
13C8 FOSA	*104*		*10 - 155*
13C2-PFDoDA	*129*		*22 - 165*
13C9 PFNA	*105*		*52 - 168*

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-58726/2-A
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 58726

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		10/17/23 09:14	10/17/23 15:11	1

Lab Sample ID: LCS 670-58726/1-A
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 58726

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	1500	1610		ug/L		107	90 - 110

Lab Sample ID: 670-28663-C-1-A MS
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 58726

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	570	J3	1500	2470	J3	ug/L		127	85 - 115

Lab Sample ID: 670-28663-C-1-B MSD
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 58726

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	570	J3	1500	2470	J3	ug/L		127	85 - 115	0	20

Lab Sample ID: MB 670-58727/3-A
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 58727

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	40	U	100	40	ug/L		10/17/23 09:16	10/17/23 15:44	1

Lab Sample ID: LCS 670-58727/1-A
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 58727

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	1500	1640		ug/L		109	90 - 110

Lab Sample ID: LCSD 670-58727/2-A
Matrix: Water
Analysis Batch: 58840

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 58727

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Total Phosphorus as P	1500	1650		ug/L		110	90 - 110	1	20

GC/MS VOA

Analysis Batch: 59240

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	8260D	
MB 670-59240/7	Method Blank	Total/NA	Water	8260D	
LCS 670-59240/4	Lab Control Sample	Total/NA	Water	8260D	
678-14050-D-1 MS	Matrix Spike	Total/NA	Water	8260D	
678-14050-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

HPLC/IC

Analysis Batch: 58241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	300.0	
MB 670-58241/37	Method Blank	Total/NA	Water	300.0	
MB 670-58241/6	Method Blank	Total/NA	Water	300.0	
MB 670-58241/70	Method Blank	Total/NA	Water	300.0	
LCS 670-58241/4	Lab Control Sample	Total/NA	Water	300.0	
LCS 670-58241/68	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-58241/5	Lab Control Sample Dup	Total/NA	Water	300.0	
LCSD 670-58241/69	Lab Control Sample Dup	Total/NA	Water	300.0	
762-2624-E-1 MS	Matrix Spike	Total/NA	Water	300.0	
762-2624-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 433641

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	SPE	
MB 410-433641/1-A	Method Blank	Total/NA	Water	SPE	
LCS 410-433641/2-A	Lab Control Sample	Total/NA	Water	SPE	
LCSD 410-433641/3-A	Lab Control Sample Dup	Total/NA	Water	SPE	

Analysis Batch: 434592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 410-433641/1-A	Method Blank	Total/NA	Water	537 IDA	433641
LCS 410-433641/2-A	Lab Control Sample	Total/NA	Water	537 IDA	433641
LCSD 410-433641/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	433641

Analysis Batch: 435049

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	537 IDA	433641

Prep Batch: 435651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1 - RE	MLPV-IDW01-20231012	Total/NA	Water	SPE	
MB 410-435651/1-A	Method Blank	Total/NA	Water	SPE	
LCS 410-435651/2-A	Lab Control Sample	Total/NA	Water	SPE	
LCSD 410-435651/3-A	Lab Control Sample Dup	Total/NA	Water	SPE	

Analysis Batch: 437294

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1 - RE	MLPV-IDW01-20231012	Total/NA	Water	537 IDA	435651
MB 410-435651/1-A	Method Blank	Total/NA	Water	537 IDA	435651
LCS 410-435651/2-A	Lab Control Sample	Total/NA	Water	537 IDA	435651

LCMS (Continued)

Analysis Batch: 437294 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 410-435651/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	435651

General Chemistry

Prep Batch: 58726

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	365.2/365.3/365	
MB 670-58726/2-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-58726/1-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-28663-C-1-A MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-28663-C-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Prep Batch: 58727

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 670-58727/3-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-58727/1-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
LCSD 670-58727/2-A	Lab Control Sample Dup	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 58840

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-28589-1	MLPV-IDW01-20231012	Total/NA	Water	365.4	58726
MB 670-58726/2-A	Method Blank	Total/NA	Water	365.4	58726
MB 670-58727/3-A	Method Blank	Total/NA	Water	365.4	58727
LCS 670-58726/1-A	Lab Control Sample	Total/NA	Water	365.4	58726
LCS 670-58727/1-A	Lab Control Sample	Total/NA	Water	365.4	58727
LCSD 670-58727/2-A	Lab Control Sample Dup	Total/NA	Water	365.4	58727
670-28663-C-1-A MS	Matrix Spike	Total/NA	Water	365.4	58726
670-28663-C-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	58726

Lab Chronicle

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - IDW

Job ID: 670-28589-1

Client Sample ID: MLPV-IDW01-20231012

Date Collected: 10/12/23 13:25
Date Received: 10/13/23 11:55

Lab Sample ID: 670-28589-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	59240	P1K	EET ORL	10/19/23 19:07
Total/NA	Analysis	300.0		1	58241	BR	EET ORL	10/14/23 03:47
Total/NA	Prep	SPE	RE		435651	HAT6	ELLE	10/25/23 16:28
Total/NA	Analysis	537 IDA	RE	1	437294	DS2G	ELLE	10/31/23 12:55
Total/NA	Prep	SPE			433641	K3UG	ELLE	10/20/23 07:30
Total/NA	Analysis	537 IDA		1	435049	R7RE	ELLE	10/24/23 18:19
Total/NA	Prep	365.2/365.3/365			58726	JA	EET ORL	10/17/23 09:14
Total/NA	Analysis	365.4		1	58840	JA	EET ORL	10/17/23 15:24

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: 670-28589-1
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	06-30-24

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	06-30-24

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - IDW

Job ID: 670-28589-1

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
SPE	PFAS by SPE	Lab SOP	ELLE

Protocol References:

EPA = US Environmental Protection Agency

Lab SOP = Laboratory Standard Operating Procedure

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: 670-28589-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-28589-1	MLPV-IDW01-20231012	Water	10/12/23 13:25	10/13/23 11:55

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV			COC No.	Page: 1 of 1	
Site Location: IDW			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 #	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: 15-2 & 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 C Nitrate by EPA 300.0	H2SO4 <2 Total Phosphorus by EPA 365.4	Comments
	MLPV-IDW01 -20231012	MLPV-IDW01	20231012	1325	IDW	IDW	G	7	3	2	1	1	
	MLPV-IDW02	MLPV-IDW02	202309		IDW	IDW	G	7	3	2	1	1	DK

670-28589 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-14 & 15-2 (not Table B-15 compliant)

***Lab* Comments:** SO 11189

Sample Shipment and Delivery Details
Number of coolers in shipment:
Samples Iced?(check) Yes ✓ No ____ 0.4 / 0.4
Shipping Company:
Tracking No:
Date Shipped:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1	Devin Kehoe	10/13/23	1155		10-13-23	1155
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**

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: 670-17054.1
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 #: 670-28589-1
Address: 2425 New Holland Pike,	Due Date Requested: 10/31/2023			
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-IDW01-20231012 (670-28589-1)	10/12/23	13:25 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
	10/16 1430				
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 10/17/23 0956	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: Raw 0.2 - COR -0.1

MB

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-28589-1

Login Number: 28589
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: 670-28589-1

Login Number: 28589 **List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**
List Number: 2 **List Creation: 10/17/23 10:20 AM**
Creator: Ballard, Megan

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 acceptable,where thermal pres is required(</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV:Container Temp acceptable,where thermal pres is required (</=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 11/22/2023 7:22:54 AM

JOB DESCRIPTION

NASA KSC MLPV - HS2

JOB NUMBER

670-30546-1

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.

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
11/22/2023 7:22:54 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: 670-30546-1
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

Job ID: 670-30546-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-30546-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 11/17/2023 10:00 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 5.2°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 - HS2

Job ID: 670-30546-1

Client Sample ID: MLPV-IW0053R-040.0-20231116 — Lab Sample ID: 670-30546-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	2.4		1.0	0.53	ug/L	1		8260D	Total/NA
Vinyl chloride	18		1.0	0.71	ug/L	1		8260D	Total/NA

Client Sample ID: MLPV-MW0111-050.0-20231116 — Lab Sample ID: 670-30546-2

No Detections.

Client Sample ID: MLPV-MW0112-052.0-20231116 — Lab Sample ID: 670-30546-3

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: MLPV-MW0113-040.0-20231116 — Lab Sample ID: 670-30546-4

No Detections.

Client Sample ID: MLPV-MW0114-040.0-20231116 — Lab Sample ID: 670-30546-5

No Detections.

Client Sample ID: MLPV-MW0115-040.0-20231116 — Lab Sample ID: 670-30546-6

No Detections.

Client Sample ID: MLPV-TB01-20231116 — Lab Sample ID: 670-30546-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0053R-040.0-20231116 Lab Sample ID: 670-30546-1

Date Collected: 11/16/23 15:20 **Matrix: Water**
Date Received: 11/17/23 10:00

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**2.4**		1.0	0.53	ug/L			11/22/23 00:42	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 00:42	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 00:42	1
Vinyl chloride	**18**		1.0	0.71	ug/L			11/22/23 00:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*11/22/23 00:42*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/22/23 00:42*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/22/23 00:42*	*1*

Client Sample ID: MLPV-MW0111-050.0-20231116 Lab Sample ID: 670-30546-2

Date Collected: 11/16/23 14:48 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 01:01	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 01:01	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 01:01	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 01:01	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*11/22/23 01:01*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/22/23 01:01*	*1*
Dibromofluoromethane (Surr)	*110*		*53 - 146*		*11/22/23 01:01*	*1*

Client Sample ID: MLPV-MW0112-052.0-20231116 Lab Sample ID: 670-30546-3

Date Collected: 11/16/23 16:40 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 01:19	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 01:19	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 01:19	1
Vinyl chloride	**2.3**		1.0	0.71	ug/L			11/22/23 01:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*11/22/23 01:19*	*1*
4-Bromofluorobenzene (Surr)	*98*		*41 - 142*		*11/22/23 01:19*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/22/23 01:19*	*1*

Client Sample ID: MLPV-MW0113-040.0-20231116 Lab Sample ID: 670-30546-4

Date Collected: 11/16/23 08:24 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 01:37	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 01:37	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 01:37	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 01:37	1

Client Sample ID: MLPV-MW0113-040.0-20231116 Lab Sample ID: 670-30546-4

Date Collected: 11/16/23 08:24 **Matrix: Water**
Date Received: 11/17/23 10:00

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*102*		*40 - 146*		*11/22/23 01:37*	*1*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*		*11/22/23 01:37*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/22/23 01:37*	*1*

Client Sample ID: MLPV-MW0114-040.0-20231116 Lab Sample ID: 670-30546-5

Date Collected: 11/16/23 09:30 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 01:55	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 01:55	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 01:55	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 01:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*105*		*40 - 146*		*11/22/23 01:55*	*1*
4-Bromofluorobenzene (Surr)	*97*		*41 - 142*		*11/22/23 01:55*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*11/22/23 01:55*	*1*

Client Sample ID: MLPV-MW0115-040.0-20231116 Lab Sample ID: 670-30546-6

Date Collected: 11/16/23 10:51 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 02:13	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 02:13	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 02:13	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 02:13	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*11/22/23 02:13*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/22/23 02:13*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/22/23 02:13*	*1*

Client Sample ID: MLPV-TB01-20231116 Lab Sample ID: 670-30546-7

Date Collected: 11/16/23 00:00 **Matrix: Water**
Date Received: 11/17/23 10:00

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			11/22/23 02:32	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 02:32	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 02:32	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 02:32	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	*100*		*40 - 146*		*11/22/23 02:32*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*11/22/23 02:32*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*11/22/23 02:32*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - HS2

Job ID: 670-30546-1

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)
670-30546-1	MLPV-IW0053R-040.0-20231116	102	99	107
670-30546-2	MLPV-MW0111-050.0-2023111 6	103	99	110
670-30546-3	MLPV-MW0112-052.0-2023111 6	103	98	107
670-30546-4	MLPV-MW0113-040.0-2023111 6	102	101	107
670-30546-5	MLPV-MW0114-040.0-2023111 6	105	97	111
670-30546-6	MLPV-MW0115-040.0-2023111 6	100	99	107
670-30546-7	MLPV-TB01-20231116	100	100	104
LB 670-63841/1-A	Method Blank	103	99	105
LCS 670-64488/4	Lab Control Sample	99	101	105
MB 670-64488/7	Method Blank	101	100	107

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: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
185-659-C-1-A MS	Matrix Spike	99	99	103
185-659-C-1-A MSD	Matrix Spike Duplicate	100	100	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: LB 670-63841/1-A
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			11/21/23 21:21	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/21/23 21:21	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/21/23 21:21	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/21/23 21:21	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*11/21/23 21:21*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/21/23 21:21*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*11/21/23 21:21*	*1*

Lab Sample ID: MB 670-64488/7
Matrix: Water
Analysis Batch: 64488

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			11/21/23 21:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/21/23 21:03	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/21/23 21:03	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/21/23 21:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*11/21/23 21:03*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*11/21/23 21:03*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/21/23 21:03*	*1*

Lab Sample ID: LCS 670-64488/4
Matrix: Water
Analysis Batch: 64488

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		105	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		95	54 - 134
Trichloroethene	20.0	22.4		ug/L		112	62 - 135
Vinyl chloride	20.0	15.0		ug/L		75	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*
Dibromofluoromethane (Surr)	*105*		*53 - 146*

Lab Sample ID: 185-659-C-1-A MS
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike
Prep Type: TCLP

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	20.4		ug/L		102	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	17.8		ug/L		89	54 - 134
Trichloroethene	0.89	U	20.0	20.1		ug/L		101	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 185-659-C-1-A MS
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Vinyl chloride	0.71	U	20.0	14.9		ug/L		74	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*103*		*53 - 146*

Lab Sample ID: 185-659-C-1-A MSD
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U	20.0	21.5		ug/L		107	56 - 128	5	17
trans-1,2-Dichloroethene	0.73	U	20.0	19.2		ug/L		96	54 - 134	7	20
Trichloroethene	0.89	U	20.0	19.8		ug/L		99	62 - 135	1	20
Vinyl chloride	0.71	U	20.0	15.0		ug/L		75	20 - 167	1	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - HS2

Job ID: 670-30546-1

GC/MS VOA

Leach Batch: 63841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 670-63841/1-A	Method Blank	Total/NA	Water	1311	
185-659-C-1-A MS	Matrix Spike	TCLP	Water	1311	
185-659-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	1311	

Analysis Batch: 64488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-30546-1	MLPV-IW0053R-040.0-20231116	Total/NA	Water	8260D	
670-30546-2	MLPV-MW0111-050.0-20231116	Total/NA	Water	8260D	
670-30546-3	MLPV-MW0112-052.0-20231116	Total/NA	Water	8260D	
670-30546-4	MLPV-MW0113-040.0-20231116	Total/NA	Water	8260D	
670-30546-5	MLPV-MW0114-040.0-20231116	Total/NA	Water	8260D	
670-30546-6	MLPV-MW0115-040.0-20231116	Total/NA	Water	8260D	
670-30546-7	MLPV-TB01-20231116	Total/NA	Water	8260D	
LB 670-63841/1-A	Method Blank	Total/NA	Water	8260D	63841
MB 670-64488/7	Method Blank	Total/NA	Water	8260D	
LCS 670-64488/4	Lab Control Sample	Total/NA	Water	8260D	
185-659-C-1-A MS	Matrix Spike	TCLP	Water	8260D	63841
185-659-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	8260D	63841

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-30546-1
Project/Site: NASA KSC MLPV - HS2

Client Sample ID: MLPV-IW0053R-040.0-20231116
Lab Sample ID: 670-30546-1
Date Collected: 11/16/23 15:20
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 00:42

Client Sample ID: MLPV-MW0111-050.0-20231116
Lab Sample ID: 670-30546-2
Date Collected: 11/16/23 14:48
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 01:01

Client Sample ID: MLPV-MW0112-052.0-20231116
Lab Sample ID: 670-30546-3
Date Collected: 11/16/23 16:40
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 01:19

Client Sample ID: MLPV-MW0113-040.0-20231116
Lab Sample ID: 670-30546-4
Date Collected: 11/16/23 08:24
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 01:37

Client Sample ID: MLPV-MW0114-040.0-20231116
Lab Sample ID: 670-30546-5
Date Collected: 11/16/23 09:30
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 01:55

Client Sample ID: MLPV-MW0115-040.0-20231116
Lab Sample ID: 670-30546-6
Date Collected: 11/16/23 10:51
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 02:13

Client Sample ID: MLPV-TB01-20231116
Lab Sample ID: 670-30546-7
Date Collected: 11/16/23 00:00
Matrix: Water
Date Received: 11/17/23 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 02:32

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: 670-30546-1
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	06-30-24

Method Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - HS2

Job ID: 670-30546-1

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.
Job ID: 670-30546-1
Project/Site: NASA KSC MLPV - HS2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-30546-1	MLPV-IW0053R-040.0-20231116	Water	11/16/23 15:20	11/17/23 10:00
670-30546-2	MLPV-MW0111-050.0-20231116	Water	11/16/23 14:48	11/17/23 10:00
670-30546-3	MLPV-MW0112-052.0-20231116	Water	11/16/23 16:40	11/17/23 10:00
670-30546-4	MLPV-MW0113-040.0-20231116	Water	11/16/23 08:24	11/17/23 10:00
670-30546-5	MLPV-MW0114-040.0-20231116	Water	11/16/23 09:30	11/17/23 10:00
670-30546-6	MLPV-MW0115-040.0-20231116	Water	11/16/23 10:51	11/17/23 10:00
670-30546-7	MLPV-TB01-20231116	Water	11/16/23 00:00	11/17/23 10:00

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CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. | Page: 1 of 2

Project Name: NASA KSC - MLPV | PO No. 1620539 | Project No. 60615493.4 | Phase:

Site Location: 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; 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 Dustin Slater 407-766-0747 | Deliver Samples To: Eurofins Orlando | Site-Spicific WS#15 from QAPP: 15-15

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-IW0053R -040.0-20231116	MLPV-IW0053R	20231116	1520	WG	N	G	3	3	
	MLPV-MW0111 -050.0-20231116	MLPV-MW0111	20231116	1448	WG	N	G	3	3	
	MLPV-MW0112 -052.0-20231116	MLPV-MW0112	20231116	1645	WG	N	G	3	3	
	MLPV-MW0113 -040.0-20231116	MLPV-MW0113	20231116	0824	WG	N	G	3	3	
	MLPV-MW0114 -040.0-20231116	MLPV-MW0114	20231116	0930	WG	N	G	3	3	
	MLPV-MW0115-040.0-20231116	MLPV-MW0115	20231116	1051	WG	N	G	3	3	
	MLPV-MW0116	MLPV-MW0116	202311		WG	N	G	3	3	
	MLPV-TB01	MLPV-TB01	202311		WQ	TB	G	2	2	

670-30546 Chain of Custody

***Field* Comments:** Report only per QAPP WS #15-15

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1			1	11/13/23	0700
2	11/17/23	1006	2	11/17	1006
3			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**

5.4/5.2

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-30546-1

Login Number: 30546

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 11/30/2023 3:02:39 PM

JOB DESCRIPTION

NASA KSC MLPV - Former HS2

JOB NUMBER

670-30643-1

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.

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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11/30/2023 3:02:39 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: 670-30643-1
Project/Site: NASA KSC MLPV - Former 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

Job ID: 670-30643-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-30643-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 11/20/2023 2:08 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 0.4°C

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MLPV-IW0033-045.0-20231120 (670-30643-1). 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: 670-30643-1
Project/Site: NASA KSC MLPV - Former HS2

Client Sample ID: MLPV-IW0033-045.0-20231120
Lab Sample ID: 670-30643-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene - DL	46		10	5.3	ug/L	10		8260D	Total/NA
Vinyl chloride - DL	700		10	7.1	ug/L	10		8260D	Total/NA

Client Sample ID: MLPV-TB01-20231120
Lab Sample ID: 670-30643-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MLPV-IW0033-045.0-20231120 Lab Sample ID: 670-30643-1

Date Collected: 11/20/23 12:17 **Matrix: Water**
Date Received: 11/20/23 14:08

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	**46**		10	5.3	ug/L			11/30/23 12:38	10
trans-1,2-Dichloroethene	7.3	U	10	7.3	ug/L			11/30/23 12:38	10
Vinyl chloride	**700**		10	7.1	ug/L			11/30/23 12:38	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*11/30/23 12:38*	*10*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*11/30/23 12:38*	*10*
Dibromofluoromethane (Surr)	*108*		*53 - 146*		*11/30/23 12:38*	*10*

Client Sample ID: MLPV-TB01-20231120 Lab Sample ID: 670-30643-2

Date Collected: 11/20/23 11:00 **Matrix: Water**
Date Received: 11/20/23 14:08

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			11/29/23 16:37	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/29/23 16:37	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/29/23 16:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*106*		*40 - 146*		*11/29/23 16:37*	*1*
4-Bromofluorobenzene (Surr)	*106*		*41 - 142*		*11/29/23 16:37*	*1*
Dibromofluoromethane (Surr)	*113*		*53 - 146*		*11/29/23 16:37*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - Former HS2

Job ID: 670-30643-1

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)
670-30643-1 - DL	MLPV-IW0033-045.0-20231120	100	102	108
670-30643-2	MLPV-TB01-20231120	106	106	113
670-30757-F-1 MS	Matrix Spike	100	100	102
670-30757-F-1 MSD	Matrix Spike Duplicate	101	101	106
680-243153-I-25 MS - DL	Matrix Spike	101	101	102
680-243153-I-25 MSD - DL	Matrix Spike Duplicate	100	103	103
LCS 670-65215/6	Lab Control Sample	103	106	101
LCS 670-65412/4	Lab Control Sample	97	103	101
MB 670-65215/9	Method Blank	108	109	110
MB 670-65412/7	Method Blank	100	99	108

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 670-65215/9
Matrix: Water
Analysis Batch: 65215

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			11/29/23 13:06	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/29/23 13:06	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/29/23 13:06	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*108*		*40 - 146*		*11/29/23 13:06*	*1*
4-Bromofluorobenzene (Surr)	*109*		*41 - 142*		*11/29/23 13:06*	*1*
Dibromofluoromethane (Surr)	*110*		*53 - 146*		*11/29/23 13:06*	*1*

Lab Sample ID: LCS 670-65215/6
Matrix: Water
Analysis Batch: 65215

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	18.7		ug/L		93	56 - 128
trans-1,2-Dichloroethene	20.0	16.4		ug/L		82	54 - 134
Vinyl chloride	20.0	15.0		ug/L		75	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*103*		*40 - 146*
4-Bromofluorobenzene (Surr)	*106*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

Lab Sample ID: MB 670-65412/7
Matrix: Water
Analysis Batch: 65412

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			11/30/23 11:30	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/30/23 11:30	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/30/23 11:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*100*		*40 - 146*		*11/30/23 11:30*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/30/23 11:30*	*1*
Dibromofluoromethane (Surr)	*108*		*53 - 146*		*11/30/23 11:30*	*1*

Lab Sample ID: LCS 670-65412/4
Matrix: Water
Analysis Batch: 65412

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	18.7		ug/L		93	54 - 134
Vinyl chloride	20.0	22.0		ug/L		110	20 - 167

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 670-65412/4
Matrix: Water
Analysis Batch: 65412

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	*97*		*40 - 146*
4-Bromofluorobenzene (Surr)	*103*		*41 - 142*
Dibromofluoromethane (Surr)	*101*		*53 - 146*

Lab Sample ID: 670-30757-F-1 MS
Matrix: Water
Analysis Batch: 65412

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		105	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	19.4		ug/L		97	54 - 134
Vinyl chloride	0.71	U	20.0	22.2		ug/L		111	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*
Dibromofluoromethane (Surr)	*102*		*53 - 146*

Lab Sample ID: 670-30757-F-1 MSD
Matrix: Water
Analysis Batch: 65412

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
cis-1,2-Dichloroethene	0.53	U	20.0	22.1		ug/L		111	56 - 128	6	17
trans-1,2-Dichloroethene	0.73	U	20.0	19.8		ug/L		99	54 - 134	2	20
Vinyl chloride	0.71	U	20.0	23.1		ug/L		115	20 - 167	4	24

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr)	*101*		*40 - 146*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*
Dibromofluoromethane (Surr)	*106*		*53 - 146*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Lab Sample ID: 680-243153-I-25 MS
Matrix: Water
Analysis Batch: 65215

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	5700		10000	15400		ug/L		97	56 - 128
trans-1,2-Dichloroethene - DL	370	U	10000	9510		ug/L		95	54 - 134
Vinyl chloride - DL	360	U	10000	8030		ug/L		80	20 - 167

Surrogate	MS %Recovery	MS Qualifier	Limits
Toluene-d8 (Surr) - DL	*101*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*101*		*41 - 142*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL (Continued)

Lab Sample ID: 680-243153-I-25 MS
Matrix: Water
Analysis Batch: 65215

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Surrogate	MS %Recovery	MS Qualifier	Limits
Dibromofluoromethane (Surr) - DL	*102*		*53 - 146*

Lab Sample ID: 680-243153-I-25 MSD
Matrix: Water
Analysis Batch: 65215

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
cis-1,2-Dichloroethene - DL	5700		10000	15800		ug/L		101	56 - 128	3	17
trans-1,2-Dichloroethene - DL	370	U	10000	9530		ug/L		95	54 - 134	0	20
Vinyl chloride - DL	360	U	10000	7830		ug/L		78	20 - 167	2	24

Surrogate	MSD %Recovery	MSD Qualifier	Limits
Toluene-d8 (Surr) - DL	*100*		*40 - 146*
4-Bromofluorobenzene (Surr) - DL	*103*		*41 - 142*
Dibromofluoromethane (Surr) - DL	*103*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Job ID: 670-30643-1
Project/Site: NASA KSC MLPV - Former HS2

GC/MS VOA

Analysis Batch: 65215

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-30643-2	MLPV-TB01-20231120	Total/NA	Water	8260D	
MB 670-65215/9	Method Blank	Total/NA	Water	8260D	
LCS 670-65215/6	Lab Control Sample	Total/NA	Water	8260D	
680-243153-I-25 MS - DL	Matrix Spike	Total/NA	Water	8260D	
680-243153-I-25 MSD - DL	Matrix Spike Duplicate	Total/NA	Water	8260D	

Analysis Batch: 65412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-30643-1 - DL	MLPV-IW0033-045.0-20231120	Total/NA	Water	8260D	
MB 670-65412/7	Method Blank	Total/NA	Water	8260D	
LCS 670-65412/4	Lab Control Sample	Total/NA	Water	8260D	
670-30757-F-1 MS	Matrix Spike	Total/NA	Water	8260D	
670-30757-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260D	

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-30643-1
Project/Site: NASA KSC MLPV - Former HS2

Client Sample ID: MLPV-IW0033-045.0-20231120
Lab Sample ID: 670-30643-1

Date Collected: 11/20/23 12:17
Matrix: Water
Date Received: 11/20/23 14:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	DL	10	65412	AAM	EET ORL	11/30/23 12:38

Client Sample ID: MLPV-TB01-20231120
Lab Sample ID: 670-30643-2

Date Collected: 11/20/23 11:00
Matrix: Water
Date Received: 11/20/23 14:08

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	65215	AAM	EET ORL	11/29/23 16:37

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: 670-30643-1
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

Method Summary

Client: AECOM Technical Services Inc.
Job ID: 670-30643-1
Project/Site: NASA KSC MLPV - Former HS2

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: 670-30643-1
Project/Site: NASA KSC MLPV - Former HS2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-30643-1	MLPV-IW0033-045.0-20231120	Water	11/20/23 12:17	11/20/23 14:08
670-30643-2	MLPV-TB01-20231120	Water	11/20/23 11:00	11/20/23 14:08

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of	
Site Location:	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 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:		

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-IW0033-0[illegible]-20231120	MLPV-IW0033	20231120	1217	WG	N	G	3	3	
	MLPV-TB01-20231120	MLPV-TB01	20231120	1100	WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	

670-30643 Chain of Custody

***Field* Comments:** Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details

Number of coolers in shipment:

	Relinquished by (signature)	Date	Time
1	[signature]	11/20/23	1405
2			
3			

	Received by (signature)	Date	Time
1	[signature]	11-20-23	1408
2			
3			

Samples Iced?(check) Yes ✓ No____ 0.6 10.4

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**

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

eurofins

Project Name: NASA KSC - MLPV		COC No.	Page: 1 of
Site Location:		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 #	Caroline Bekins 714-943-9928 Devin Kehoe 919-943-3797	Deliver Samples To:	
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-IW0033-045.0-20231120	MLPV-IW0033	20231120	1217	WG	N	G	3	3	
	MLPV-TB01-20231120	MLPV-TB01	20231120	1100	WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	
					WG	N	G	3	3	

670-30643 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-14

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

	Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1		11/20/23	1405		11-20-23	1408
2						
3						

Samples Iced?(check) Yes ✓ No ____ 0.6 10.4
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: 670-30643-1

Login Number: 30643

List Source: Eurofins Orlando

List Number: 1

Creator: Lavardera, Angelina

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 12/14/2023 4:04:45 PM Revision 1

JOB DESCRIPTION

NASA KSC MLPV - HS3 OFW

JOB NUMBER

670-30548-1

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs FL 32701

See page two for job notes and contact information.

myEOL

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



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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 - HS3 OFW

Job ID: 670-30548-1

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: 670-30548-1

Laboratory: Eurofins Orlando

Narrative

Job Narrative
670-30548-1

REVISION

The report being provided is a revision of the original report sent on 11/30/2023. The report (revision 1) is being revised due to update of Sample IDs to match chain of custody..

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 11/17/2023 10:06 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 6.0°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 - HS3 OFW

Job ID: 670-30548-1

Client Sample ID: VABRA-MW0011-030.0-20231116 — Lab Sample ID: 670-30548-1

No Detections.

Client Sample ID: VABRA-MW0012-020.0-20231116 — Lab Sample ID: 670-30548-2

No Detections.

Client Sample ID: MLPV-TB03-20231116 — Lab Sample ID: 670-30548-3

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: VABRA-MW0011-030.0-20231116

Lab Sample ID: 670-30548-1

Date Collected: 11/16/23 11:52
Matrix: Water
Date Received: 11/17/23 10:06

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			11/22/23 02:50	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 02:50	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 02:50	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 02:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*11/22/23 02:50*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*11/22/23 02:50*	*1*
Dibromofluoromethane (Surr)	*104*		*53 - 146*		*11/22/23 02:50*	*1*

Client Sample ID: VABRA-MW0012-020.0-20231116

Lab Sample ID: 670-30548-2

Date Collected: 11/16/23 12:48
Matrix: Water
Date Received: 11/17/23 10:06

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			11/22/23 03:08	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 03:08	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 03:08	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 03:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*102*		*40 - 146*		*11/22/23 03:08*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/22/23 03:08*	*1*
Dibromofluoromethane (Surr)	*111*		*53 - 146*		*11/22/23 03:08*	*1*

Client Sample ID: MLPV-TB03-20231116

Lab Sample ID: 670-30548-3

Date Collected: 11/16/23 11:00
Matrix: Water
Date Received: 11/17/23 10:06

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			11/22/23 03:26	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/22/23 03:26	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/22/23 03:26	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/22/23 03:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*11/22/23 03:26*	*1*
4-Bromofluorobenzene (Surr)	*102*		*41 - 142*		*11/22/23 03:26*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*11/22/23 03:26*	*1*

Surrogate Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - HS3 OFW

Job ID: 670-30548-1

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)
670-30548-1	VABRA-MW0011-030.0-2023111	101	100	104
670-30548-2	VABRA-MW0012-020.0-20231116	102	99	111
670-30548-3	MLPV-TB03-20231116	101	102	105
LB 670-63841/1-A	Method Blank	103	99	105
LCS 670-64488/4	Lab Control Sample	99	101	105
MB 670-64488/7	Method Blank	101	100	107

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: TCLP**

		Percent Surrogate Recovery (Acceptance Limits)		
		TOL	BFB	DBFM
Lab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)
185-659-C-1-A MS	Matrix Spike	99	99	103
185-659-C-1-A MSD	Matrix Spike Duplicate	100	100	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: LB 670-63841/1-A
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			11/21/23 21:21	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/21/23 21:21	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/21/23 21:21	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/21/23 21:21	1

Surrogate	*LB %Recovery*	*LB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*103*		*40 - 146*		*11/21/23 21:21*	*1*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*		*11/21/23 21:21*	*1*
Dibromofluoromethane (Surr)	*105*		*53 - 146*		*11/21/23 21:21*	*1*

Lab Sample ID: MB 670-64488/7
Matrix: Water
Analysis Batch: 64488

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			11/21/23 21:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			11/21/23 21:03	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			11/21/23 21:03	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			11/21/23 21:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*101*		*40 - 146*		*11/21/23 21:03*	*1*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*		*11/21/23 21:03*	*1*
Dibromofluoromethane (Surr)	*107*		*53 - 146*		*11/21/23 21:03*	*1*

Lab Sample ID: LCS 670-64488/4
Matrix: Water
Analysis Batch: 64488

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		105	56 - 128
trans-1,2-Dichloroethene	20.0	18.9		ug/L		95	54 - 134
Trichloroethene	20.0	22.4		ug/L		112	62 - 135
Vinyl chloride	20.0	15.0		ug/L		75	20 - 167

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*101*		*41 - 142*
Dibromofluoromethane (Surr)	*105*		*53 - 146*

Lab Sample ID: 185-659-C-1-A MS
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike
Prep Type: TCLP

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	20.4		ug/L		102	56 - 128
trans-1,2-Dichloroethene	0.73	U	20.0	17.8		ug/L		89	54 - 134
Trichloroethene	0.89	U	20.0	20.1		ug/L		101	62 - 135

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 185-659-C-1-A MS
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Vinyl chloride	0.71	U	20.0	14.9		ug/L		74	20 - 167		

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*40 - 146*
4-Bromofluorobenzene (Surr)	*99*		*41 - 142*
Dibromofluoromethane (Surr)	*103*		*53 - 146*

Lab Sample ID: 185-659-C-1-A MSD
Matrix: Water
Analysis Batch: 64488

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	0.53	U	20.0	21.5		ug/L		107	56 - 128	5	17
trans-1,2-Dichloroethene	0.73	U	20.0	19.2		ug/L		96	54 - 134	7	20
Trichloroethene	0.89	U	20.0	19.8		ug/L		99	62 - 135	1	20
Vinyl chloride	0.71	U	20.0	15.0		ug/L		75	20 - 167	1	24

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*100*		*40 - 146*
4-Bromofluorobenzene (Surr)	*100*		*41 - 142*
Dibromofluoromethane (Surr)	*100*		*53 - 146*

QC Association Summary

Client: AECOM Technical Services Inc.
Project/Site: NASA KSC MLPV - HS3 OFW

Job ID: 670-30548-1

GC/MS VOA

Leach Batch: 63841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 670-63841/1-A	Method Blank	Total/NA	Water	1311	
185-659-C-1-A MS	Matrix Spike	TCLP	Water	1311	
185-659-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	1311	

Analysis Batch: 64488

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-30548-1	VABRA-MW0011-030.0-20231116	Total/NA	Water	8260D	
670-30548-2	VABRA-MW0012-020.0-20231116	Total/NA	Water	8260D	
670-30548-3	MLPV-TB03-20231116	Total/NA	Water	8260D	
LB 670-63841/1-A	Method Blank	Total/NA	Water	8260D	63841
MB 670-64488/7	Method Blank	Total/NA	Water	8260D	
LCS 670-64488/4	Lab Control Sample	Total/NA	Water	8260D	
185-659-C-1-A MS	Matrix Spike	TCLP	Water	8260D	63841
185-659-C-1-A MSD	Matrix Spike Duplicate	TCLP	Water	8260D	63841

Lab Chronicle

Client: AECOM Technical Services Inc.
Job ID: 670-30548-1
Project/Site: NASA KSC MLPV - HS3 OFW

Client Sample ID: VABRA-MW0011-030.0-20231116
Lab Sample ID: 670-30548-1
Date Collected: 11/16/23 11:52
Matrix: Water
Date Received: 11/17/23 10:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 02:50

Client Sample ID: VABRA-MW0012-020.0-20231116
Lab Sample ID: 670-30548-2
Date Collected: 11/16/23 12:48
Matrix: Water
Date Received: 11/17/23 10:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 03:08

Client Sample ID: MLPV-TB03-20231116
Lab Sample ID: 670-30548-3
Date Collected: 11/16/23 11:00
Matrix: Water
Date Received: 11/17/23 10:06

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	64488	AAM	EET ORL	11/22/23 03:26

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: 670-30548-1
Project/Site: NASA KSC MLPV - HS3 OFW

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.
Project/Site: NASA KSC MLPV - HS3 OFW

Job ID: 670-30548-1

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 - HS3 OFW

Job ID: 670-30548-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-30548-1	VABRA-MW0011-030.0-20231116	Water	11/16/23 11:52	11/17/23 10:06
670-30548-2	VABRA-MW0012-020.0-20231116	Water	11/16/23 12:48	11/17/23 10:06
670-30548-3	MLPV-TB03-20231116	Water	11/16/23 11:00	11/17/23 10:06

eurofins

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

Project Name: NASA KSC - MLPV	COC No.	Page: 1 of 1	
Site Location: Hot Spot 3 OFW	PO No. 1621517	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 / Dustin Slater 407-766-0747	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: 15-15

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
	VABRA-MW0011 - 030.0-20231116	VABRA-MW0011	20231116	1152	WG	N	G	3	3	
	VABRA-MW0012 - 020.0-20231116	VABRA-MW0012	20231116	1248	WG	N	G	3	3	
	MLPV-TB03-20231116	MLPV-TB03	20231116	1100	WQ	N	G	2	2	

670-30548 Chain of Custody

***Field* Comments:**
Report only per QAPP WS #15-15

***Lab* Comments:**

Sample Shipment and Delivery Details
Number of coolers in shipment:

Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time
1			1	11/13/23	0750
2	11/17/23	1000	2	11/17	1006
3			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**

6, 2/6.0

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-30548-1

Login Number: 30548
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	

APPENDIX L

RIS COMPLETION TICKETS

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Data Checker

Completion Ticket

On 2/20/2024 at 4:14 PM the following files were submitted to Tetra Tech

COMPLETION_AECOM_MLPV_Oct2023_20240220.txt

LITHOLOGY_AECOM_MLPV_Oct2023_20240220.txt

LOCATION_AECOM_MLPV_Oct2023_20240220.txt

PROJECT_AECOM_MLPV_Oct2023_20240220.txt

RESULT_AECOM_MLPV_Oct2023_20240220.txt

SAMPLE_AECOM_MLPV_Oct2023_20240220.txt

WATER_AECOM_MLPV_Oct2023_20240220.txt

The following comment was provided with this submission:
MLPV Hot Spot 2, Hot Spot 3 and BioSparge Area Groundwater Sampling Oct2023

If you need to identify this session at a later date you may use the Ticket Key:

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Completion Ticket

On 10/16/2024 at 11:22 AM the following files were submitted to Tetra Tech

COMPLETION_AECOM-MLPV-VAB_Nov2023_20241016.txt

LITHOLOGY_AECOM-MLPV-VAB_Nov2023_20241016.txt

LOCATION_AECOM-MLPV-VAB_Nov2023_20241016.txt

PROJECT_AECOM-MLPV-VAB_Nov2023_20241016.txt

RESULT_AECOM-MLPV-VAB_Nov2023_20241016.txt

SAMPLE_AECOM-MLPV-VAB_Nov2023_20241016.txt

WATER_AECOM-MLPV-VAB_Nov2023_20241016.txt

The following comment was provided with this submission:
AECOM - MLPV VAB HotSpot2 and HotSpot3 GW Sampling November 2023

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F:\TetraTechExternalClients\ProtectedData\Repository\20241016_4739085742_kedd_AECOM\

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APPENDIX M

WATER LEVEL LOGS

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Date: 7/13/2023

MLPV Water Level Log					
Hot Spot 2 (Air Sparge System Area)					
Well ID	**Diam.**	**Sl.**	**Time**	**Depth (ft btoc/North)**	**Notes**
MLPV-IW0030	1	55-65		-	PVC stickup- in flooded swale with tall overgrowth
MLPV-IW0032	0.75	30-40	1551	-	wells submerged- need to be retrofitted- raise and install well pads
MLPV-IW0033	0.75	40-50	1551	-	
MLPV-IW0034	0.75	30-40	1535	3.16	
MLPV-IW0035	0.75	40-50	1538	3.38	
MLPV-IW0036	0.75	40-45	1345	3.07	
MLPV-IW0037	0.75	40-50	1457	3.84	
MLPV-IW0011I	2	35-40	1455	3.8	
MLPV-IW0038	0.75	30-40	1505	1.45	wells need to be retrofitted- raise well pads
MLPV-IW0039	0.75	40-50	1507	1.35	
MLPV-IW0040	0.75	30-40	1545	3.21	
MLPV-IW0041	0.75	40-50	1548	3.31	
MLPV-IW0042	0.75	30-40	1535	0.76	
MLPV-IW0043	0.75	40-50	1530	0.75	
MLPV-IW0044	0.75	40-50	1530	-	could not locate- need to re-drill
MLPV-IW0045	0.75	40-50	1610	1.03	
MLPV-IW0009D	1	45 - 50	1745	2	
MLPV-IW0009I	2	28 - 33	1447	2.04	
MLPV-IW0053	1	35 - 45		-	noted as destroyed- need to re-install
MLPV-MW0092	1	47-57	1450	3.43	
MLPV-MW0091	1	47-57	1600	3.89	
MLPV-IW0017I	2	35 - 40	1405	3.44	
MLPV-IW0014I	2	35 - 40	1335	2.38	
MLPV-SAMW0001	0.75	43 - 48	1400	2.2	
MLPV-SAMW0002	0.75	43 - 48	1355	2.57	
MLPV-SAMW0003	0.75	43 - 48	1340	2.61	
MLPV-SAMW0004I	1	35-40	1337	2.75	
MLPV-SAMW0004D	1	45-50	1330	2.72	
MLPV-SAMW0005I	1	35-40	1410	3.8	
MLPV-MW0088	1	35-45	1420	4.25	
MLPV-MW0090	1	47-57	1435	-	can not locate- possibly covered by staging equipment
MLPV-MW0093	1	35-45	1433	2.78	
MLPV-IW0012D	2	45 - 50	1435	2.81	
MLPV-IW0012I	2	35 - 40	1335	2.81	
MLPV-MW0087	1	47-57	1415	3.21	
MLPV-MW0089	1	35-45	1458	4.25	
MLPV-MW0086	1	15-25	1514	2.84	
Hot Spot 3 (OFW Area)					
Well ID	**Diam.**	**Sl.**	**Time**	**Depth (ft btoc/North)**	**Notes**
VABRA-MW0011	0.75	25-30	1555	2.52	
VABRA-MW0012	0.75	15-25	1557	2.48	
VABRA-MW0013	0.75	20-25	1610	2.09	
VABRA-MW0014	0.75	25-30	1546	2.51	

Date: 7/13/2023

MLPV Water Level Log					
Biosparge Area					
Well ID	**Diam.**	**Sl.**	**Time**	**Depth (ft btoc/North)**	**Notes**
MLPV-IW0057	0.75	40-50	944	4.16	
MLPV-IW0058	0.75	45-50	940	4.07	
MLPV-IW0059	0.75	45-50	938	4.56	
MLPV-IW0060	0.75	40-50	925	0.72	
MLPV-IW0027D	2	45 - 50	934	1.07	
MLPV-IW0027I	2	28 - 33	932	1.79	
MLPV-ASMW0001	1	35-40	944	-	could not locate- buried/under gravel
MLPV-ASMW0002	1	35-40	947	4.65	
MLPV-ASMW0003	1	35-40	940	5.07	
MLPV-ASMW0004	1	35-40	921	0.82	
MLPV-ASMW0005	1	35-40	923	1.37	
MLPV-ASMW0006	1	35-40	926	0.63	
MLPV-IW0061	0.75	35-40	1010	4.51	
MLPV-IW0062	0.75	40-45	1012	4.55	
MLPV-IW0063	0.75	35-40	847	2.53	
MLPV-IW0064	0.75	40-45	849	2.37	
MLPV-IW0028D	2	45 - 50	835	1.84	need to raise well pad/manhole cover
MLPV-IW0028I	2	28 - 33	827	1.51	
MLPV-IW0046	1	35 - 45	840	2.26	
MLPV-IW0031	1	25-35	845	1.44	
MLPV-IW0001S	2	2- 12	850	-	obstruction at 1.25'
MLPV-IW0001D	2	50 - 55	852	3.19	
MLPV-IW0001I	2	28-33	854	3.24	
MLPV-IW0006IR	2	28 - 33	918	1.65	
MLPV-MW0094	1	35-45	826	4.54	
MLPV-MW0095	1	25-35	828	4.97	
MLPV-MW0096	1	35-45	1017	5.17	
MLPV-MW0097	1	35-45	1040	4.84	
MLPV-IW0047	2	35 - 45	1030	4.06	
MLPV-IW0002IR	1	28 - 33	1015	5.00	
MLPV-MW0102	1	25-35	805	0.33	
MLPV-MW0103	1	35-45	803	TOC	water level at top of casing
MLPV-MW0104	1	47-57	800	TOC	water level at top of casing
MLPV-MW0105	1	47-57	813	0.72	
MLPV-MW0106	1	25-35	811	1.47	
MLPV-MW0107	1	35-45	809	1.44	
MLPV-MW0108	1	35-45	936	2.8	
MLPV-MW0098	1	20-30	1102	4.02	
MLPV-IW0029D	2	42 - 47	1110	3.91	
MLPV-MW0099	1	40-50	1105	3.32	
MLPV-IW0054	1	40 - 50	1103	4.33	
MLPV-IW0048	11	40 - 50	1112	2.93	
OPF3-IW0006S	0.75	10-20	1120	3.11	

Date: 7/13/2023

MLPV Water Level Log					
VAB Area					
Well ID	Diam.	Sl.	Time	Depth (ft btoc/North)	Notes
MLPV-IW0055	1	40 - 50	1244	4.81	
MLPV-MW0101	1	40-50	1253	5.56	
MLPV-IW0022D	2	48 - 53	1350	5.37	
MLPV-IW0049	1	38 - 48	1352	5.14	
MLPV-IW0018D	2	50 - 55	1307	5.93	
MLPV-IW0020D	2	45 - 50	1443	5.44	
MLPV-IW0056	1	30 - 40	1500	-	badge does not work to enter gate
MLPV-IW0050	1	40 - 50	923	4.6	
MLPV-IW0051	1	45 - 55	936	3.88	
MLPV-IW0052	1	40 - 50	1456	4.55	
VABU-IW0004S	2	3-13	925	3.81	
MLPV-MW0110	1	1-11	1416	2.95	
MLPV-MW0109	1	20-30	1410	3.97	
MLPV-MW0076	1	47-57	837	4.46	
MLPV-MW0077	1	25-35	839	4.21	
MLPV-MW0078	1	25-35	835	4.26	
MLPV-MW0079	1	25-35	830	4.39	
MLPV-MW0080	1	47-57	827	4.45	
MLPV-MW0081	1	25-35	808	4.51	
MLPV-MW0082	1	35-45	803	4.54	
MLPV-MW0083	1	47-57	806	4.61	
MLPV-MW0084	1	47-57	902	5.06	
MLPV-MW0085	1	47-57	910	5.39	
PCCA-MW0004	1	5-15	1106	4.31	
PCCA-MW0007	1	5-15	1112	5.56	
PCCA-MW0008	1	5-15	1123	4.78	
PCCA-MW0009	1	5-15	1102	3.61	
PCCA-MW0010	1	5-15	1208	3.55	
PCCA-MW0011	1	5-15	1155	3.31	
PCCA-MW0012	1	5-15	1202	3.48	
PCCA-MW0013	1	5-15	1146	2.45	
PCCA-MW0014	1	5-15	1120	3.30	
PCCA-MW0015	1	15-25	1113	4.22	
PCCA-MW0016	1	15-25	1127	3.66	
PCCA-MW0017	1	15-25	1100	3.84	
PCCA-MW0018	1	15-25	1154	3.81	
PCCA-MW0019	1	15-25	1145	3.18	
PCCA-MW0020	1	25-35	1128	3.70	
PRES-IW0001SR	1	6-16	955	6.06	
PRES-IW0002D	2	42-47	1012	-	could not locate- buried or destroyed
PRES-IW0006S	2	3-13	1700	4.10	
PRES-IW0007S	2	1-11	1012	-	could not locate- possibly destroyed
PRES-IW0007I	2	32 - 37	1711	3.37	
PRES-IW0007D	2	42 - 47	1710	3.38	
PRES-IW0008I	2	38 - 42	1719	4.42	
PRES-IW0009	1	40 - 50	1010	3.39	
PRES-IW0010	1	40 - 50	1022	0.91	
SATV-IW0003D	-	40 - 45	Abandoned		
SATV-IW0004I	-	25 - 30	Abandoned		
SATV-IW0009I	2	22 - 27	831	4.36	
SATV-IW0010	1	35 - 45	804	4.43	
TPF-MW0001	0.75	23 - 28			
VAB-IW0005D	2	52 - 57	915	3.46	aka MLPV-VAB-IW0005D
VABU-IW0006D	2	42 - 47	928	4.01	
VABU-IW0001I	2	20 - 30	1236	5.56	

Date: 7/13/2023

MLPV Water Level Log					
West Crawler Park					
Well ID	**Diam.**	**Sl.**	**Time**	**Depth (ft btoc/North)**	**Notes**
MLPV-MW0100	1	15-25	1155	2.98	
WCPS-IW0001SR	1	2.5-12.5	1200	2.34	
WCPS-IW0002SRR	1	3 - 13	1145	3.56	
WCPS-IW0005S	2	2-12	1205	2.90	
WCPS-IW0006S	2	3-13	1150	3.15	
WCPS-IW0009S	2	2.5-12.5	1145	3.12	Another 2" well approx 5' west
WCPS-IW0010S	2	2.5-12.5	1150	3.49	
WCPS-IW0012S	1	2-12	1210	-	could not locate
WCPS-IW0013S	1	2.5-12.5	1155	2.97	
WCPS-IW0014S	2	4-14	1132	-	under a car
WCPS-IW0015S	2	3-13	1203	-	could not locate
WCPS-IW0016	1	15-25	1210	2.86	

DTW Log 10/11/2023

Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 059

System Monitored	Location	Screen Interval (feet bls)	DTW (ft)	Time
Biosparge Area	MLPV-IW0006IR	28 to 33	1.63	0958
	MLPV-IW0028I	28 to 33	1.46	1009
	MLPV-IW0046	35 to 45	2.23	1011
	MLPV-IW0057	40 to 50	4.18	0840
	MLPV-IW0058	45 to 50	4.11	0841
	MLPV-IW0059	45 to 50	4.31	0843
	MLPV-IW0060	40 to 50	0.34	0946
	MLPV-ASMW0004	35 to 40	0.81	0956
	MLPV-ASMW0005	35 to 40	1.34	0952
	MLPV-ASMW0006	35 to 40	0.34	0946
	MLPV-IW0031	25 to 35	1.41	1007
	MLPV-IW0061	35 to 40	4.5	0847
	MLPV-IW0062	40 to 45	4.49	0846
	MLPV-IW0063	35 to 40	2.51	1002
	MLPV-IW0064	40 to 45	2.34	1002
	MLPV-MW0102	25 to 35	0.51	1139
	MLPV-MW0103	35 to 45	0.43	1139
	MLPV-MW0107	35 to 45	1.4	1142

DTW Log 10/11/2023

Mobile Launch Platform (MLP) Rehabilitation Sites / Vehicle Assembly Building (VAB) Area, SWMU 059

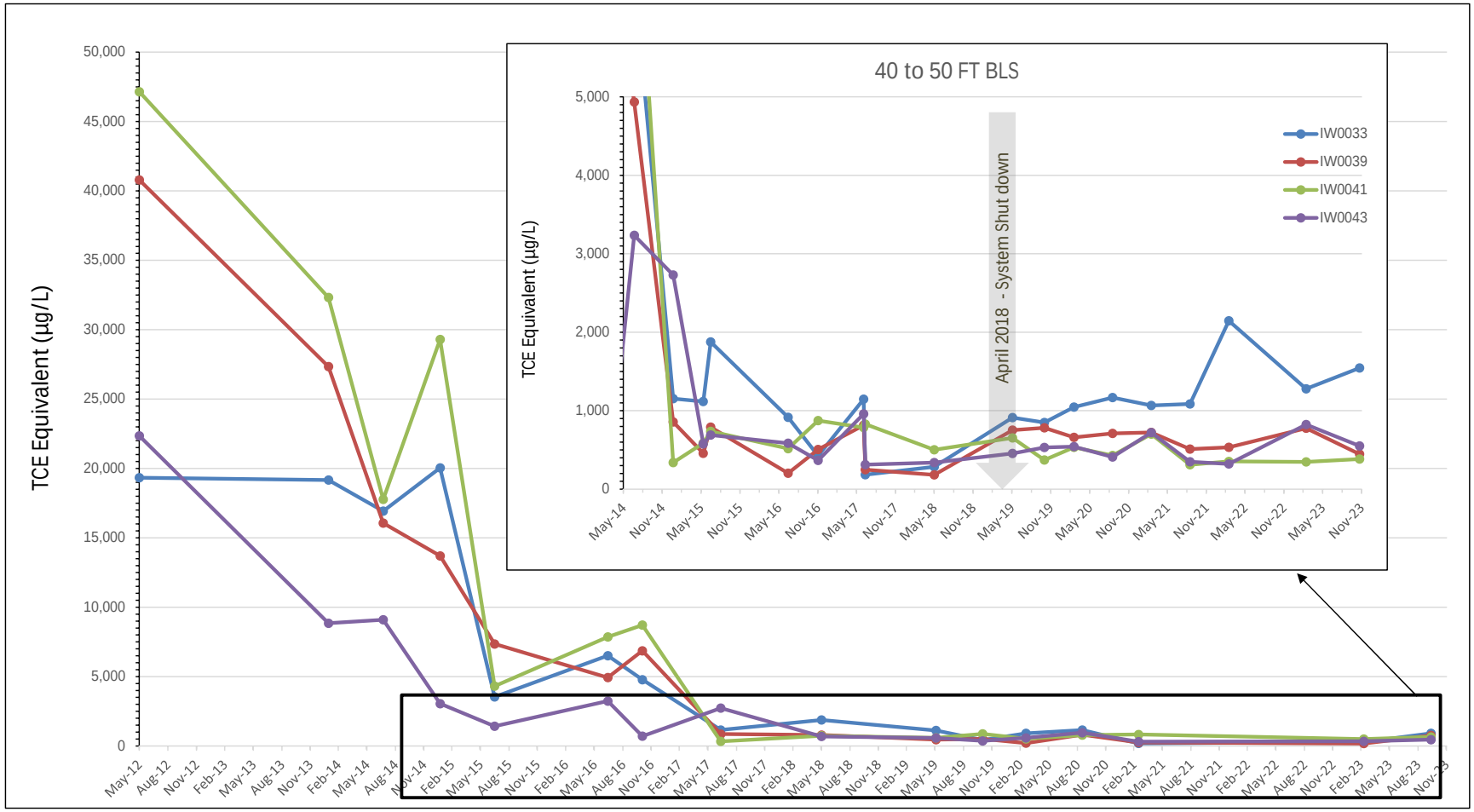
System Monitored	Location	Screen Interval (feet bls)	DTW (ft)	Time
Former Hot Spot 2 (Air Sparge Area)	MLPV-IW0011I	35 to 40	4.03	0822
	MLPV-IW0033	40 to 50	1.47	0811
	MLPV-IW0034	30 to 40	3.46	0803
	MLPV-IW0035	40 to 50	3.53	0803
	MLPV-IW0036	40 to 45	3.31	0917
	MLPV-IW0037	40 to 50	4.02	0821
	MLPV-IW0039	40 to 50	2.51	0818
	MLPV-IW0041	40 to 50	3.51	0809
	MLPV-IW0043	40 to 50	0.96	0815
	MLPV-IW0044	40 to 50	0.00	0832
	MLPV-IW0045	40 to 50	1.00	0826
	MLPV-SAMW0004I	35 to 40	3.00	0916
	MLPV-SAMW0004D	45 to 50	2.97	0916
Hot Spot 3 OFW Area	VABRA-MW0011	25 to 35	2.03	0901
	VABRA-MW0012	15 to 25	2.05	0901
	VABRA-MW0013	20 to 25	1.59	0905
	VABRA-MW0014	25 to 30	2.17	0903

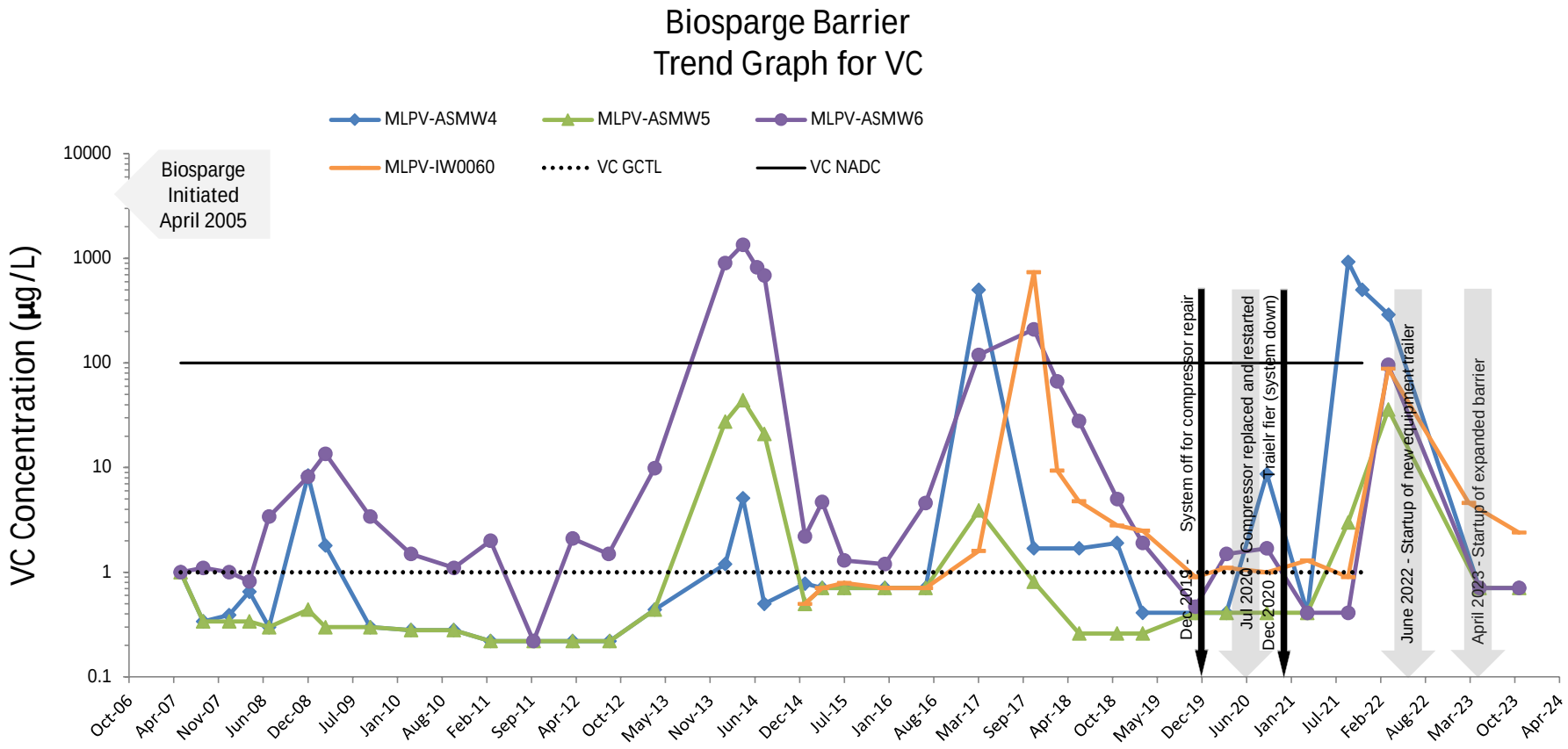
APPENDIX N

TREND CHARTS

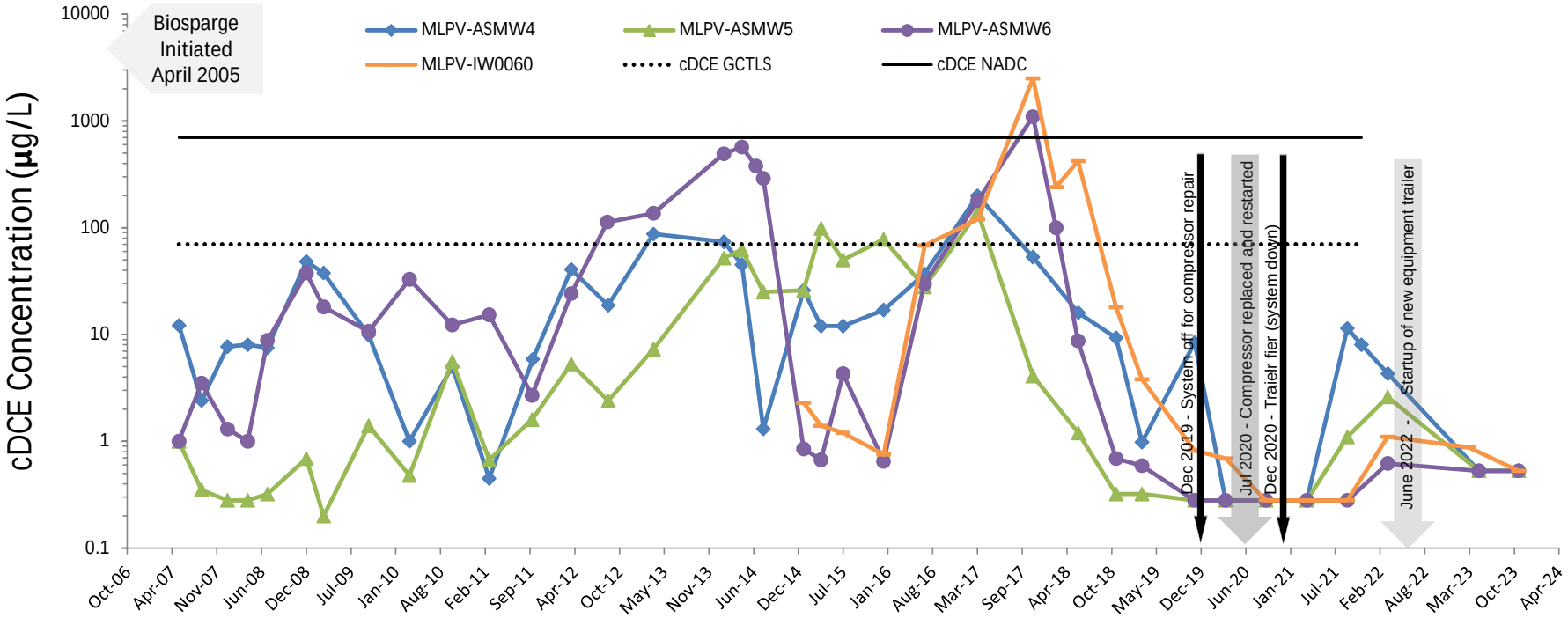
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Former Hot Spot 2 (Air Sparge Area)
Trend Chart

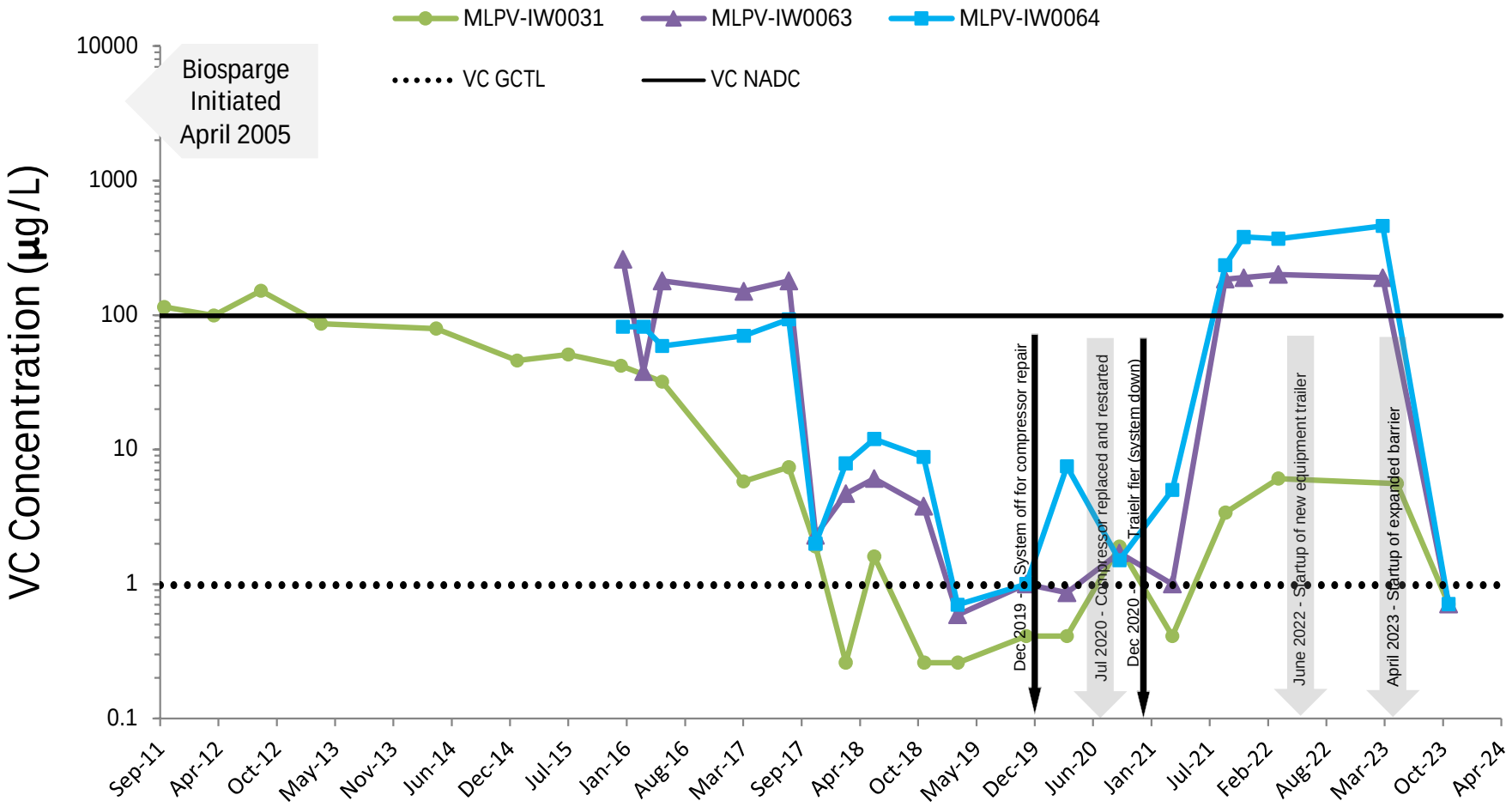



Biosparge Barrier
Trend Graph for VC
MLPV-ASMW4
MLPV-ASMW5
MLPV-ASMW6
MLPV-IW0060
VC GCTL
VC NADC
Biosparge Initiated April 2005
VC Concentration (µg/L)
10000
1000
100
10
1
0.1
System off for compressor repair
Jul 2020 - Compressor replaced and restarted
Dec 2020 - Trailelr fier (system down)
June 2022 - Startup of new equipment trailer
April 2023 - Startup of expanded barrier
Oct-06
Apr-07
Nov-07
Jun-08
Dec-08
Jul-09
Jan-10
Aug-10
Feb-11
Sep-11
Apr-12
Oct-12
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Apr-24

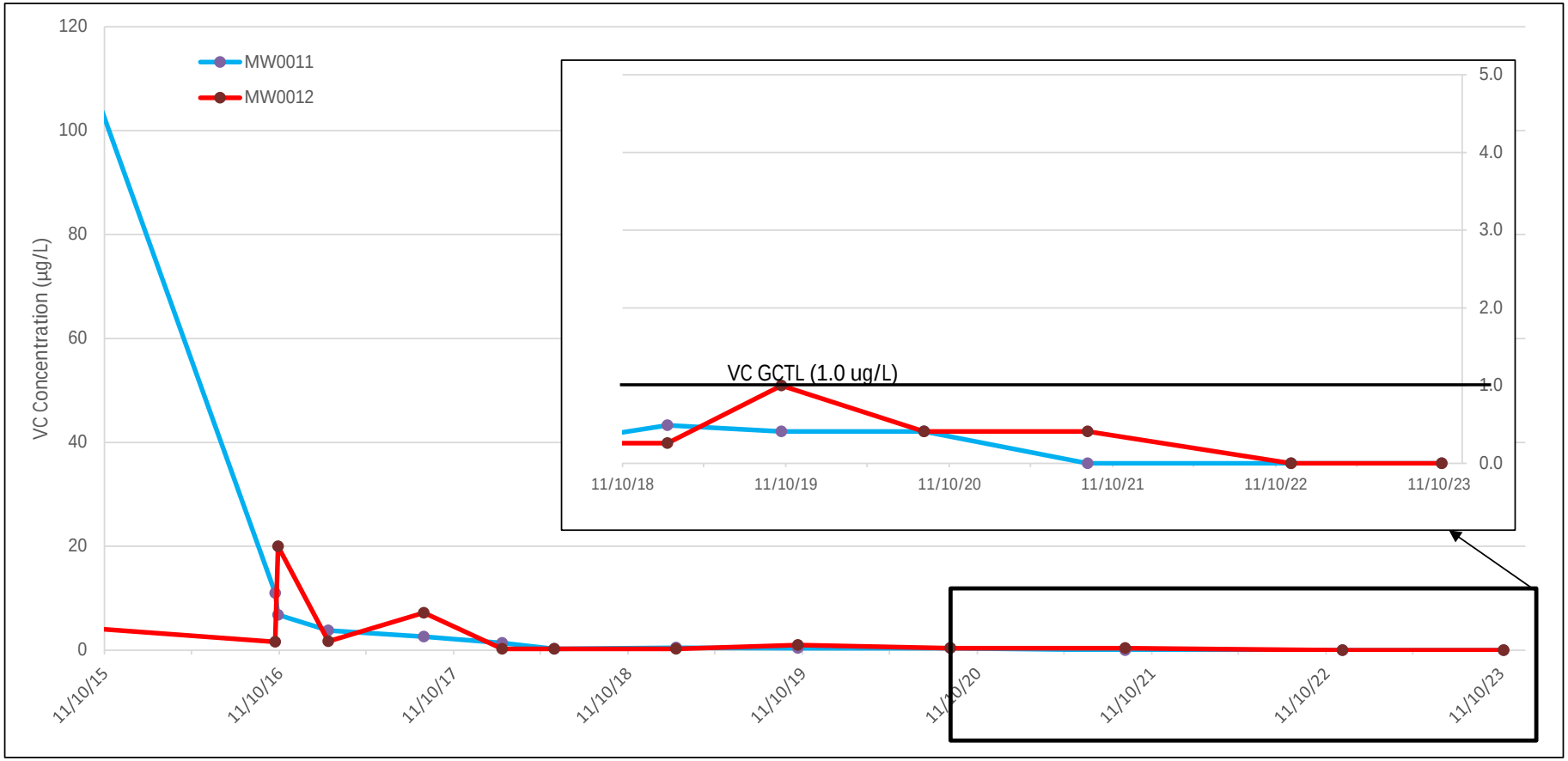
Biosparge Barrier
Trend Graph for cDCE



Biosparge Barrier Expansion
Trend Graph for VC



Hot Spot 3 (OFW Area)
Trend Chart



Hot Spot 3 (OFW Area)
Trend Chart

