2023 ANNUAL LONG-TERM MONITORING REPORT VEHICLE ASSEMBLY BUILDING AREA

Fire Station 3 (Formally Fire Station 6) (SWMU 106) Launch Complex 39 Observation Gantry Area (SWMU 107)

KENNEDY SPACE CENTER, FLORIDA

Prepared for:

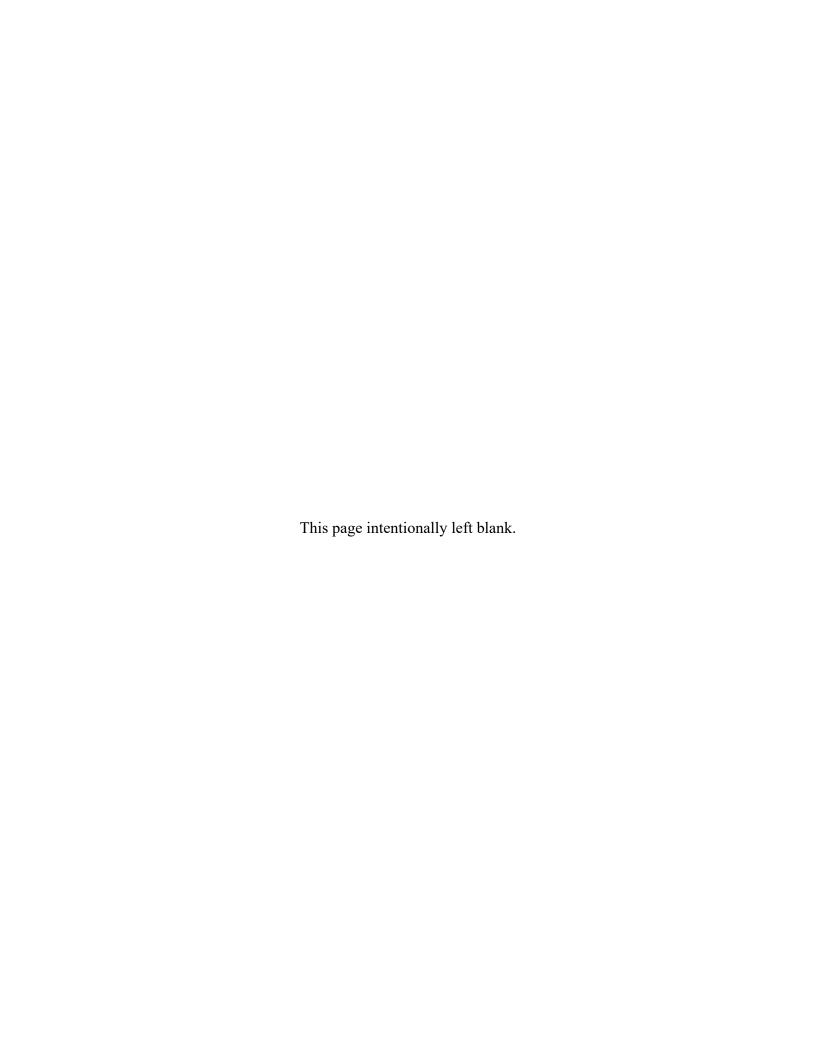


Environmental Assurance Branch National Aeronautics and Space Administration Kennedy Space Center, Florida 32899

> A-E Contract 80KSC019D0010 Task Order 80KSC019F0076

> > December 2024 Revision 0

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In accordance with the provisions of Florida Statutes, Chapter 492, this 2023 Annual Long-Term Monitoring Report for the Kennedy Space Center Vehicle Assembly Building Area located in Merritt Island, Florida, has been prepared under the direct supervision of a Professional Geologist registered in the State of Florida. This work was performed in accordance with generally accepted professional geology practices pursuant to Chapter 492 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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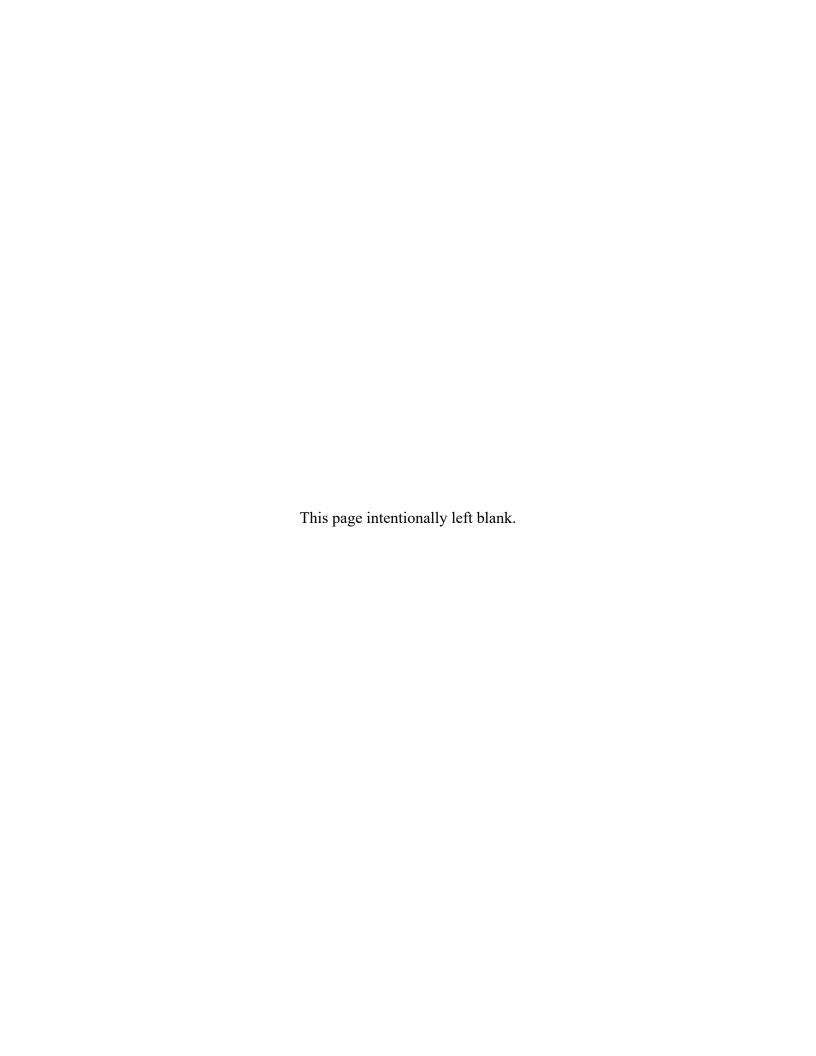


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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ADP Advance Data Package

AECOM Technical Services, Inc

AST aboveground storage tank

bls below land surface

*c*DCE *cis*-1,2-dichloroethene

COC contaminant of concern

DPT Direct Push Technology

Eurofins Eurofins Environment Testing – Orlando

FDEP Florida Department of Environmental Protection

FS3 Fire Station 3
FS6 Fire Station 6

GCTL Groundwater Cleanup Target Level

IM Interim Measure

KSC Kennedy Space Center

KSCRT KSC Remediation Team

LC39OGA Launch Complex 39 Observation Gantry Area

LOC location of concern

LTM long-term monitoring

LUCIP Land Use Control Implementation Plan

μg/L microgram per liter

MDL method detection limit

mg/kg milligrams per kilogram

MSS Mobile Service Structure

NADC Natural Attenuation Default Concentration

NASA National Aeronautics and Space Administration

NFA No Further Action

OFW Outstanding Florida Water

PCB polychlorinated biphenyl

RCRA Resource Conservation and Recovery Act

2023 Annual LTM Report

VAB Area Revision: 0 December 2024

RFI RCRA Facility Investigation

RIS Remediation Information System

SCTL Soil Cleanup Target Level

SWMU Solid Waste Management Unit

TCE trichloroethene

tDCE trans-1,2-dichloroethene

USEPA United States Environmental Protection Agency

VAB Vehicle Assembly Building Area

VC vinyl chloride

VOC volatile organic compound

EXECUTIVE SUMMARY

This report presents a summary of the groundwater monitoring activities that occurred in February 2024 at two sites in the Vehicle Assembly Building (VAB) Area Long-Term Monitoring (LTM) program at the John F. Kennedy Space Center, Florida. The two sites are Fire Station 3 (formerly Fire Station 6) (FS3) – Solid Waste Management Unit (SWMU) 106 and Launch Complex 39 Observation Gantry Area (LC39OGA) – SWMU 107.

The activities presented in this report include two field events: (1) February 15 and 19, 2024 – monitoring well installation and professional land survey at the LC39OGA site and (2) February 19, 2024 – groundwater and surface water sampling at the FS3 and LC39OGA sites.

The following is a summary of each site with conclusions and recommendations based on the February 2024 LTM activities.

FS3 – SWMU 106

The site was added to the VAB LTM program in May 2013 and is currently sampled on a biennial frequency. The site contaminant of concern (COC) is vinyl chloride (VC). This site was not sampled during the May 2023 biennial sampling event or the February 2024 sampling event due to flooding, which prevented access to the monitoring wells.

Recommendations/Path Forward

The following recommendations for a path forward are provided.

- The monitoring wells will be sampled during the next available dry period.
- Three monitoring wells, FS6-MW0001 through FS6-MW0003, will be sampled annually for two consecutive years.
- Monitoring well FS6-MW0001 will likely need a riser installed and may need to be relocated to dry land.
- Monitoring wells FS6-MW0002 and FS6-MW0003 may need clearing for access.

The next sampling event is currently scheduled for December 2024 and a site visit will be conducted to determine if new monitoring wells or site clearing will be necessary.

LC390GA – SWMU 107

The site was added to the VAB LTM program in 2019 and is currently sampled on an annual frequency. The site COC is VC.

Conclusions

Data from groundwater sampling activities performed during this reporting period have been compared to the previous sampling data, and the following conclusions are provided.

- Groundwater flow in the 5 to 15 feet below land surface (bls) and 15 to 27 feet bls zones is generally to the south toward the Banana River Outstanding Florida Water, which is consistent with historical observations.
- In February 2024, VC concentrations were above the State of Florida Groundwater Cleanup Target Level of 1 microgram per liter in four monitoring wells, LC39OGA-MW0002, LC39OGA-MW0004, LC39OGA-MW0010, and LC39OGA-MW0012.
- No site volatile organic compound (VOC) concentrations were detected in the surface water samples collected in February 2024.

Recommendations

Based on groundwater sampling activities performed during this reporting period, and compared to previous sampling events, the following recommendations are provided.

- Remove monitoring well LC39OGA-MW0003 and surface water sample location LC39OGA-SW0002 from the LTM plan due to two or more consecutive events with no detections of site VOCs.
- Conduct annual sampling at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004 through LC39OGA-MW0012.
- Collect surface water samples at four locations, LC39OGA-SW0004, LC39OGA-SW0005, LC39OGA-SW0006, and proposed location LC39OGA-SW0007, which is located directly downgradient of LC39OGA-MW0010.
- Analyze samples for site VOCs.
- Collect water level measurements at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-0002, and LC39OGA-MW0004 through LC39OGA-MW0012.

The next sampling events are scheduled for December 2024.

SECTION 1 INTRODUCTION

1.1 **OVERVIEW**

The National Aeronautics and Space Administration (NASA), through its Environmental Assurance Branch, is managing cleanup of several sites in the Vehicle Assembly Building (VAB) Area Long-Term Monitoring (LTM) program at the John F. Kennedy Space Center (KSC), Florida. This report presents an annual update for two sites, which are Fire Station 3 (FS3) (formerly Fire Station 6 [FS6]) – Solid Waste Management Unit (SWMU) 106 and Launch Complex 39 Observation Gantry Area (LC39OGA) - SWMU 107. The sites are monitored under KSC's Resource Conservation and Recovery Act (RCRA) Corrective Action Program.

AECOM Technical Services, Inc. (AECOM) prepared this annual report update and completed LTM activities at the two sites for NASA under Contract 80KSC019D0010, Task Order 80KSC019F0076. An Advance Data Package (ADP) was presented to the KSC Remediation Team (KSCRT) in preparation for this report. The KSCRT approved the recommendations within the presentation during a meeting on June 12, 2024. The ADP and KSCRT meeting minutes are provided in **Appendix A**. This report presents the activities and findings of the February 2024 (FS3 and LC39OGA) sampling event compared to previously collected groundwater and surface water data. The evaluation of these data provides conclusions and recommendations for continued groundwater and surface water monitoring.

1.2 SITE LOCATIONS

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. The VAB LTM program site locations are shown on **Figure 1-1**. The current site layouts for each site are presented as **Figure 1-2** and **Figure 1-3**. Descriptions for each site's location and background are summarized in Section 1.3.

1.3 BACKGROUND

The following are background summaries for each VAB LTM site discussed in this report. Site location and historical site operations are also discussed.

1.3.1 FS3 (Formerly FS6) – SWMU 106

The FS3 site is located approximately 2 miles west and northwest of the VAB area along Pad B Road and extends northward from Saturn Causeway to Launch Complex 39B. The site encompasses the facilities and structures along Pad B Road, which includes 14 numbered structures and several unnumbered structures. This site was added to the VAB LTM program in May 2013 and is currently scheduled to be sampled on a biennial frequency. The site contaminant of concern (COC) is vinyl chloride (VC).

Fifteen locations of concern (LOCs) were identified during a site assessment in 2007. LOC 1 – Drainage Outfalls is the area covered under this report and is located in the central area of the SWMU. This central area includes five buildings, two groundwater aboveground storage tanks (ASTs), and LOC 6 – Active Transformer, which is the only other active environmental area within the SWMU. LOC 1 is surrounded by Pad B Road and the Crawlerway to the west, wetland areas to the south and east, and the Industrial Water Pumping Station, parking areas, potable water ASTs, and Pad A Emergency Road to the North.

The facilities, in the central area of the SWMU adjacent to FS3, are utilized to support operations at LC39A and LC39B. The Industrial Water Pumping Station (J7-1388) supplies water to LC39A and LC39B. LOC 1 is located southwest of the Industrial Water Pumping Station (J7-1388) and consists of concrete drains and stormwater drains connected directly to the parking area. An astronaut rescue vehicle was observed parked and leaking into a drain located in the parking area (NASA 2010). LOC 1 also consists of drainage piping connected to former floor drains in the Industrial Water Pumping Station (J7-1388) and drains connected to a concrete pit that was secondary containment for a former 12,000-gallon diesel AST (NASA 2010).

In 2007, a SWMU Assessment Report identified 15 LOCs and confirmed that no ecological habitat was present within the site boundary. From 2007 to 2010, a Confirmation Sampling Report, Interim Measures (IM) Work Plan, and RCRA Facility Investigation (RFI) Work Plan were approved (NASA 2010). No Further Action (NFA) was approved for LOCs 3, 4, 7, and 9 through 15 and for groundwater at LOC 5. IM was approved for soil at LOCs 1, 2, 5, and 8, and an RFI was approved for groundwater at LOC 1. An Interim Land Use Control Implementation Plan (LUCIP) was approved for groundwater at LOC 1 and for soil at LOC 6. A summary of the activities from prior to 2007 through 2010, at LOCs 1 and 6, is provided below.

LOC 1 – Drainage Outfalls:

Groundwater:

- 22 Direct Push Technology (DPT) groundwater sampling locations were completed.
- Installation and sampling of one monitoring well FS6-MW0001S were completed.
- VC was detected above the State of Florida Groundwater Cleanup Target Level (GCTL) in 10 DPT locations and 1 monitoring well sample.
- RFI Work Plan was approved for groundwater to delineate VC exceedances in groundwater via DPT groundwater sampling and install monitoring wells.

Soil:

- 14 soil samples were collected at depths down to 2 feet bls.
- Three soil samples, collected at 0 to 0.5 feet bls, contained metals (barium, chromium, copper, mercury, and selenium) and Total Recoverable Petroleum Hydrocarbons above the above the State of Florida residential Soil Cleanup Target Level (SCTL) or leachability based on groundwater.

• IM Work Plan was approved for soils.

LOC 6 – Active Transformer:

- At Potential Release Location 043, 6 to 8 gallons of oil spilled in 1991.
- Excavation of approximately 200 cubic feet of soil around the transformer pad were performed.
- Previous sampling indicated polychlorinated biphenyls (PCBs) at 0.59 milligrams per kilogram (mg/kg), which is above the residential SCTL of 0.5 mg/kg for PCBs, were present in the soils under the transformer pad.
- Due to the transformer being active, excavation was halted, and the area was backfilled.
- LUCIP to keep the transformer pad in place was implemented.

In 2012, an IM report (NASA 2012) for soil was approved. In the LOC 1 area, an excavation of approximately 660 square feet by 1 foot bls was conducted to both horizontal and vertical sample locations with concentrations below residential SCTLs. NFA for soils at LOCs 1, 2, 5, and 8 was approved.

In 2013, an RFI Progress Report with Step I Engineering Evaluation (NASA 2013a) was completed for LOC 1. Groundwater sampling at 15 DPT locations was completed with a mobile laboratory to delineate the affected groundwater and determine new monitoring well locations. DPT sample intervals were 8 feet bls to 12 feet bls, 17 feet bls to 21 feet bls, 22 feet bls to 26 feet bls, 27 feet bls to 31 feet bls, 38 feet bls to 42 feet bls, and 43 feet bls to 47 feet bls. Two new monitoring wells, FS6-MW0002S and FS6-MW0003S, were installed, and samples from the two new monitoring wells and the existing monitoring well FS6-MW0001S were collected. There was one exceedance of trichloroethene (TCE) above its GCTL at one DPT location, DPT0038, but it was not confirmed by sampling the monitoring well FS6-MW0002S installed in the same location. VC concentrations in groundwater were confirmed to be above GCTLs at monitoring well FS6-MW0001S. All site COC concentrations were below State of Florida Natural Attenuation Default Concentrations (NADCs). Interim groundwater monitoring was conducted at the three monitoring wells for volatile organic compounds (VOCs) during two semiannual events. After evaluating the results, LTM along with a Statement of Basis and LUCIP were approved. The LTM Work Plan (NASA 2014a) included annual groundwater monitoring of monitoring wells FS6-MW0001S and FS6-MW0003S for VOCs and water level measurements in the three monitoring wells.

The site was added to the VAB LTM program in May 2013, and long-term groundwater monitoring on a biennial frequency, alternating between wet and dry seasons was approved. The site COC is VC. LTM was conducted biennially at the site in 2014, 2016, 2018, and 2020. Results from the 2020 LTM event indicated that groundwater flow is generally to the southeast, which is consistent with historical observations. VC concentrations were below the GCTL in both monitoring wells sampled, FS6-MW0001S and FS6-MW0003S. Recommendations

presented in the 2021 Biennial Long-Term Groundwater Monitoring Report (NASA 2021) included continuing biennial sampling, alternating between wet and dry seasons, of two monitoring wells, FS6-MW0001 and FS6-MW0003, for VC, and to continue water level measurements at three monitoring wells.

This site was originally scheduled to be sampled during the May 2023 biennial sampling event; however, due to site flooding, which prevented access to the monitoring wells, the site was not sampled. In February 2024, another attempt to sample the wells was conducted; however, the site remained flooded. An attempt to sample this site will be conducted during the next available dry period, and modification to monitoring well FS6-MW0001, such as installation of a well riser or relocating the well to dry land, may be needed along with clearing for access to monitoring wells FS6-MW0002 and FS6-MW0003. Due to the extended time period since the last sampling event monitoring well FS6-MW0002 will also be sampled, and the frequency will be annual for the next two years. A photo log of the site conditions in February 2024 is included as **Appendix B**. The current site layout is presented as **Figure 1-2**.

1.3.2 LC39OGA – SWMU 107

The LC39OGA site is located approximately 2 miles northeast of the VAB area, along the southern side of the Saturn Causeway. The East Crawler Park site, now known as the Mobile Service Structure (MSS) Park site, is to the north, and the Banana River, which is part of the Indian River and is an Outstanding Florida Water (OFW), is to the south. The western portion of the site consists of a former vehicle staging area, the Marine Patrol Storage Facility (K7-0288), Security Boathouse (K7-0287), and the current well network. The eastern portion of the site consists of two visitor tour buildings (K7-0140 and K7-0142), a guard house (K7-0140A), and the Launch Complex 39 Observation Tower (K7-0141). The current site layout is presented as **Figure 1-3**.

In 2009, an SWMU assessment was conducted, and five LOCs were identified, one of which was LOC 3, which is covered in this report. LOC 3 was a former vehicle staging area. During the LOC 3 SWMU assessment, samples contained VC above the GCTL and polychlorinated biphenyls (PCBs) above the residential and industrial SCTLs; however, no source was identified (NASA 2013b).

From 2009 through 2013, confirmatory soil sampling was conducted at the site (NASA 2013b). A total of 104 soil samples were collected for PCB analysis; 21 samples exceeded the residential SCTL of 0.5 milligrams per kilogram for PCBs. In 2016, a Soil Interim Measure (NASA 2017a) was conducted to address soil impacted with PCBs above the residential SCTL. Approximately 370 tons were removed and properly disposed of off-site. At the February 2017 KSCRT meeting, team consensus was reached for No Further Action for soil [Meeting Minute 1702-M04; Decision Number 1702-D08].

From 2009 through 2011, 218 groundwater samples from 52 locations were collected and analyzed for VOCs. Of the 218 samples, 215 samples were collected using DPT and 3 samples were collected in 2011 from monitoring wells LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0003 (NASA 2013b). VC was detected above the GCTL, but below the NADC to a depth of 27 feet below land surface (bls); however, no source area was identified.

In May 2014, an LTM Work Plan (NASA 2014b) was presented at a KSCRT meeting. The LTM plan included semiannual groundwater sampling of eight monitoring wells: LC39OGA-MW0001, LC39OGA-MW0002, LC39OGA-MW0004, LC39OGA-MW0005, LC39OGA-MW0006, LC39OGA-MW0007, LC39OGA-MW0008, and LC39OGA-MW0009 for VOCs. The monitoring program also included sampling for dissolved gases and collecting field parameters to better assess geochemical conditions. The plan was to re-evaluate the monitoring program after 2 years (NASA 2018).

Prior to the November 2015 and May 2016 LTM events, sampling of dissolved gases was discontinued because data confirmed reductive dichlorination was occurring at the site. Monitoring wells LC39OGA-MW0006 and LC39OGA-MW0008 were removed from the program due to having two consecutive events below GCTLs. The LTM plan was updated to semiannual sampling of six monitoring wells for VOCs (NASA 2018).

Prior to the November 2017 LTM sampling, LC39OGA-MW0005 was removed from the sampling program because VC had not been detected for three consecutive events. The sampling frequency was changed from semiannual to annual. The LTM plan was updated to annual sampling of five wells for VOCs (NASA 2018).

In 2019, the site was added to the VAB LTM program, and after team discussions, LC39OGA-MW0003 was added to the LTM plan to confirm that detections of VOCs in 2011, which were below GCTLs, remained below GCTLs. Sampling was conducted on an annual frequency for six monitoring wells: LC39OGA-MW0001, LC39OGA-MW0002, LC39OGA-MW0003, LC39OGA-MW0004, LC39OGA-MW0007, and LC39OGA-MW0009. The site COC is VC (NASA 2021).

In November 2019 and November 2020, annual sampling was conducted at six monitoring wells. The wells were sampled for site VOCs, which are *cis*-1,2-dichloroehtene (*c*DCE), *trans*-1,2-dichloroethene (*t*DCE), TCE, and VC. In 2019, VC concentrations were above the GCTL of 1 microgram per liter (µg/L) in three monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004, screened from 5 to 15 feet bls. In 2020, VC concentrations were above the GCTL in one monitoring well, LC39OGA-MW0009, screened from 22 to 27 feet bls. It was proposed to continue sampling the same six monitoring wells on an annual frequency, to collect three surface water samples adjacent to monitoring well LC39OGA-MW0003, and to conduct DPT groundwater sampling in the vicinity of monitoring well LC39OGA-MW009 to investigate the extents of VC upgradient of the plume (NASA 2021).

In May 2021, DPT groundwater sampling was conducted in the vicinity of LC39OGA-MW009 and upgradient of the plume. Thirty-one groundwater samples were collected from eight DPT boring locations, LC39OGA-DPT0048 through LC39OGA-DPT0055, at depths ranging from 13 feet bls to 57 feet bls. Concentrations of VC were above the GCTL in 10 samples, five from 13 to 17 feet bls and five from 23 to 27 feet bls. Concentrations of *c*DCE and *t*DCE were detected in several samples; however, the concentrations were below GCTLs. TCE was not detected. No concentrations of site VOCs were detected below 27 feet bls (NASA 2024).

In June 2021, annual sampling was conducted at six monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, LC39OGA-MW0003, LC39OGA-MW0004, LC39OGA-MW0007, and LC39OGA-MW0009, and three surface water sample locations, LC39OGA-SW0001, LC39OGA-SW0002, and LC39OGA-SW0003. The samples were analyzed for site VOCs. Concentrations of VC were above the GCTL in four monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004, screened from 5 to 15 feet bls, and LC39OGA-MW0009, screened from 22 to 27 feet bls. There were no detections of site VOCs in surface water. The team proposed to conduct additional limited DPT groundwater sampling in the northeast area upgradient of the plume to determine the location of an upgradient monitoring well. The team also proposed to install a new monitoring well, LC39OGA-MW0010, screened from 5 to 15 feet bls downgradient of the plume, and conduct annual sampling of 10 monitoring wells, adding LC39OGA-MW0005, LC39OGA-MW0006, LC39OGA-MW0008, and LC39OGA-MW0010 to the LTM plan, and conduct sampling at four surface water locations, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006 (NASA 2024).

In July 2022, 37 DPT groundwater samples were collected from eight DPT boring locations, LC39OGA-DPT0056 through LC39OGA-DPT0063, at depths ranging from 8 feet bls to 57 feet bls. Concentrations of VC were detected above the GCTL in five samples from two locations, LC39OGA-DPT0058 and LC39OGA-DPT0060, two from 8 to 12 feet bls, one from 13 to 17 feet bls, and two from 23 to 27 feet bls. The concentration of *c*DCE was detected above the GCTL in one sample from LC39OGA-DPT0060 in the 8 to 12 feet bls sample interval. Concentrations of TCE and *t*DCE were detected in several samples; however, the concentrations were at or below GCTLs. No concentrations of site VOCs were detected below 27 feet bls. The team proposed to install two upgradient monitoring wells, LC39OGA-MW011, screened from 5 to 15 feet bls, and LC39OGA-MW0012, screened from 22 to 27 feet bls, adjacent to LC39OGA-DPT0060, and add them to the annual LTM plan (NASA 2024).

In May 2023, annual LTM sampling was conducted at 10 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0010, and four surface water locations, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006. Monitoring wells LC39OGA-MW011 and LC39OGA-MW0012 were not installed due to construction activities that restricted access to the MSS Park Site, where the wells were to be located. Concentrations of *c*DCE, *t*DCE, and TCE were detected in several monitoring wells; however, the concentrations

were below the GCTLs of 70 μ g/L, 100 μ g/L, and 3 μ g/L, respectively. VC was not detected in any sample collected during the event. There we no detections of site VOCs in the surface water samples. The team proposed that, once the MSS Park Site can be accessed, monitoring wells LC39OGA-MW011 and LC39OGA-MW0012 would be installed and added to the LTM plan. The team also proposed to conduct annual sampling and water level measurements at 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012, and collect surface water samples at four locations, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006. Samples were to be analyzed for site VOCs (NASA 2024).

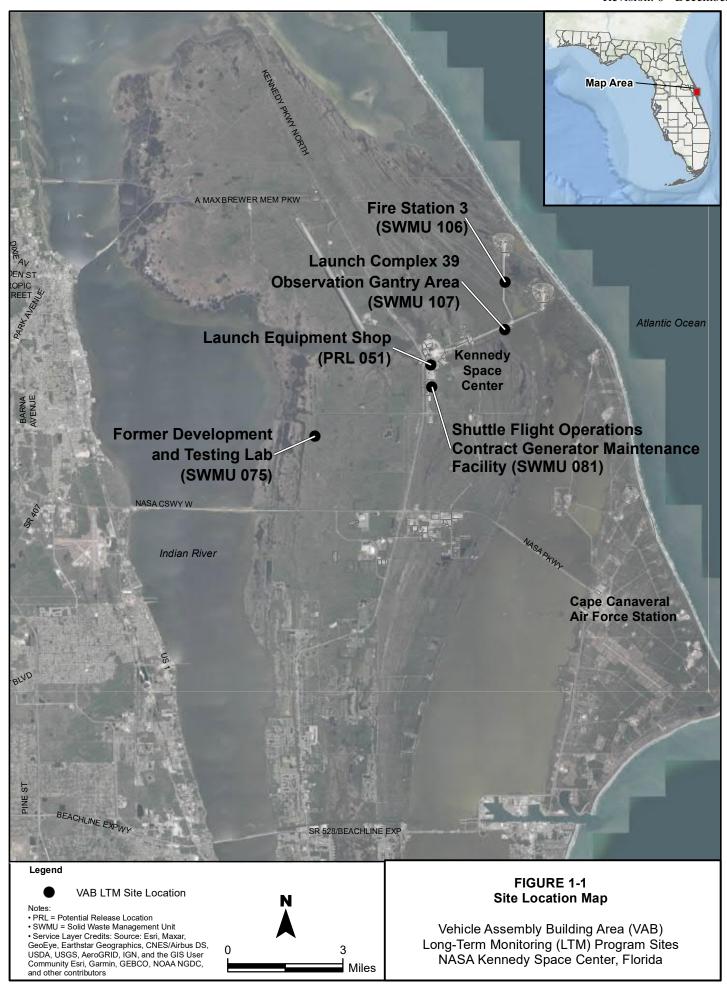
1.4 PURPOSE

The purpose of this report is to present the annual LTM field activities and results conducted in February 2024 at the FS3 – SWMU 106 and LC39OGA – SWMU 107 sites, and to present conclusions and recommendations.

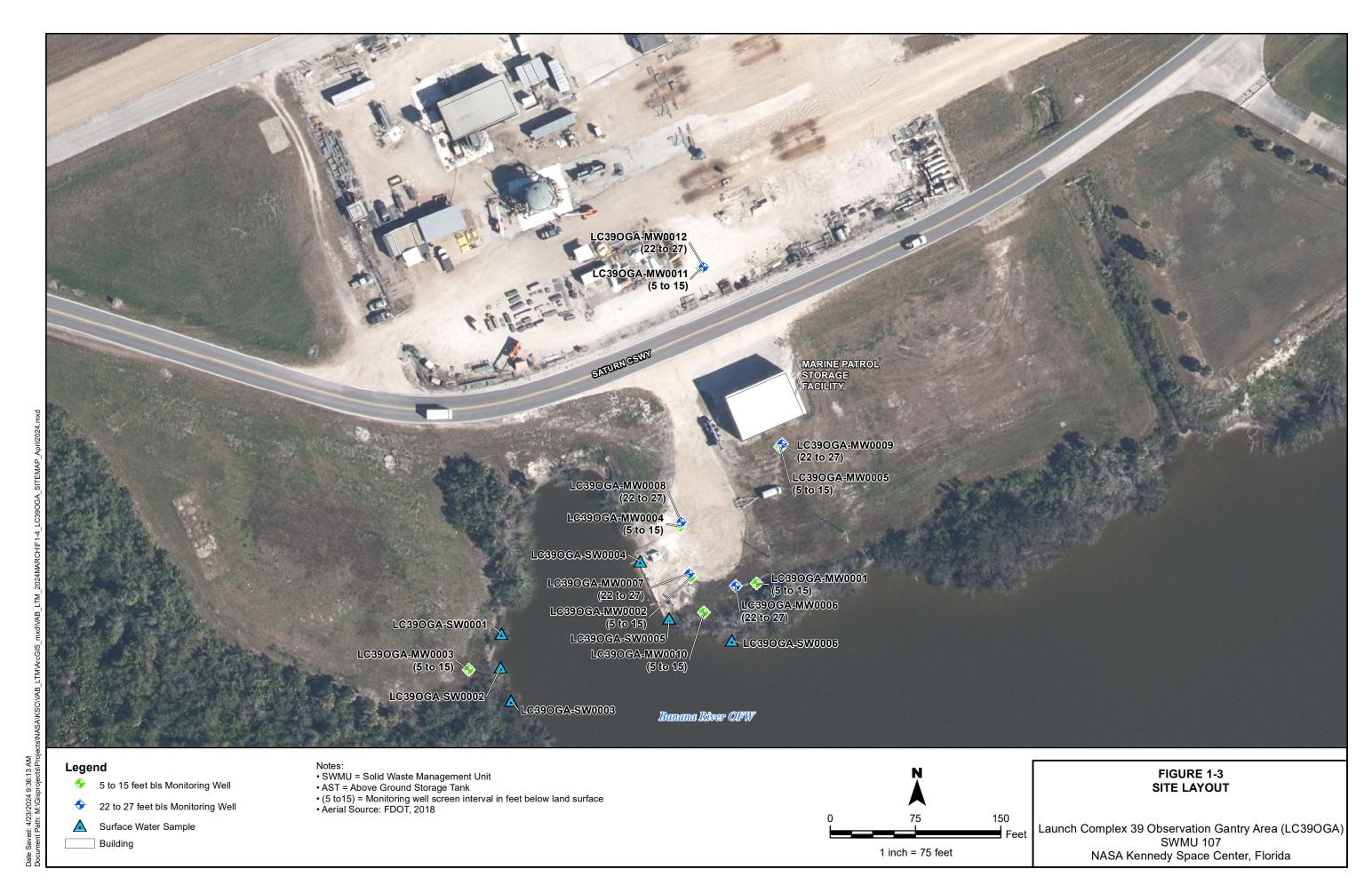
1.5 REPORT ORGANIZATION

The remainder of this report is organized as follows:

- Section 2: LC39OGA (SWMU 107) LTM Field Activities and Results. This section describes the methodology used and presents a summary of the monitoring well installation, groundwater monitoring, and surface water sampling activities. It also summarizes the analytical results for the sampling activities for the LC39OGA site.
- Section 3: Conclusions and Recommendations. This section presents conclusions and recommendations for the future of the FS3 and LC39OGA sites and presents the proposed 2024 LTM monitoring schedule.
- Section 4: References. This section lists the documents used in developing this report.







SECTION 2 LC39OGA (SWMU 107) LTM FIELD ACTIVITIES AND RESULTS

2.1 LTM FIELD ACTIVITIES

This section provides a summary of the LTM field activities and results for the LC39OGA site. The site was added to the VAB LTM program in 2019 and is sampled on an annual frequency. The site COC is VC. The site VOCs that were analyzed are *c*DCE, *t*DCE, TCE, and VC.

Two field events were conducted in February 2024 at the LC39OGA site for the VAB LTM program and are listed below.

- February 15 and 19, 2024 Monitoring well installation and survey
- February 19, 2024 Groundwater monitoring and surface water sampling

Field activities were conducted in general accordance with Florida Department of Environmental Protection (FDEP) Standard Operating Procedures (FDEP 2018), the KSC Sampling and Analysis Plan (NASA 2017b), and the KSC Decision Process Document for the RCRA Corrective Action Program (NASA 2019). The 2023 LTM schedule is presented as **Table 2-1**. Daily field notes are provided in **Appendix C**. Groundwater sampling and calibration logs are provided in **Appendix D**.

2.2 MONITORING WELL INSTALLATION

On February 15, 2024, AECOM personnel provided oversight for Environmental Drilling Services, Inc. during the installation of two monitoring wells, LC39OGA-MW0011 and LC39OGA-MW0012. The monitoring wells were installed using DPT and were constructed with 1-inch diameter Schedule 40 polyvinyl chloride riser and 10 feet and 5 feet, respectively, of 0.010-slot screen, prepacked with a 20/30 sand. The wells were sealed with 30/65 fine sand and finished with Type I/II Portland cement to the surface. They were completed with a lockable well cap and enclosed within an 8-inch round bolt-down vault encased in a 2-foot by 2-foot by 4-inch-thick square concrete pad. The wells were installed with a screen interval depth of 5 to 15 feet bls for LC39OGA-MW0011 and 22 to 27 feet bls for LC39OGA-MW0012.

The monitoring wells were installed upgradient of the plume at the southern edge of the MSS Park Site adjacent to LC39OGA-DPT0060 to assist with monitoring the upgradient extents of the plume. A professional land survey of the wells was conducted by Land and Sea Surveying Concepts, Inc. on February 19, 2024. The monitoring well construction logs, permits, and asbuilt survey are provided in **Appendix E**.

2.3 GROUNDWATER ELEVATIONS AND FLOW DIRECTION

On February 19, 2024, water levels were measured in 12 monitoring wells: seven in the 5 to 15 feet bls zone, and five in the 22 to 27 feet bls zone. Groundwater flow in the 5 to 15 feet bls zone was to the southwest toward the Banana River OFW, and average depth to water was 1.93 feet

bls. Groundwater flow in the 22 to 27 feet bls zone was to the south toward the Banana River OFW, and average depth to water was 2.42 feet bls.

Groundwater flow direction in both zones in February 2024 was consistent with historical observations toward the Banana River OFW. Groundwater level measurements were recorded from site wells prior to sampling and are summarized in **Table 2-2**. Groundwater contour maps for February 2024, representing the 5 to 15 feet bls and 22 to 27 feet bls zones for each event, are provided on **Figure 2-1** and **Figure 2-2**.

2.4 GROUNDWATER MONITORING RESULTS

In February 2024, AECOM personnel sampled 12 monitoring wells, LC39OGA-MW0001 through LC39OGA-MW0012. The samples were submitted to a fixed-based laboratory, Eurofins Environment Testing – Orlando (Eurofins), for analysis by United States Environmental Protection Agency (USEPA) Method 8260B for site VOCs: *c*DCE, *t*DCE, TCE, and VC.

In February 2024, VC concentrations were above the GCTL of 1 μg/L in four monitoring wells: LC39OGA-MW0002, LC39OGA-MW0004, and LC39OGA-MW00010, screened from 5 to 15 feet bls, and LC39OGA-MW0012, screened from 22 to 27 feet bls. The highest VC concentration was 8.5 μg/L at LC39OGA-MW0012. Concentrations of *c*DCE and *t*DCE were detected in several monitoring wells; however, the concentrations were below the GCTLs of 70 μg/L and 100 μg/L, respectively. No concentration of TCE was detected, and the method detection limit (MDL) was below the GCTL of 3 μg/L. No VOC concentrations were above NADCs. Groundwater analytical results are summarized in **Table 2-3** and are presented on **Figure 2-3** and **Figure 2-4**. Laboratory analytical reports are provided in **Appendix F**. Data were uploaded to KSC's Remediation Information System (RIS) upon receipt. The RIS completion tickets are provided in **Appendix G**.

2.5 SURFACE WATER SAMPLING RESULTS

In February 2024, AECOM personnel collected four surface water samples, LC39OGA-SW0002, LC39OGA-SW0004, LC39OGA-SW0005, and LC39OGA-SW0006. The samples were submitted to Eurofins for analysis by USEPA Method 8260B for site VOCs: *c*DCE, *t*DCE, TCE, and VC. No concentrations of site VOCs were detected in the surface water samples collected, and the MDLs were below the State of Florida Freshwater and Marine Surface Water Criteria for Toxicity. Surface water analytical results are summarized in **Table 2-3** and are presented on **Figure 2-3** and **Figure 2-4**. Laboratory analytical reports are provided in **Appendix F**. Data were uploaded to KSC's RIS upon receipt. The RIS completion tickets are provided in **Appendix G**.

2.6 INVESTIGATION-DERIVED WASTE

Investigation-derived waste from field activities was contained in properly labeled 55-gallon drums, which were stored on NASA-provided spill pallets, and secured with cargo straps to be properly disposed of by NASA.

Table 2-1 2023 Annual Long-Term Monitoring Schedule Vehicle Assembly Building Area Long-Term Monitoring Program

		February 2024 Annual Event (2023 Annual Event)					
Well ID	Screen Interval (feet bls)	Monitoring Well Installation	Water Levels	Sampled (Analytical Parameters)			
Fire Station 3 (FS3) (Former F	Fire Station 6) SWMU 106 (An	nual for the next t	two years -	2024 and 2025)*			
FS6-MW0001	25 to 35		X	Site VOCs			
FS6-MW0002	20 to 30		X				
FS6-MW0003	20 to 30		X	Site VOCs			
Launch Complex 39 Observati	ion Gantry Area (LC39OGA)	SWMU 107 (Annı	ual)				
LC39OGA-MW0001	5 to 15		X	Site VOCs			
LC39OGA-MW0002	5 to 15		X	Site VOCs			
LC39OGA-MW0003	5 to 15		X	Site VOCs			
LC39OGA-MW0004	5 to 15		X	Site VOCs			
LC39OGA-MW0005	5 to 15		X	Site VOCs			
LC39OGA-MW0006	22 to 27		X	Site VOCs			
LC39OGA-MW0007	22 to 27		X	Site VOCs			
LC39OGA-MW0008	22 to 27		X	Site VOCs			
LC39OGA-MW0009	22 to 27		X	Site VOCs			
LC39OGA-MW0010	5 to 15		X	Site VOCs			
LC39OGA-MW0011	5 to 15	X	X	Site VOCs			
LC39OGA-MW0012	22 to 27	X	X	Site VOCs			
LC39OGA-SW0001	Surface Water						
LC39OGA-SW0002	Surface Water			Site VOCs			
LC39OGA-SW0003	Surface Water						
LC39OGA-SW0004	Surface Water			Site VOCs			
LC39OGA-SW0005	Surface Water			Site VOCs			
LC39OGA-SW0006	Surface Water			Site VOCs			

Notes:

*FS3 was flooded during the February 2024 Annual Event and was not monitored.

Blank cells indicate that the well is not included for that event or activity.

bls = below land surface

SWMU = Solid Waste Management Unit

VOC = Volatile Organic Compound

Table 2-2 Groundwater Elevation Data Launch Complex 39 Observation Gantry Area (LC39OGA) - SWMU 107

			11/19/14		05/11/15		11/30/15		05/25/16		11/28/17	
Well ID	Screen Interval (ft bls)	TOC Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)								
5 to 15 ft bls												
LC39OGA-MW0001	5 to 15	0.87	0.80	0.07	0.72	0.15	0.20	0.67	0.90	-0.03	0.00	0.87
LC39OGA-MW0002	5 to 15	1.11	0.50	0.61	0.59	0.52	0.40	0.71	1.20	-0.09	0.25	0.86
LC39OGA-MW0003	5 to 15	1.52		NM		NM	0.65	0.87	1.46	0.06	0.81	0.71
LC39OGA-MW0004	5 to 15	1.60	1.30	0.30	1.32	0.28	0.76	0.84	1.60	0.00	0.60	1.00
LC39OGA-MW0005	5 to 15	2.17	1.42	0.75	1.94	0.23	1.10	1.07	1.96	0.21	1.21	0.96
LC39OGA-MW0010	5 to 15	1.32		NM		NM		NM		NM	NM	
LC39OGA-MW0011	5 to 15	5.77		NM		NM		NM		NM	NM	
22 to 27 ft bls												
LC39OGA-MW0006	22 to 27	1.12	0.85	0.27	0.79	0.33	0.20	0.92	0.98	0.14	0.05	1.07
LC39OGA-MW0007	22 to 27	1.32	1.12	0.20	0.98	0.34	0.70	0.62	1.21	0.11	0.23	1.09
LC39OGA-MW0008	22 to 27	1.62	1.31	0.31	1.28	0.34	0.70	0.92	1.49	0.13	0.56	1.06
LC39OGA-MW0009	22 to 27	2.24	1.70	0.54	1.85	0.39	1.10	1.14	1.94	0.30	1.11	1.13
LC39OGA-MW0012	22 to 27	5.91		NM								

Notes:

ft bls = feet below land surface

BTOC = below top of casing

NAVD88 = North American Vertical Datum of 1988

NM = not measured

TOC = top of casing

Table 2-2 Groundwater Elevation Data Launch Complex 39 Observation Gantry Area (LC39OGA) - SWMU 107

			11/18/19		11/18/20		06/30/21		05/09/23		02/19/24	
Well ID	Screen Interval (ft bls)	TOC Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)								
5 to 15 ft bls												
LC39OGA-MW0001	5 to 15	0.87	0.00	0.87	0.15	0.72	0.86	0.01	0.65	0.22	1.05	-0.18
LC39OGA-MW0002	5 to 15	1.11	0.07	1.04	0.68	0.43	1.13	-0.02	0.88	0.23	1.21	-0.10
LC39OGA-MW0003	5 to 15	1.52	0.25	1.27	0.80	0.72	1.41	0.11	1.16	0.36	1.52	0.00
LC39OGA-MW0004	5 to 15	1.60	0.27	1.33	0.88	0.72	1.44	0.16	1.25	0.35	1.64	-0.04
LC39OGA-MW0005	5 to 15	2.17	0.78	1.39	1.10	1.07	1.65	0.52	1.67	0.50	1.70	0.47
LC39OGA-MW0010	5 to 15	1.32		NM		NM		NM	0.97	0.35	1.57	-0.25
LC39OGA-MW0011	5 to 15	5.77		NM		NM		NM		NM	4.83	0.94
22 to 27 ft bls												
LC39OGA-MW0006	22 to 27	1.12	0.00	1.12	0.70	0.42	1.15	-0.03	0.85	0.27	1.41	-0.29
LC39OGA-MW0007	22 to 27	1.32	0.27	1.05	0.90	0.42	1.22	0.10	1.21	0.11	1.58	-0.26
LC39OGA-MW0008	22 to 27	1.62	0.31	1.31	0.91	0.71	1.44	0.18	1.21	0.41	1.74	-0.12
LC39OGA-MW0009	22 to 27	2.24	0.79	1.45	1.25	0.99	1.88	0.36	1.67	0.57	2.11	0.13
LC39OGA-MW0012	22 to 27	5.91		NM	<u> </u>	NM		NM		NM	5.25	0.66

Notes:

ft bls = feet below land surface

BTOC = below top of casing

NAVD88 = North American Vertical Datum of 1988

NM = not measured

TOC = top of casing

Table 2-3 Groundwater and Surface Water Analytical Results Launch Complex 39 Observation Gantry Area (LC39OGA) - SWMU 107

		Category	Volatile Organic Compounds (VOCs) by Method 8260								
		Analyte	CIS-1,2- DICHLOROETHENE	TRANS-1,2- DICHLOROETHENE	TRICHLOROETHENE	VINYL CHLORIDE					
		GCTL (µg/L)	70	100	3	1					
		NADC (μg/L)	700	1000	300	100					
Location ID	Screened Interval (feet bls)	Sample Date									
LC39OGA-MW0001	5 to 15	08/30/11	1.4	33.2	0.36 U	8.0					
		12/05/14	0.64 I	22	0.5 U	4.1					
		05/11/15	0.69 I	21	0.5 U	0.5 U					
		10/30/15	0.55 I	15	0.58 U	0.5 U					
		05/25/16	0.5 U	4.7	0.5 U	1.0					
		11/28/17	0.78 I	11	0.58 U	2.7					
		11/18/19	0.28 U	16.7	0.35 U	6.7					
		11/18/20	0.28 U	23.6	0.35 U	0.41 U					
		06/30/21	0.53 U	18	0.89 U	5.1					
		05/09/23	0.53 U	13	0.89 U	0.71 U					
		02/19/24	0.53 U	5.9	0.89 U	0.89 I					
LC39OGA-MW0002	5 to 15	08/30/11	7.2	6.7	0.36 U	37.5					
		12/05/14	2.1	4.3	0.5 U	19					
		05/11/15	3.3	3.9	0.5 U	26					
		10/30/15	0.72 I	4.0	0.58 U	21					
		05/25/16	0.5 U	4.0	0.5 U	21					
		11/28/17	0.5 U	4.0	0.58 U	9.4					
		11/18/19	0.28 U	6.1	0.35 U	13.6					
		11/18/20	0.28 U	4.1	0.35 U	0.41 U					
		06/30/21	0.53 U	3.1	0.89 U						
		05/09/23	0.53 U	3.0	0.89 U	0.71 U					
		02/19/24	0.53 U	3.6	0.89 U	3.7					
LC39OGA-MW0003	5 to 15	08/30/11	5.1	0.19 U	2.5	0.36 U					
		11/18/19	1.9	0.22 U	1.4	0.41 U					
		11/18/20	2.3	0.22 U	1.3	0.41 U					
		06/30/21	3.0 I	3.6 U	4.4 U	3.6 U					
		05/09/23	0.87 I	0.73 U	0.96 I	0.71 U					
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U					
LC39OGA-MW0004	5 to 15	11/18/14	3.9	1.6	0.5 U	10					
		05/12/15	4.6	1.7	0.5 U	8.9					
		10/30/15	3.9	2.1	0.58 U	7.4					
		05/25/16	4.3	2.8	0.5 U	13					
		11/28/17	0.57 I	2.2	0.58 U	32					
		11/18/19	1.8	2.6	0.35 U	21.8					
		11/18/20	1.6	2.1	0.35 U	0.41 U					
		06/30/21	0.53 U	2.0	0.89 U	19					
		05/09/23	0.53 U	0.93 I	0.89 U	0.71 U					
		02/19/24	0.53 U	0.85 I	0.89 U	5.1					
LC39OGA-MW0005	5 to 15	11/18/14	0.5 U	5.3	0.5 U	4.3					
		05/11/15	0.5 U	2.2	0.5 U	0.5 U					
		10/30/15	0.5 U	3.5	0.58 U	0.5 U					
		05/25/16	0.5 U	6.3	0.5 U	0.5 U					
		05/09/23	0.70 I	3.1	0.89 U	0.71 U					
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U					
LC39OGA-MW0006	22 to 27	11/18/14	0.79 I	0.5 U	0.5 U	0.5 U					
		05/11/15	0.61 I	0.5 U	0.5 U	0.5 U					
		05/09/23	0.75 I	0.73 U	0.89 U	0.71 U					
		02/19/24	0.69 I	0.73 U	0.89 U	0.71 U					

Table 2-3 Groundwater and Surface Water Analytical Results Launch Complex 39 Observation Gantry Area (LC39OGA) - SWMU 107

		Category	ategory Volatile Organic Compounds (VOCs) by Method 8260							
		Analyte	CIS-1,2-	TRANS-1,2-	TRICHLOROETHENE	VINYL CHLORIDE				
			DICHLOROETHENE	DICHLOROETHENE		VINYL CHLORIDE				
		GCTL (µg/L)	70	100	3	1				
	Screened Interval	NADC (μg/L)	700	1000	300	100				
Location ID	(feet bls)	Sample Date								
LC39OGA-MW0007	22 to 27	11/18/14	1.3	0.5 U	0.5 U	0.5 U				
		05/12/15	1.0	0.5 U	0.5 U	0.5 U				
		10/30/15	1.0	0.5 U	0.58 U	0.5 U				
		05/25/16	1.5	0.5 U	0.5 U	0.5 U				
		11/28/17	0.65 I	0.5 U	0.58 U	0.5 U				
		11/18/19	2.0	0.22 U	0.35 U	0.41 U				
		11/18/20	0.43 I	0.22 U	0.35 U	0.41 U				
		06/30/21	0.96 I	0.73 U	0.89 U	0.71 U				
		05/09/23	0.55 I	0.73 U	0.89 U	0.71 U 0.71 U				
		02/19/24	0.72 I	0.73 U	0.89 U	0.71 U				
LC39OGA-MW0008	22 to 27	11/18/14	2.2	0.5 U	0.5 U	0.61 I				
		05/12/15	3	0.5 U	0.5 U	0.5 U				
		05/09/23	1.8	0.73 U	0.89 U	0.71 U				
		02/19/24	2.2	0.73 U	0.89 U	0.73 I				
LC39OGA-MW0009	22 to 27	11/18/14		0.5.11	0.5 U	12				
LC39OGA-IVI W 0009	22 to 27	05/11/15	5	0.5 U 1.1	0.5 U	13				
		10/30/15	4.6	0.5 U	0.58 U	7.1				
		05/25/16	0.97 I	0.5 U	0.5 U	1.2				
		11/28/17	5.0	0.50 I	0.58 U	6.1				
		11/18/19	4.5	0.22 U	0.35 U	0.41 U				
		11/18/20	6	0.52 I	0.35 U	8				
		06/30/21	7.2	0.73 U	0.89 U	7.6				
		05/09/23	5.7	0.73 U	0.89 U	0.71 U				
		02/19/24	1.2	0.73 U	0.89 U	1.0				
LC39OGA-MW0010	5 to 15	05/09/23	1.1	2.6	0.89 U	0.71 U				
LC370GA-WW0010	3 to 13	02/19/24	0.53 U	3.2	0.89 U	5.0				
		V		0,2						
LC39OGA-MW0011	5 to 15	02/19/24	0.53 U	0.73 U	0.89 U	0.71 U				
LC39OGA-MW0012	22 to 27	02/19/24	1.1	0.73 U	0.89 U	8.5				
LC3900A-WW 0012	22 10 27	02/19/24	1.1	0.73 0	0.89 0	0.3				
LC39OGA-SW0001	Surface Water	06/30/21	0.53 U	0.73 U	0.89 U	0.71 U				
LC39OGA-SW0002	Surface Water	06/30/21	0.53 U	0.73 U	0.89 U	0.71 U				
		05/09/23	0.53 U	0.73 U	0.89 U	0.71 U				
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U				
I C200C A CWOOO2	C C W	0.6/20/21	0.50 **	0.72.11	0.00.77	0.71.11				
LC39OGA-SW0003	Surface Water	06/30/21	0.53 U	0.73 U	0.89 U	0.71 U				
LC39OGA-SW0004	Surface Water	05/09/23	0.53 U	0.73 U	0.89 U	0.71 U				
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U				
LC39OGA-SW0005	Surface Water	05/09/23	0.53 U	0.73 U	0.89 U	0.71 U				
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U				
LC39OGA-SW0006	Surface Water	05/09/23	0.53 U	0.73 U	0.89 U	0.71 U				
		02/19/24	0.53 U	0.73 U	0.89 U	0.71 U				

Notes:

Bolded results indicate the presence of an analyte at the specified concentration.

Red font indicates an exceedance of GCTLs.

Highlighted cell indicates an exceedance of NADCs.

Blank cells indicate the analyte was not analyzed for that specific well.

bls = below land surface

GCTL = Groundwater Cleanup Target Level, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

I = The reported value is between the laboratory method detection limit, and the practical quantitation limit.

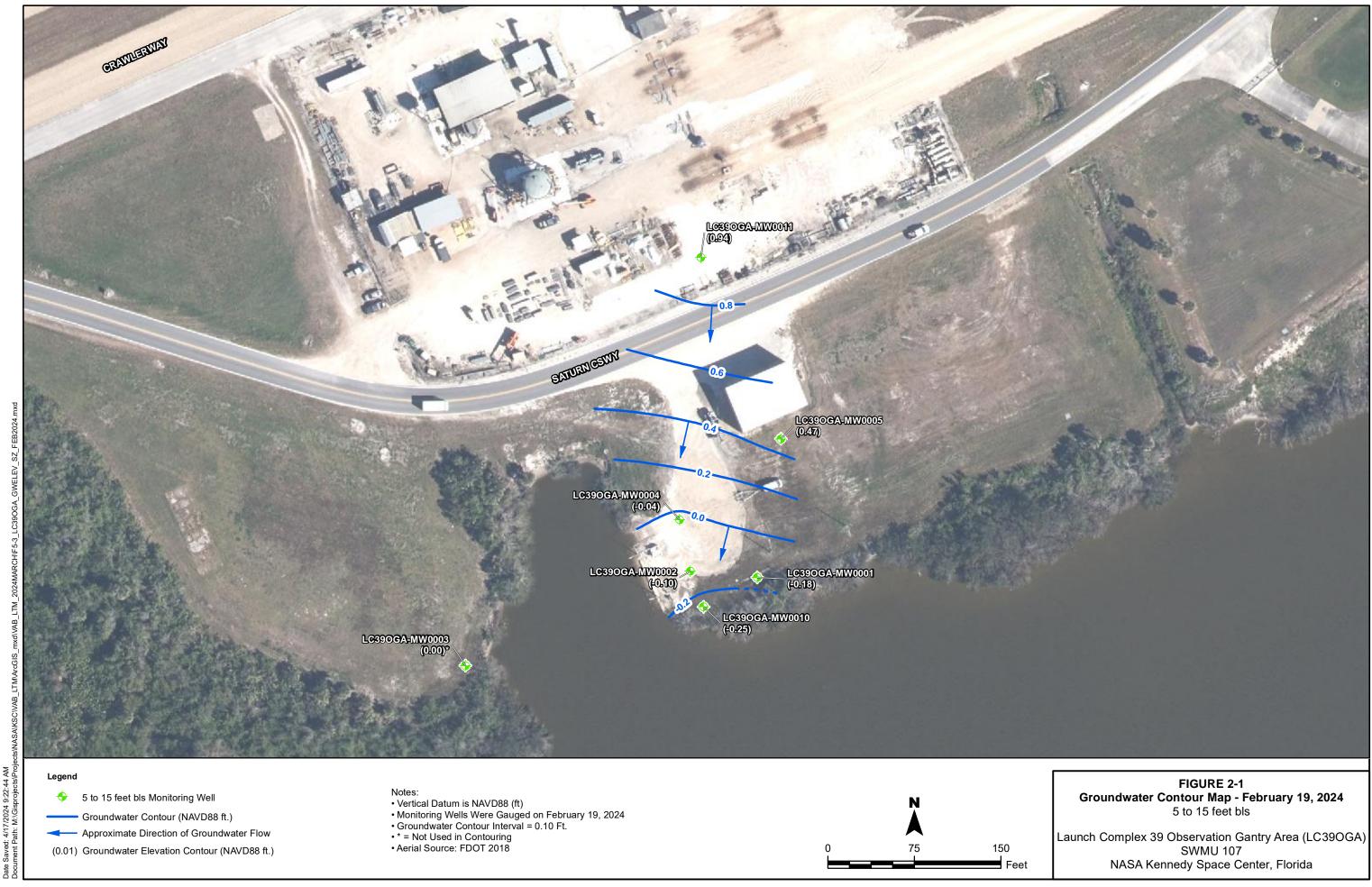
NADC = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)

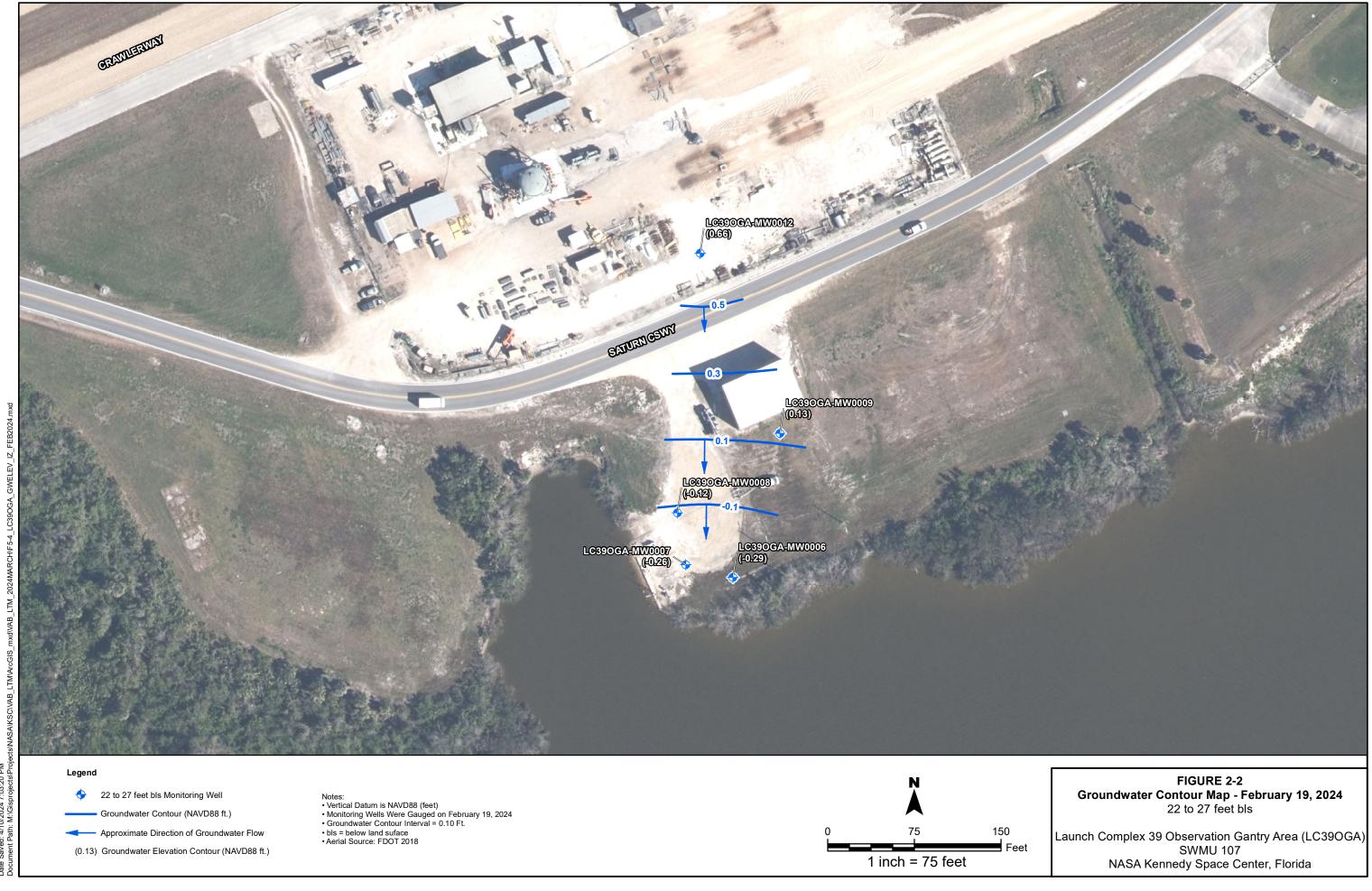
SW = Surface Water

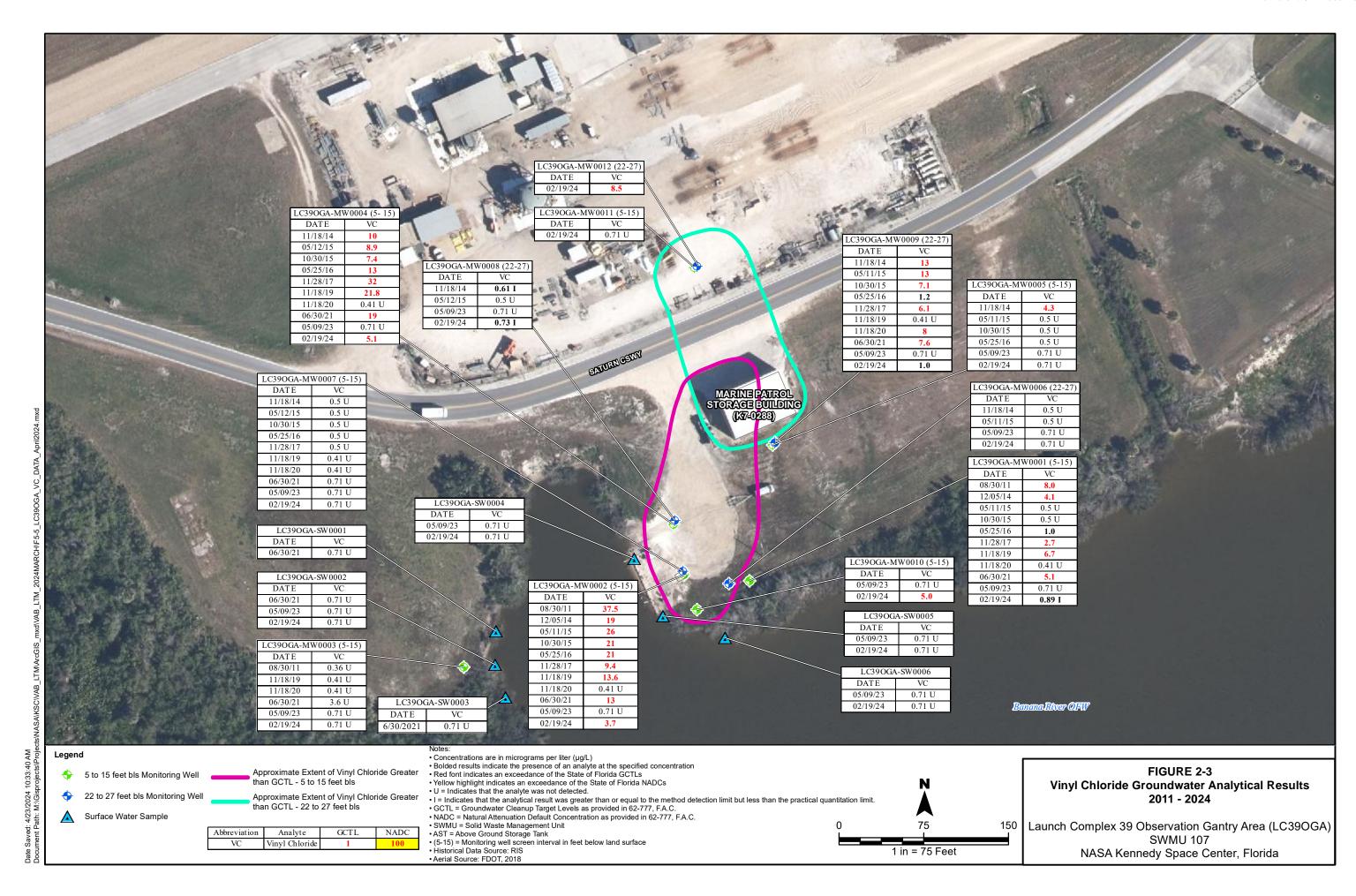
SWMU = Solid Waste Management Unit

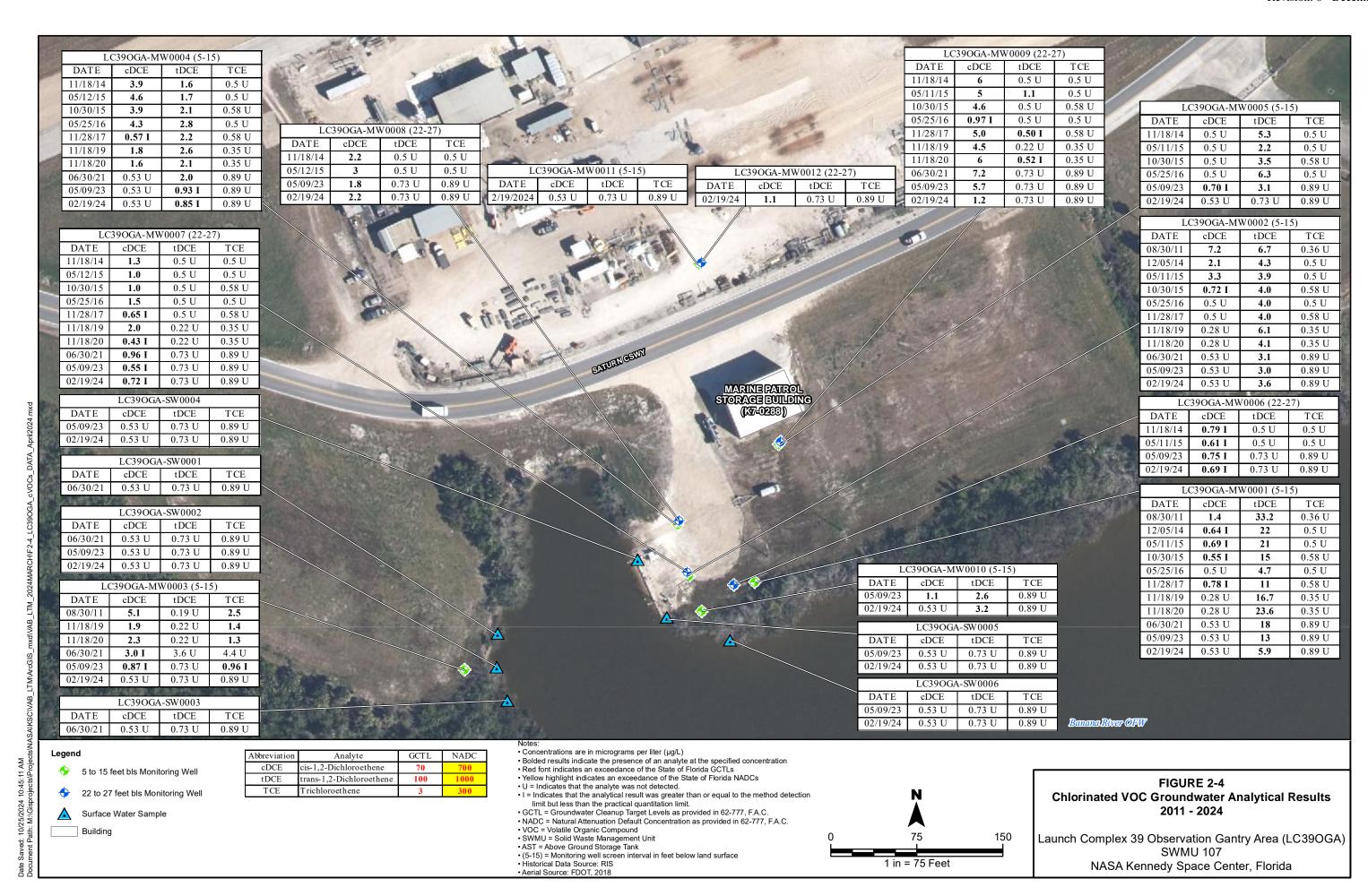
 $U = \mbox{The compound}$ was analyzed for but not detected.

 μ g/L = micrograms per liter









SECTION 3 CONCLUSIONS AND RECOMMENDATIONS

This chapter provides conclusions and recommendations for the VAB LTM program sites based on the February 2024 LTM results. The VAB LTM activities and results were presented to the KSCRT in June 2024, and the KSCRT agreed with the recommendations below. The ADP and meeting minutes are provided in **Appendix A**. The Proposed 2024 LTM schedule is provided as **Table 3-1** and the Proposed LTM Plan for LC39OGA – SWMU 107 is presented on **Figure 3-1**.

3.1 FS3 – SWMU 106

Recommendations/Path Forward

This site was not sampled during the May 2023 biennial sampling event or the February 2024 annual sampling event due to flooding, which prevented access to the monitoring wells. The following recommendations for a path forward are provided.

- The monitoring wells will be sampled during the next available dry period.
- Three monitoring wells, FS6-MW0001 through FS6-MW0003, will be sampled annually for two consecutive years.
- Monitoring well FS6-MW0001 will likely need a riser installed and may need to be relocated to dry land.
- Monitoring wells FS6-MW0002 and FS6-MW0003 may need clearing for access.

The next sampling event is currently scheduled for December 2024 and a site visit will be conducted to determine if new monitoring wells or site clearing will be necessary.

3.2 LC39OGA – SWMU 107

Conclusions

Data from groundwater sampling activities performed during this reporting period have been compared to the previous sampling data, and the following conclusions are provided.

- Groundwater flow in the 5 to 15 feet bls and 22 to 27 feet bls zones is generally to the south toward the Banana River OFW, which is consistent with historical observations.
- In February 2024, VC concentrations were above the GCTL of 1 μg/L in four monitoring wells, LC39OGA-MW0002, LC39OGA-MW0004, LC39OGA-MW0010, and LC39OGA-MW0012.
- No VC concentrations were above NADCs.
- No site VOC concentrations were detected in the surface water samples collected in February 2024.

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Recommendations

Based on groundwater sampling activities performed during this reporting period, and compared to previous sampling events, the following recommendations are provided.

- Remove monitoring well LC39OGA-MW0003 and surface water sample location LC39OGA-SW0002 from the LTM plan due to two or more consecutive events with no detections of site VOCs.
- Conduct annual sampling at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004 through LC39OGA-MW0012.
- Collect surface water samples at four locations, LC39OGA-SW0004, LC39OGA-SW0005, LC39OGA-SW0006, and proposed location LC39OGA-SW0007, which is located directly downgradient of LC39OGA-MW0010.
- Analyze samples for site VOCs.
- Collect water level measurements at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-0002, and LC39OGA-MW0004 through LC39OGA-MW0012.

The next sampling events are scheduled for December 2024.

Table 3-1 Proposed 2024 Long-Term Monitoring Schedule Vehicle Assembly Building Area Long-Term Monitoring Program

		December 2024 Biennial Event								
Well ID	Screen Interval (feet bls)	Water Levels	Re-develop Well Prior to Sampling	Sampled (Analytical Parameters)						
Former Development and Tes	Former Development and Testing Laboratory (FDTL) SWMU 075 (Biennial)									
FDTL-IW0003I	15 to 25	X								
FDTL-IW0004I	15 to 25	X								
FDTL-IW0005I	25 to 35	X								
FDTL-IW0006S	5 to 15	X		d'a Mod						
FDTL-IW0007I FDTL-IW0008I	10 to 20 10 to 20	X		Site VOCs Site VOCs						
FDTL-IW00081	10 to 20 10 to 20	X		Site VOCs						
FDTL-IW00091	10 to 20	X		Site VOCs						
FDTL-IW0011I	10 to 20	X		Site VOCS						
FDTL-IW0012I	10 to 20	X								
FDTL-IW0013I	10 to 20	X								
FDTL-IW0014I	10 to 20	X		Site VOCs						
FDTL-IW0015S	5 to 15	X		Site VOCs						
FDTL-IW0016I	10 to 20	X								
FDTL-IW0017I	10 to 20	X		Site VOCs						
FDTL-IW0018I	5 to 15	X								
FDTL-IW0019I	10 to 20	X		Site VOCs						
FDTL-IW0020I	10 to 20	X		A1						
FDTL-SW0001	Surface Water			Site VOCs						
FDTL-SW0002	Surface Water Surface Water			Site VOCs						
FDTL-SW0003 FDTL-SW0004	Surface Water Surface Water			Site VOCs Site VOCs						
FDTL-SW0004 FDTL-SW0005	Surface Water Surface Water			Site VOCs						
	Fire Station 6) SWMU 106 (A)	nnual for the next two year	s - 2024 and 2025)	Sile vocs						
FS6-MW0001	25 to 35	X	s - 2024 and 2023)	Site VOCs						
FS6-MW0002	20 to 30	X		Site VOCs						
FS6-MW0003	20 to 30	X		Site VOCs						
	tion Gantry Area (LC39OGA)			51.6 (6.65						
LC39OGA-MW0001	5 to 15	X	T	Site VOCs						
LC39OGA-MW0002	5 to 15	X		Site VOCs						
LC39OGA-MW0003	5 to 15			200 / 2 22						
LC39OGA-MW0004	5 to 15	X		Site VOCs						
LC39OGA-MW0005	5 to 15	X		Site VOCs						
LC39OGA-MW0006	22 to 27	X		Site VOCs						
LC39OGA-MW0007	22 to 27	X		Site VOCs						
LC39OGA-MW0008	22 to 27	X		Site VOCs						
LC39OGA-MW0009	22 to 27	X		Site VOCs						
LC39OGA-MW0010	5 to 15	X		Site VOCs						
LC39OGA-MW0011	5 to 15	X		Site VOCs						
LC39OGA-MW0012	22 to 27	X		Site VOCs						
LC39OGA-SW0001	Surface Water									
LC39OGA-SW0002 LC39OGA-SW0003	Surface Water Surface Water									
LC39OGA-SW0003	Surface Water			Site VOCs						
LC39OGA-SW0005	Surface Water			Site VOCs						
LC390GA-SW0006	Surface Water			Site VOCs						
LC39OGA-SW0007*	Surface Water			Site VOCs						
Launch Equipment Shop (LE										
LES-IW0001I	20 to 25									
LES-IW0002S	3 to 13	X								
LES-IW0003S	7 to 17	X								
LES-IW0004S	3 to 13	X								
LES-IW0005S	3 to 13	X		TRPH						
LES-IW0006S	5 to 15	X								
LES-IW0006D	40 to 45									
LES-IW0007S	5 to 15	X								
LES-IW0008S	5 to 15	X								
LES-IW0009S	5 to 15	X		TRPH						
LES-IW0010S	4 to 14	X								
LES-IW0011S	5 to 15	X		TRPH						
LES-IW0012S	5 to 15	X								
LES-IW0013S	6 to 11	X								

2023 Annual LTM Report VAB Area Revision: 0 December 2024

Table 3-1 Proposed 2024 Long-Term Monitoring Schedule Vehicle Assembly Building Area Long-Term Monitoring Program

		December 2024 Biennial Event								
Well ID	Screen Interval (feet bls)	Water Levels	Re-develop Well Prior to Sampling	Sampled (Analytical Parameters)						
Shuttle Flight Operations Con	Shuttle Flight Operations Contract Generator Maintenance Facility (SFOC) SWMU 081 (Biennial)									
SFOC-IW0001S	2 to 12	X	X	Antimony						
SFOC-IW0002S	2 to 12	X	X	Antimony						
SFOC-IW0003S	2 to 12	X								
SFOC-IW0004S	2 to 12	X	X	Antimony						
SFOC-IW0005S	2 to 12	X								
SFOC-IW0006S	5 to 15	X								
SFOC-IW0007S	5 to 15	X								
SFOC-IW0008	8 to 18	X								
SFOC-IW0009	2 to 12	X	X	Antimony						

Notes:

Blank cells indicate that the well is not included for that event or activity.

bls = below land surface

SWMU = Solid Waste Management Unit

TRPH = Total Recoverable Petroleum Hydrocarbons

VOC = Volatile Organic Compound

^{*}Proposed new surface water sample location.



SECTION 4 REFERENCES

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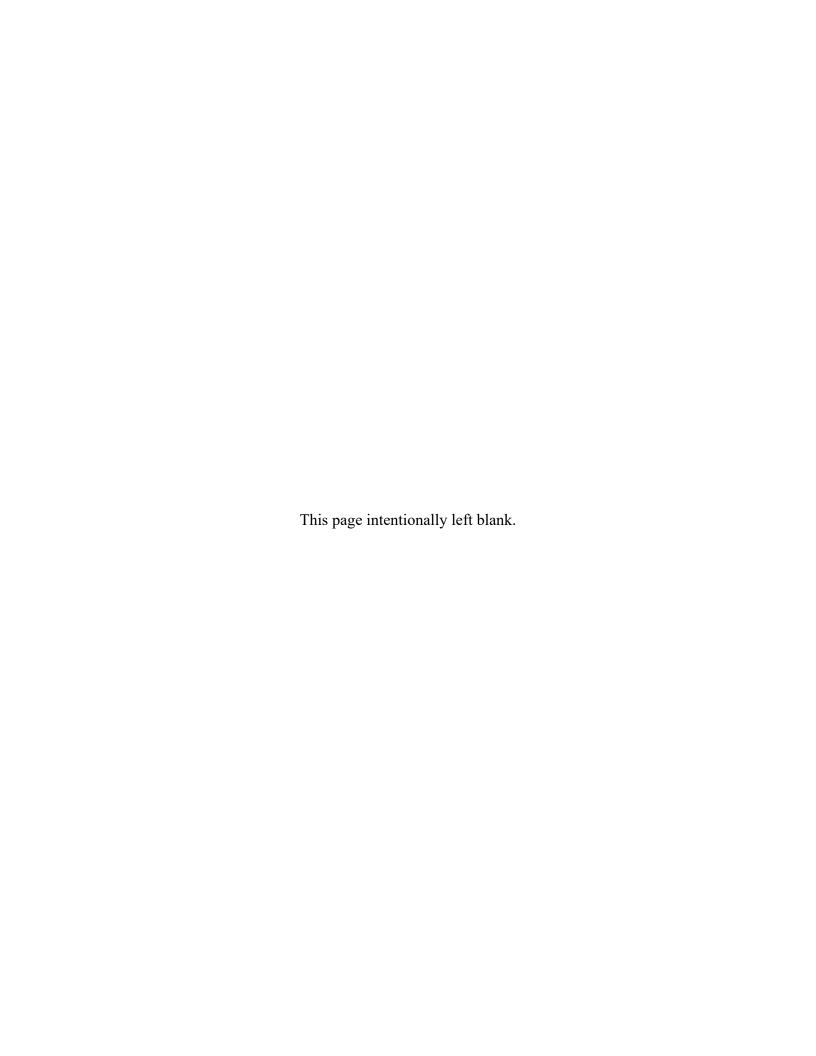
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2023 Annual LTM Report VAB Area Revision: 0 December 2024

NASA. 2024. 2021-2022 Biennial Long-Term Groundwater Monitoring Report, Vehicle Assembly Building Area, Kennedy Space Center, Florida (Revision 0). Prepared by AECOM, Orlando, Florida.

APPENDIX A

ADVANCE DATA PACKAGES AND KSC REMEDIATION TEAM MEETING MINUTES







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

2023 Annual LTM Results:

Fire Station #3 (FS3) – Solid Waste Management Unit (SWMU) 106 Launch Complex 39 Observation Gantry Area (LC39OGA) – SWMU 107

June 2024

This 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.

Delivering a better world



Outline

- VAB LTM Program Overview
- FS3 SWMU 106
- LC39OGA SWMU 107





VAB LTM Program Overview

- Five sites are currently in the VAB LTM Program and are sampled at various frequencies
- These sites are grouped together to combine field efforts and reduce quantities of Advance Data Packages (ADPs) and reports.

Site Name	Site Acronym & Number	Site COCs	Sampling Frequency	2023 Annual Sampling Event	2024 Biennial Sampling Event
Former Development and Testing Laboratory	FDTL SWMU 075	TCE and VC	Biennial		November 2024
Fire Station #3 (Former Fire Station #6)	FS3 SWMU 106	VC	Biennial	February 2024*	November 2024
Launch Complex 39 Observation Gantry Area	LC39OGA SWMU 107	VC	Annual	February 2024	November 2024
Launch Equipment Shop	LES PRL 051	TRPH	Annual		November 2024
Shuttle Flight Operations Contract Generator Maintenance Facility	SFOC SWMU 081	Antimony	Biennial		November 2024

Notes:

Sites above are located at Kennedy Space Center (KSC) Bolded sites and dates are discussed in this presentation *FS3 was flooded during the February 2024 sampling event COC – Contaminant of Concern

SWMU - Solid Waste Management Unit

PRL - Potential Release Location

TCE - Trichloroethene

TRPH – Total Recoverable Petroleum Hydrocarbons

VC - Vinyl Chloride



VAB LTM Program Overview

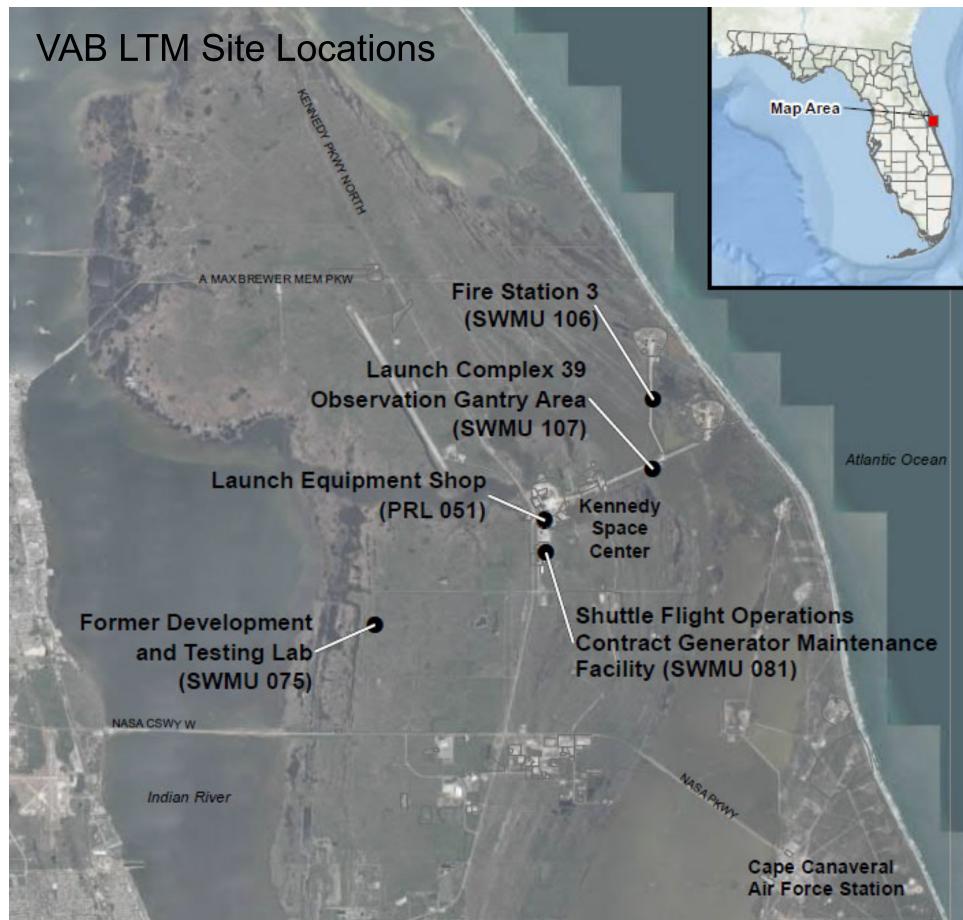
Sites Discussed in this ADP

- FS3 SWMU 106
- LC39OGA SWMU 107

Remediation Goal

 Achieve groundwater and soil contaminant concentrations below State of Florida Cleanup Target Levels promulgated in Chapter 62-777, Florida Administrative Code





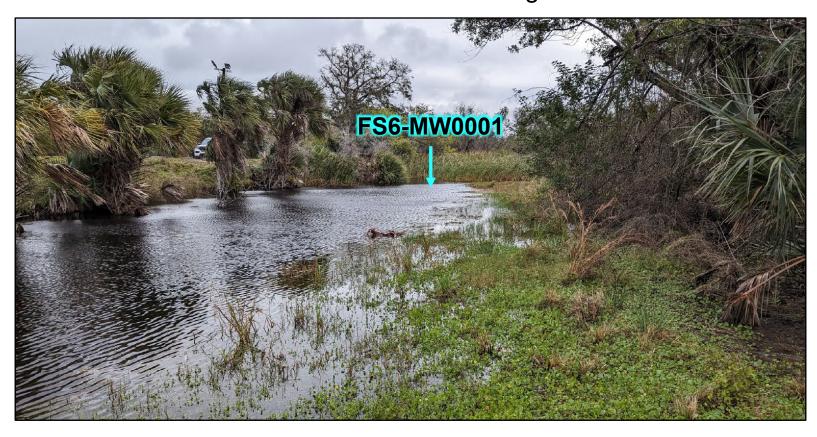
Fire Station #3

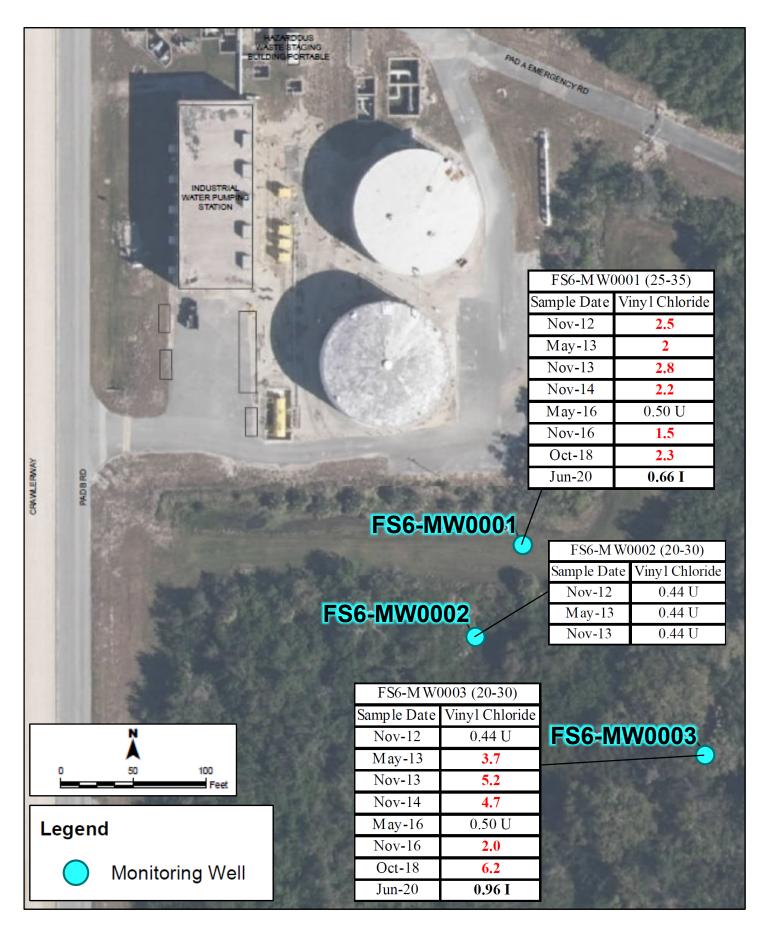
Site Flooding

- LTM was originally scheduled to be conducted during the May 2023 Biennial LTM event; however, the site was flooded, which prevented access to the monitoring wells
- In February 2024, an attempt to conduct the event was made during the annual LTM event, but the site was still flooded

Path Forward

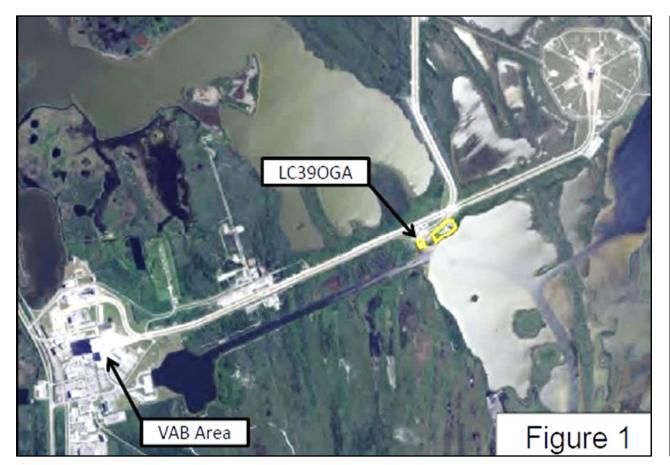
- Monitoring wells will be sampled during the next available dry period; All three wells will be sampled annually for two consecutive years
- MW0001 will likely need a riser installed and may need to be relocated to dry land
- MW0002 and MW0003 will need clearing to access

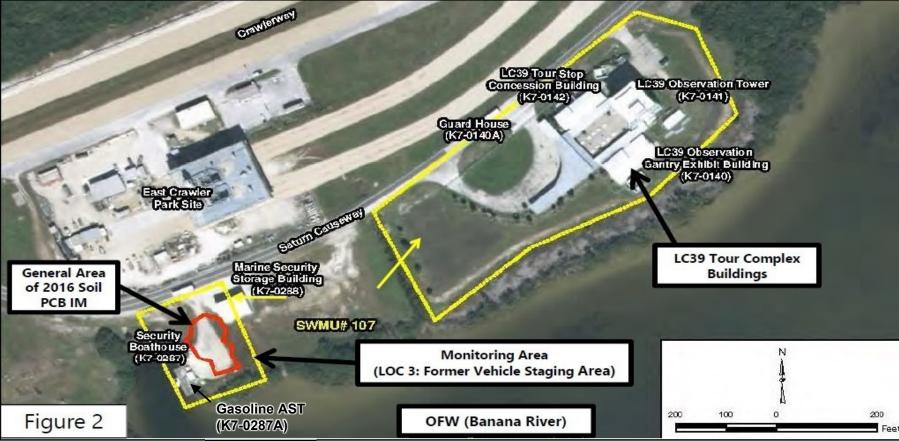




Launch Complex 39 Observation Gantry Area – Site Location and Overview

- Site is located northeast of the VAB area, along the Saturn Causeway
- Monitored area is the Location of Concern (LOC) 3 Former Vehicle Staging Area
- East Crawler Park site, now known as the Mobile Service Structure (MSS) Park site, is to the north
- The Banana River, which is part of the Indian River Lagoon System, is an Outstanding Florida Water (OFW) and is to the south and west
- Site was added to the VAB LTM Program in 2019







Launch Complex 39 Observation Gantry Area – Site Overview

May 2021 Direct Push Technology (DPT) Groundwater Sampling

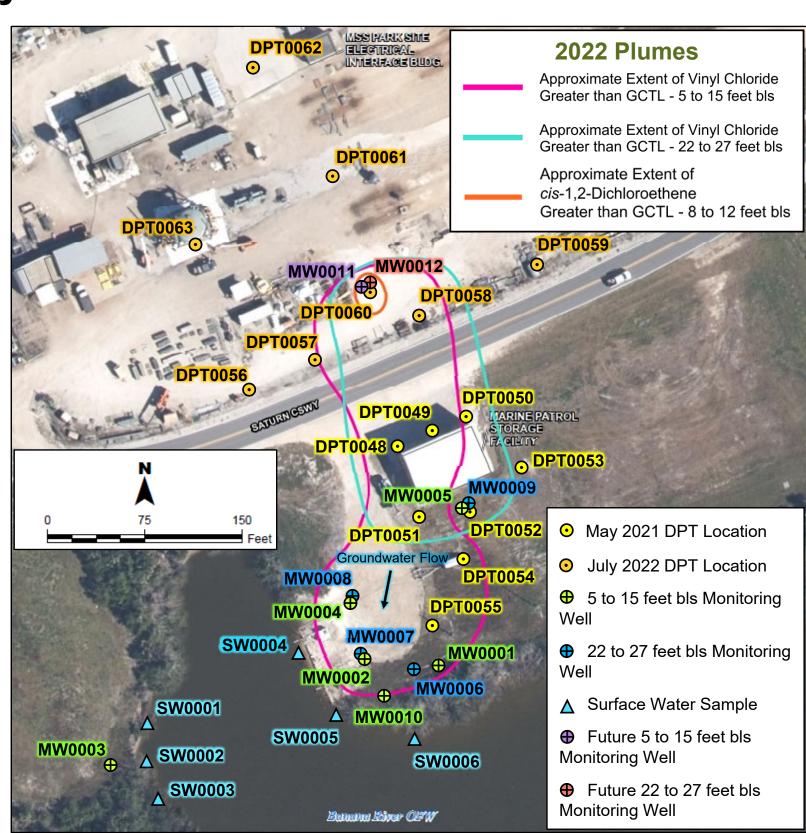
- 31 groundwater samples at 8 DPT locations
- 10 samples from seven locations had VC above the State of Florida Groundwater Cleanup Target Level (GCTL)
- No concentrations exceeded GCTLs below 27 feet below land surface (bls)

June 2021 Annual LTM

- Six monitoring wells and three surface water samples collected
- Four monitoring wells, three 5 to 15 feet bls MW0001, MW0002, and MW0004 and one 22 to 27 feet bls MW0009 had VC above the GCTL
- No detections in the surface water samples

Proposed:

- Limited DPT groundwater sampling in the northeast area to determine the location for an upgradient monitoring well
- Installation of monitoring well MW0010 downgradient of the plume
- Annual sampling of ten monitoring wells, adding monitoring wells MW0005, MW0006, MW0008, and MW0010 to the LTM plan
- Four surface water samples at SW0002, SW0004, SW0005, and SW0006
- Water level measurements at 10 monitoring wells



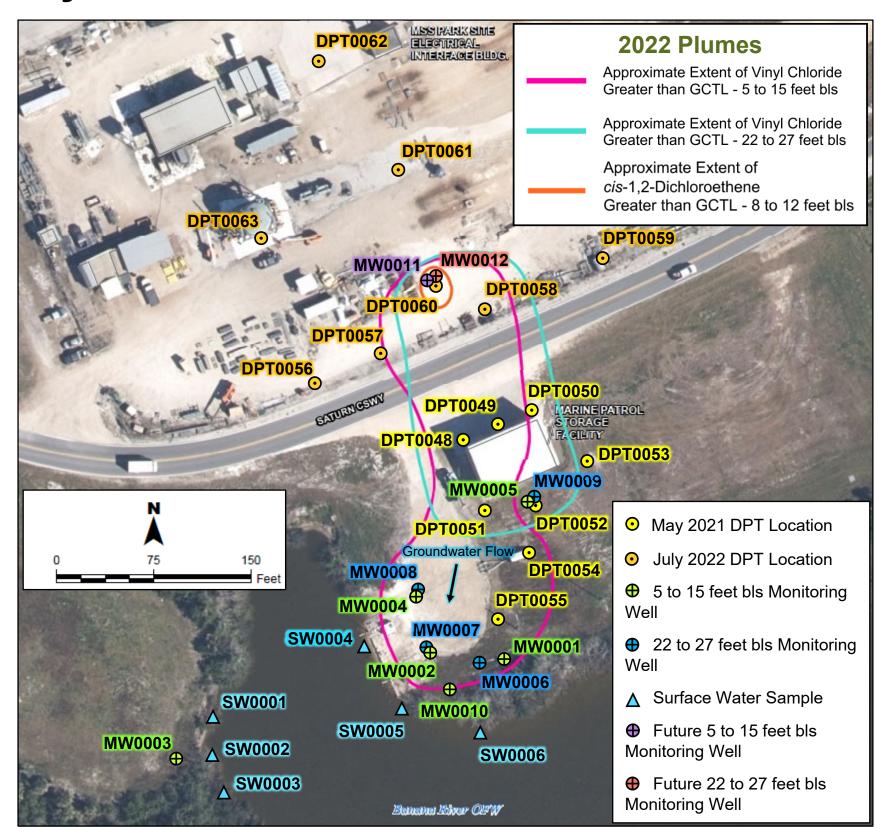
Launch Complex 39 Observation Gantry Area – Site Overview

July 2022 DPT Groundwater Sampling

- 37 groundwater samples at 8 DPT locations
- Five samples from two locations, DPT0058 and DPT0060, had VC above the GCTL; 2 at 8-12 feet bls, 1 at 13-17 feet bls, and 2 at 23 to 27 feet bls
- One sample, DPT0060 at 8-12 feet bls, had cis-1,2-dichloroethene (cDCE) above the GCTL
- No concentrations exceeded GCTLs in samples below 27 feet bls

Proposed:

 Installation of two monitoring wells, MW0011 and MW0012, adjacent to DPT0060, and to add them to the LTM plan



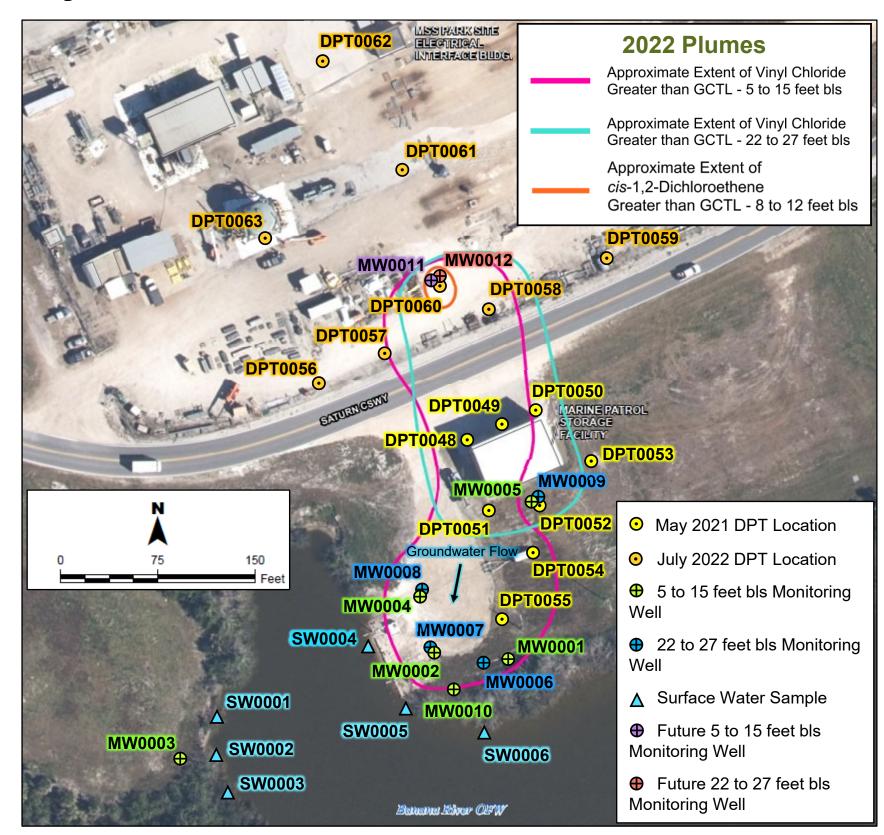
Launch Complex 39 Observation Gantry Area – Site Overview

May 2023 Annual LTM

- Monitoring wells MW0011 and MW0012 were not installed because of construction activities that restricted access to the MSS Park Site
- Ten monitoring wells sampled, and four surface water samples collected
- cDCE, trans-1,2-dichloroethene (tDCE), and TCE were detected in several monitoring wells; however, the concentrations were below GCTLs
- VC was not detected
- No detections in the surface water samples

Proposed:

- Once the MSS Park Site can be accessed, install monitoring wells MW0011 and MW0012
- Annual sampling of 12 monitoring wells, MW0001 through MW0012
- Surface water samples at four locations, SW0002, SW0004, SW0005, and SW0006
- Water level measurements at 12 monitoring wells



Launch Complex 39 Observation Gantry Area – Current Site Layout



Launch Complex 39 Observation Gantry Area – Feb 2024 Scope of Work

Site Volatile Organic Compounds (VOCs)

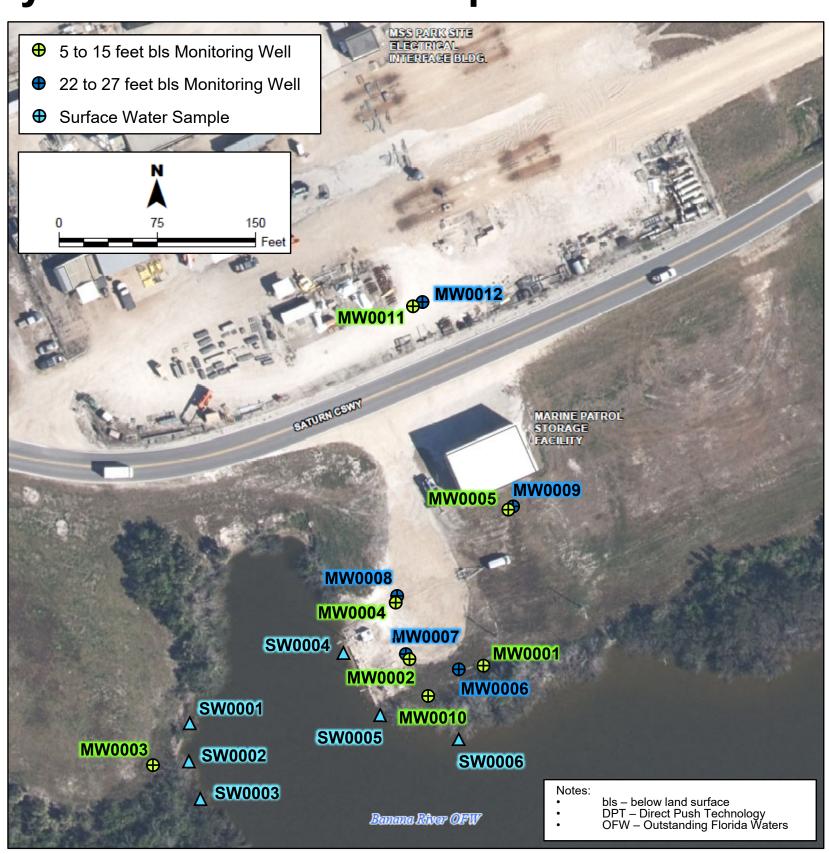
- cDCE
- tDCE
- TCE
- VC (VC is the site COC)

Feb 2024 – Monitoring Well Installation

- Installed two monitoring wells via DPT
 - LC39OGA-MW0011 (5 to 15 feet bls)
 - LC39OGA-MW0012 (22 to 27 feet bls)
- Located on the southern edge of the MSS Park Site, adjacent to DPT0060, upgradient of the VC plume

Feb 2024 – Annual LTM

- Collected water level measurements at 12 monitoring wells
- Sampled 12 monitoring wells
- Collected four surface water samples
- Analyzed samples for site VOCs



Launch Complex 39 Observation Gantry Area – Feb 2024 Groundwater Flow

5 to 15 feet bls

- Flow direction was southwest towards the Banana River
 OFW, which is consistent with historical observations
- Average depth to groundwater was 1.93 feet bls
- May 2023 groundwater flow direction was to the southwest

LC390GA-MW0005

22 to 27 feet bls

- Flow direction was south towards the Banana River OFW, which is consistent with historical observations
- Average depth to groundwater was 2.42 feet bls
- May 2023 groundwater flow direction was to the southwest



Launch Complex 39 Observation Gantry Area – Feb 2024 Analytical Results

- cDCE [2.2 micrograms per liter (μg/L)] and tDCE (5.9 μg/L) were detected in several monitoring wells; however, the concentrations were below GCTLs; the highest concentrations for each analyte are shown in brackets/parentheses above
- TCE was not detected
- VC concentrations were above the GCTL in four monitoring wells: MW0002, MW0004, MW0010, and MW00012
- Site VOCs were not detected in surface water
- No concentrations were above State of Florida Natural Attenuation Default Concentrations

VC Concentrations in Groundwater (last five events; GCTL = $1 \mu g/L$)

Sample Date	MW0001	MW0002	MW0003	MW0004	MW0005	MW0006	MW0007	MW0008	MW0009	MW0010	MW0011	MW0012
Screen Interval	5-15	5-15	5-15	5-15	5-15	22-27	22-27	22-27	22-27	5-15	5-15	22-27
11/18/2017	2.7	9.4	NS	32	NS	NS	NS	NS	6.1	NS	NS	NS
11/18/2019	6.7	13.6	0.41 U	21.8	NS	NS	0.5 U	NS	0.41 U	NS	NS	NS
11/18/2020	0.41 U	0.41 U	0.41 U	0.41 U	NS	NS	0.41 U	NS	8	NS	NS	NS
06/30/2021	5.1	13	3.6 U	19	NS	NS	0.71 U	NS	7.6	NS	NS	NS
05/09/2023	0.71 U	NS	NS									
02/19/2024	0.89 I	3.7	0.71 U	5.1	0.71 U	0.71 U	0.71 U	0.73 I	1.0	5.0	0.71 U	8.5

VC Concentrations in Surface Water (SWCTL = 2.4 μg/L)

Sample Date	SW0001	SW0002	SW0003	SW0004	SW0005	SW0006
06/30/2021	0.71 U	0.71 U	0.71 U	NS	NS	NS
05/09/2023	NS	0.71 U	NS	0.71 U	0.71 U	0.71 U
02/19/2024	NS	0.71 U	NS	0.71 U	0.71 U	0.71 U

Notes:

Detections are **bolded**

GCTL Exceedances are red bolded

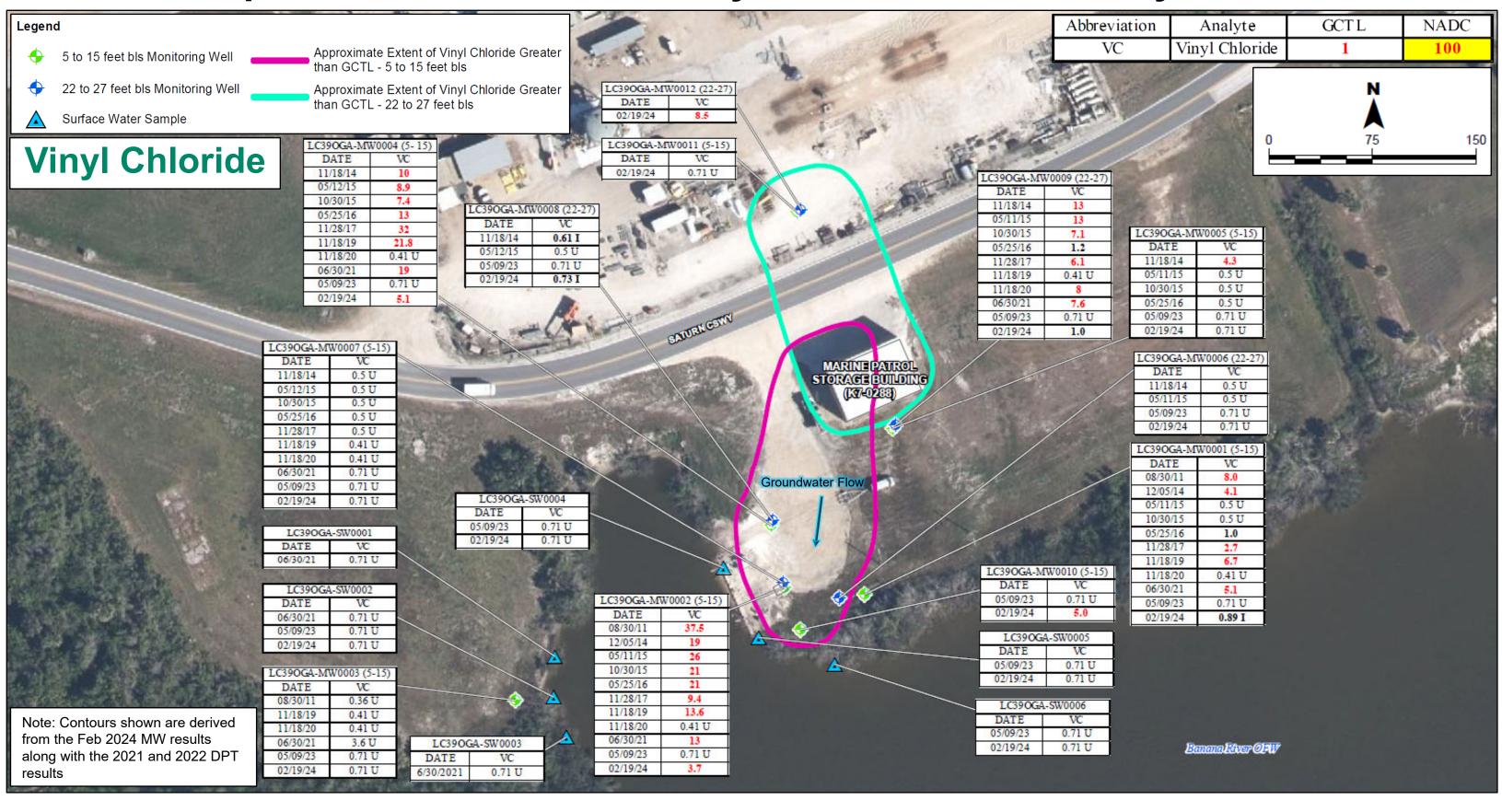
NS = Not Sampled

SWCTL = State of Florida Surface Water Cleanup Target Level

U = The analyte was not detected



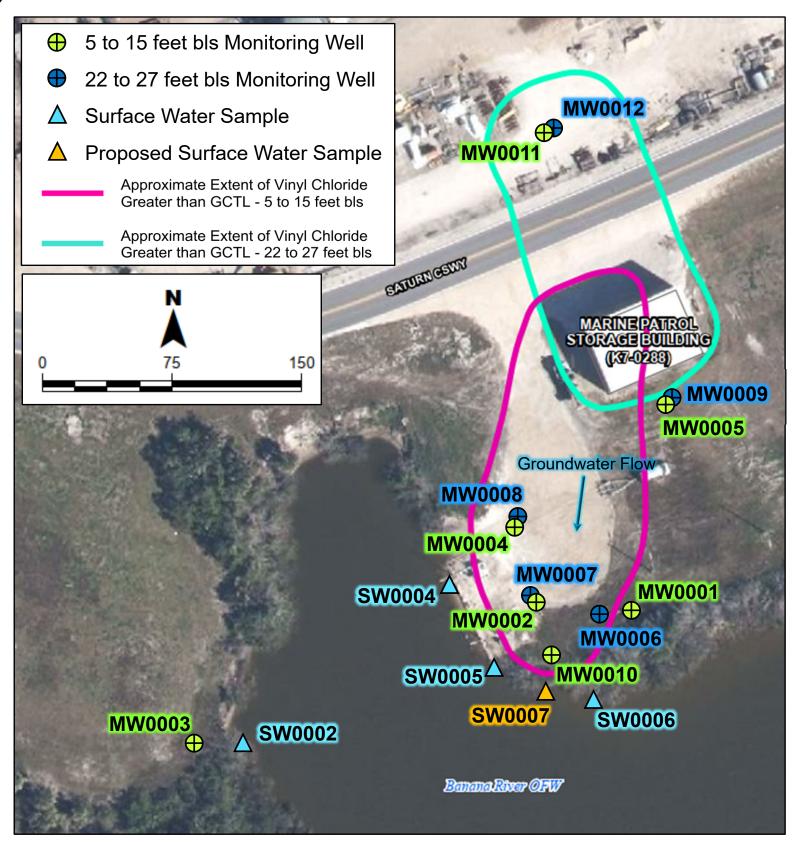
Launch Complex 39 Observation Gantry Area – Feb 2024 Analytical Results



Launch Complex 39 Observation Gantry Area – Test Consensus

Test Consensus:

- Remove LC39OGA-MW0003 and LC39OGA-SW0002 from the LTM plan due to two or more consecutive events with no detections of site VOCs
- Conduct annual sampling at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-0002, and LC39OGA-MW0004 through LC39OGA-MW0012
- Collect surface water samples at four locations, LC39OGA-SW0004, LC39OGA-SW0005, LC39OGA-SW0006, and proposed location LC39OGA-SW0007 which is located directly downgradient of LC39OGA-MW0010
- Samples will be analyzed for site VOCs
- Collect water level measurements at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-0002, and LC39OGA-MW0004 through LC39OGA-MW0012
- The next sampling event is scheduled for November 2024



Launch Complex 39 Observation Gantry Area –Test Consensus

Proposed LTM Plan

Location ID	Screen Interval (feet bls)	Water Levels	Analysis
LC39OGA-MW0001	5 to 15	X	site VOCs*
LC39OGA-MW0002	5 to 15	X	site VOCs*
LC39OGA-MW0004	5 to 15	X	site VOCs*
LC39OGA-MW0005	5 to 15	X	site VOCs*
LC39OGA-MW0006	22 to 27	X	site VOCs*
LC39OGA-MW0007	22 to 27	X	site VOCs*
LC39OGA-MW0008	22 to 27	X	site VOCs*
LC39OGA-MW0009	22 to 27	X	site VOCs*
LC39OGA-MW0010	5 to 15	X	site VOCs*
LC39OGA-MW0011	5 to 15	X	site VOCs*
LC39OGA-MW0012	22 to 27	X	site VOCs*
LC39OGA-SW0004	NA	NA	site VOCs*
LC39OGA-SW0005	NA	NA	site VOCs*
LC39OGA-SW0006	NA	NA	site VOCs*
LC39OGA-SW0007 (Proposed)	NA	NA	site VOCs*

Notes:

*site VOCs to Analyze:

- trichloroethene
- cis-1,2-dichloroethene
- *trans*-1,2-dichloroethene
- vinyl chloride

bls = below land surface NA = Not applicable









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

2023 Annual LTM Results:

Fire Station #3 (FS3) - SWMU 106

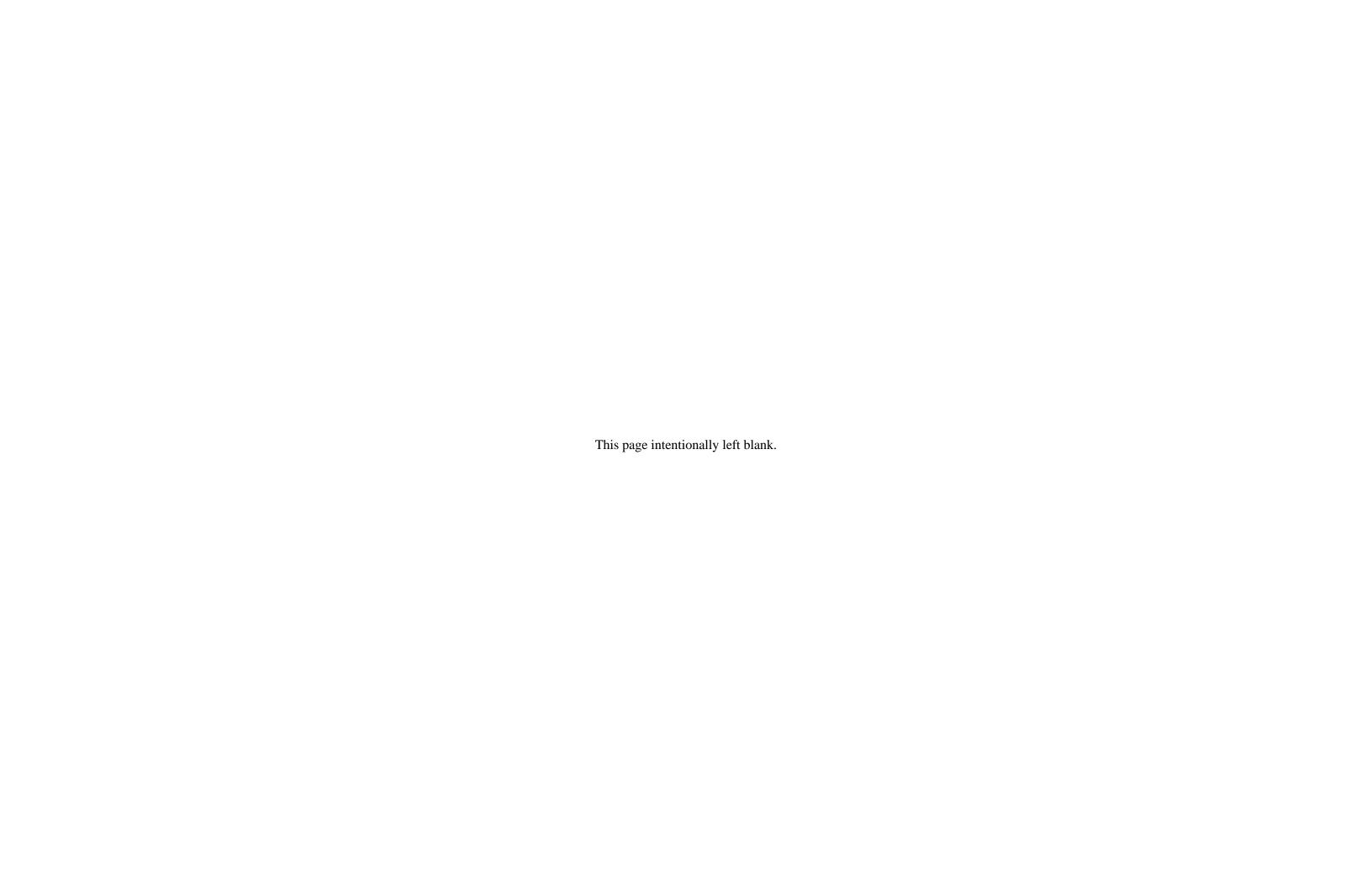
Launch Complex 39 Observation Gantry Area (LC39OGA) – SWMU 107

June 2024

Tables and figures presenting the analytical results discussed in this ADP are attached.

Delivering a better world





This is a partial version that only includes the minutes pertaining to the VAB LTM ADP Only. The VAB LTM minutes are boxed in red.

Revision 0 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. Megan Matteazzi/HGL
- 26. 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).

2406-M05 Chad Lee/AECOM

VAB Area 2023 Annual LTM Summary (Fire Station 3, SWMU 106 and Launch Complex 39 Observation Gantry Area, SWMU 107)

Objective: The objective of the ADP is to provide a brief background of the Solid Waste Management Unit (SWMU) sites, and a summary of Long-Term Monitoring (LTM) activities performed in February 2024.

Fire Station 3 (FS3), (formerly FS6):

The FS3 site was flooded during the February 2024 Annual LTM Event which prevented access to the monitoring wells; therefore, LTM was not conducted in February 2024. Periodically, site visits will be made and if the water recedes enough to allow access to the monitoring wells, the LTM event will be scheduled and conducted.

For a path forward, monitoring wells will be sampled during the next available dry period. All three wells will be sampled annually for two consecutive years. FS6-MW0001 will likely need a riser installed and may need to be relocated to dry land. FS6-MW0002 and FS6-MW0003 will need clearing for access. Collection of groundwater samples from 2 monitoring wells for analysis of site volatile organic compounds (VOCs).

In the meeting it was determined to proceed with monitoring well install MW0001 with a riser in November 2024. We may have to adjust the well based on the site conditions. There is a concern accessing monitoring wells MW0002 and MW0003 if MW0001 is under water.

FDEP inquired if this area was not flooded before and now it is. Do we know why? The Team is not aware of construction or a change in this area. NASA will conduct periodic monthly inspections to see site conditions and check access to MW0002 and MW0003 as well. (Plan to look at this site at the next land use control site inspection at the end of June).

Launch Complex 39 Observation Gantry Area (LC39OGA): Installation of two new monitoring wells LC39OGA-MW0011, screened from 5 to 15 feet below land surface (bls), and LC39OGA-MW0012, screened from 22 to 27 feet bls.

Measurement of water levels from 12 monitoring wells to determine groundwater flow direction.

Collection of groundwater samples from 12 monitoring wells for analysis of site volatile organic compounds (VOCs), *cis*-1,2-dichloroethene (*c*DCE), *trans*-1,2-dichloroethene (*t*DCE), trichloroethene (TCE), and vinyl chloride (VC).

Collection of four surface water samples for analysis of cDCE, tDCE, TCE, and VC. The site COC is VC.

Groundwater flow at the site in February 2024 was to the southwest in the 5 to 15 feet bls zone and to the south in the 22 to 27 feet bls zone. Analytical results indicate that vinyl chloride concentrations were above the GCTL of 1 μ g/L in four monitoring wells, LC39OGA-MW0002, LC39OGA-MW0004, LC39OGA-MW0010, and LC39OGA-MW0012. In several monitoring wells, *c*DCE and *t*DCE were detected, but concentrations were below their respective State of Florida Groundwater Cleanup Target Levels (GCTLs) of 70 μ g/L and 100 μ g/L. TCE was not detected in the groundwater samples, and no site VOCs were detected in the surface water samples.

The Team reached consensus to remove LC39OGA-MW0003 and LC39OGA-SW0002 from the LTM plan due to two or more consecutive events with no detections of site VOCs (2406-D08).

The Team reached consensus to conduct annual sampling at 11 monitoring wells, LC39OGA-MW0001, LC39OGA-MW0002, and LC39OGA-MW0004 through LC39OGA-MW0012 (2406-D09).

The Team reached consensus to collect surface water samples at four locations, LC39OGA-SW0004, LC39OGA-SW0005, LC39OGA-SW0006, and proposed location LC39OGA-SW0007 which is located directly downgradient of LC39OGA-MW0010 (2406-D10).

The Team reached consensus that samples will be analyzed for site VOCs (2406-D11).

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:

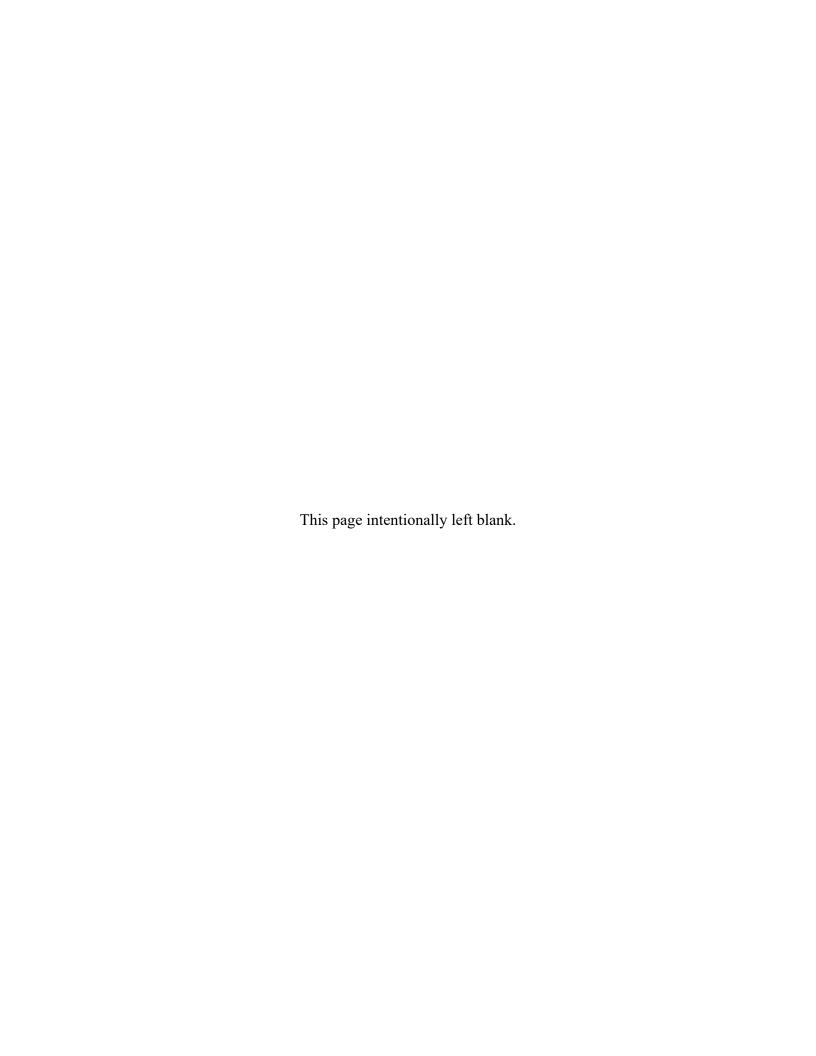
Field efforts summarized in the ADP include Operation and maintenance activities (O&M) and semi-annual performance monitoring within the Biosparge Area, interim groundwater monitoring (IGM) within the former Hot Spot 2 area, annual groundwater sampling from Hot Spot 3 Outstanding Florida Waters (OFW) 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 μ g/L). The system was further expanded in February 2023 with five biosparge wells installed to bridge gap between existing sparge walls

APPENDIX B PHOTOGRAPHIC LOG



FIELD PHOTO LOG

Project Name: VAB LTM Program **Project Number:** 60615547

Site Name: Fire Station #3 (FS3) (Former FS6) – SWMU

106

Site Location: Kennedy Space Center, FL

Photo No. 1

Date: 02/19/24

Location:

Fire Station #3

Description:

Photo of flooded area facing northeast



Photo No. 2

Date: 02/19/24

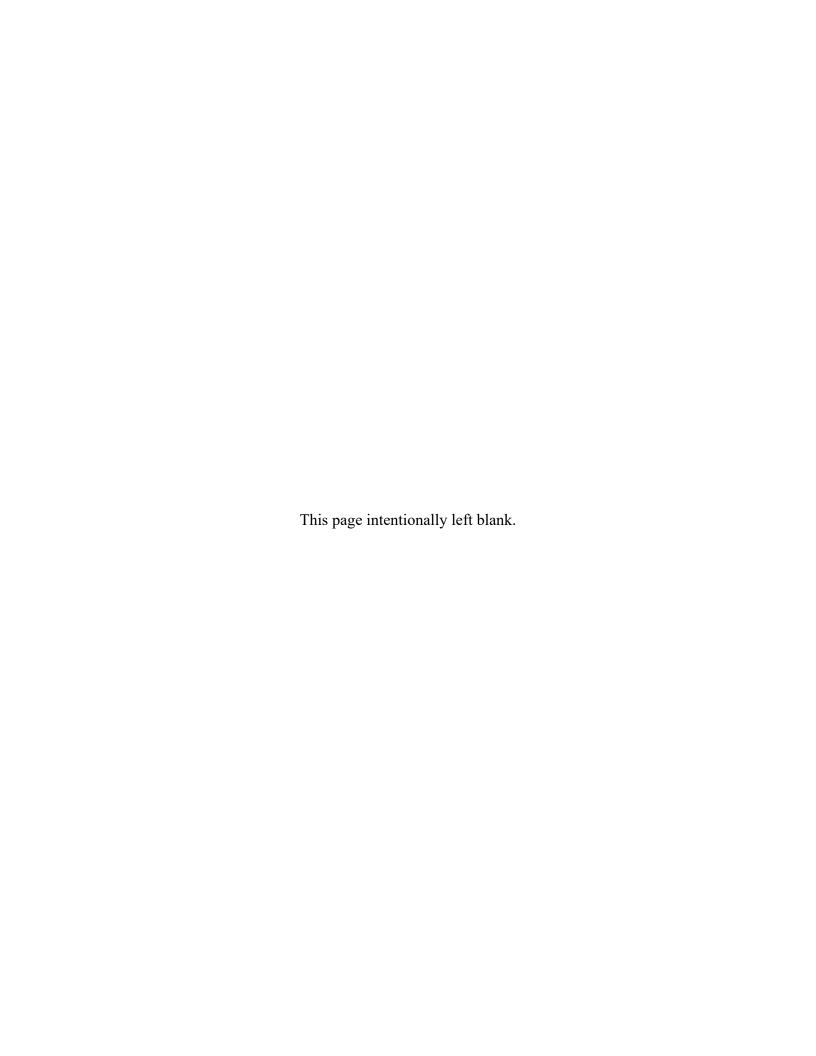
Location:

Fire Station #3

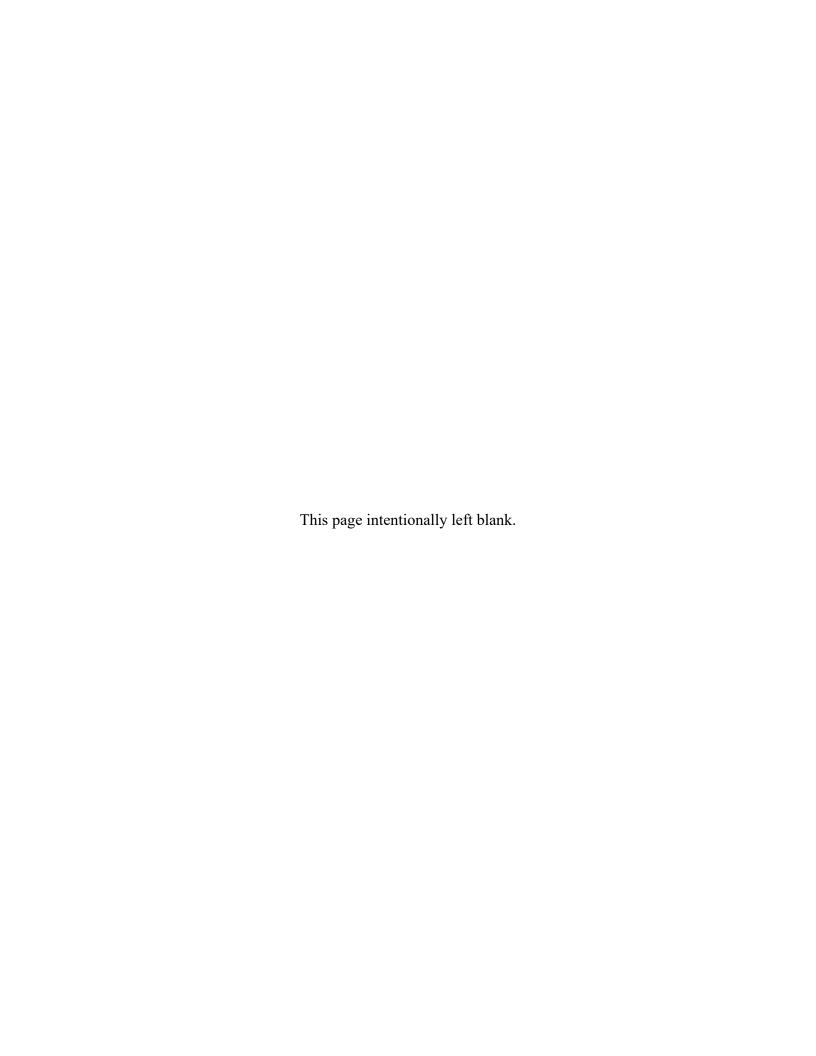
Description:

Photo of flooded area facing northeast closer to the FS6-MW0001 location.





APPENDIX C DAILY FIELD NOTES



	LC39047A BF/	
1 121	VAB LTM LC39067A BF/EDS	02/15/24
02/15/24	Brittery Pollett departs AEcony	n
0700	C V3(-	1150
0805	at Richard	1200 Bre
	- Podeing Office	1230 Bac
08 40	Ammentin (formerly Boss)	Her
0000	do the utility locate Ammentum off-site- all utilities	1240 NC+
0900	Lun Cleared	1300 Com
1000	EDS on the way to the site From the Badying Office	Co
1015	EPS on-site	1305 Beg
	- H+S meeting - Sow: Instell 2 monitoring mell	1335 Com
	Screened from 5-15 and 22-27	1340 Be
1025	Begin well instellations	1355 Com
1040	Hand auger first 5 feet, and begin	υρ
1100	Complete installation of LC390GA-MWOOIZ	1400 Depart
	Screen = 22-27 Ft. See Digital	1405 Am
1107	Develope LC390GA-HW0012	1430 All
1140	Complete development of 15390GA	
	10390GA - MW0012	1019

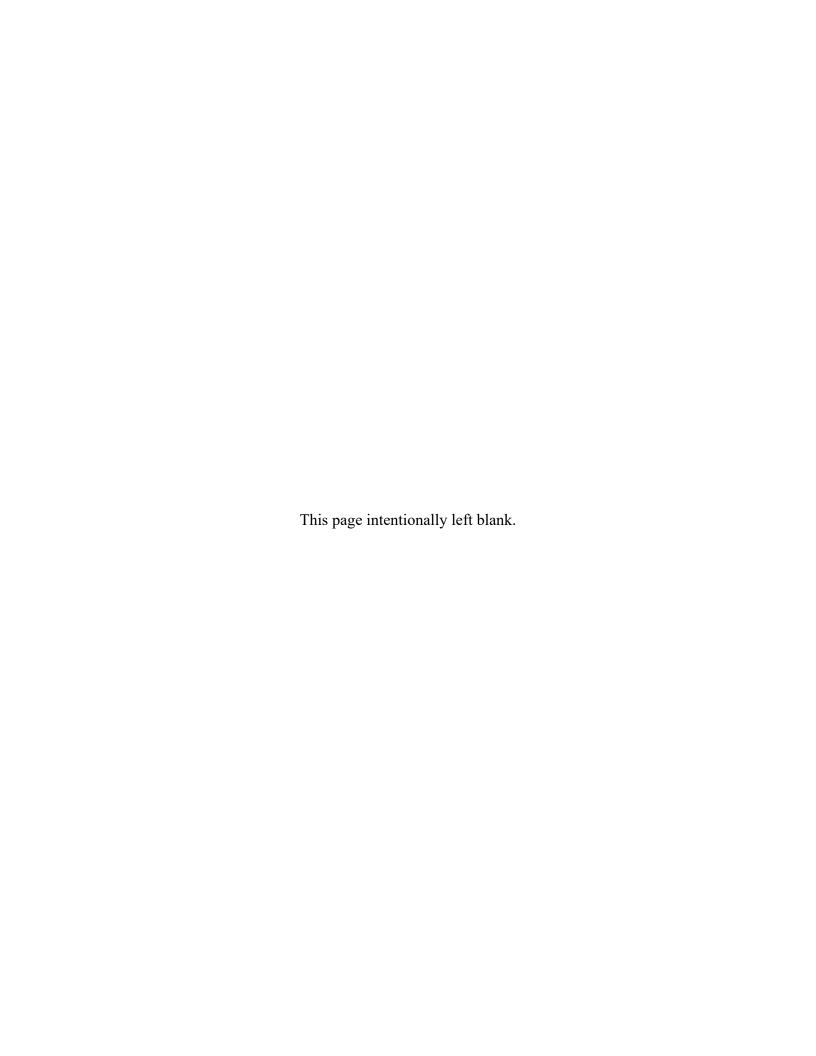
Well Instell
P8 2092

BF/ EDS

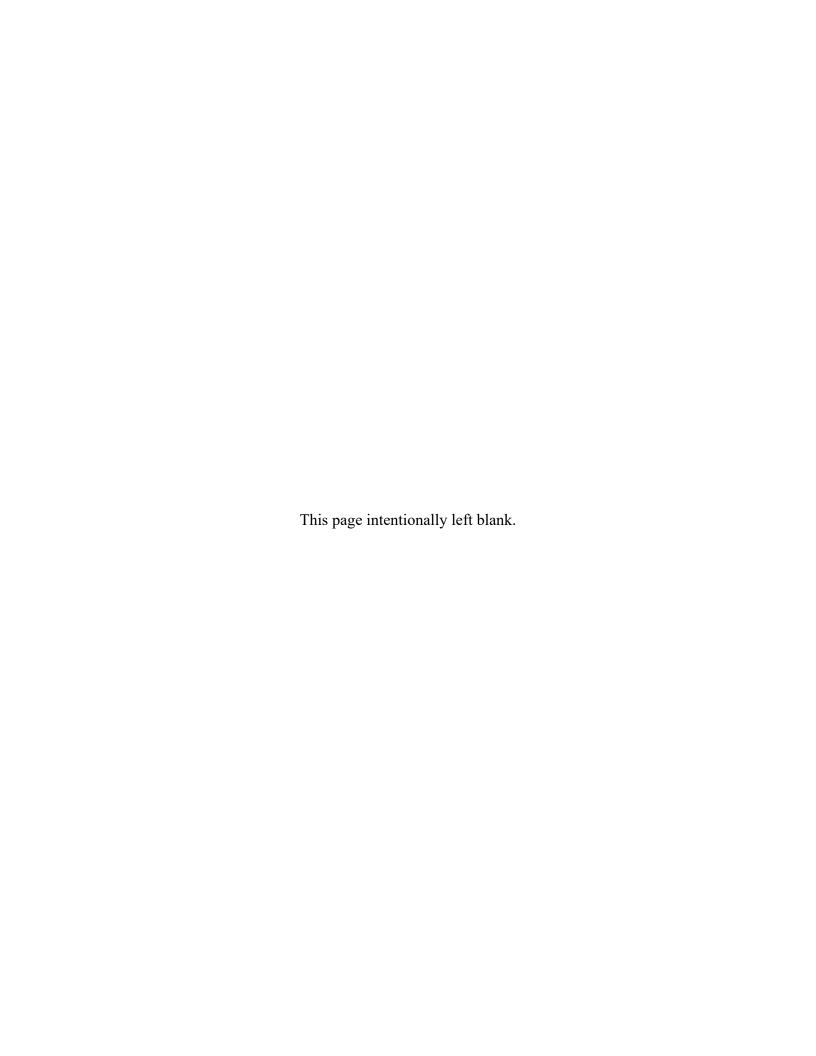
1150	Begin in Statterion of LEGGER HWOOD
	Hand augus first & Feet : 35
1200	Breck for lunch
1230	Back from lunch
1135	Begin installation of LC390GA-MWOOI
1	Hand auser Birst 5 feet
1240	Notasno Derre (NASA) on-site
17.55	Notasha Darra Off-Site
1300	Complete instellation of LC390GA -MWOO
	Screen 5-15. See Digital Well
	construction ly for details
1305	Begin development of LC390GA-MWOO!
	- Construct well pad for L6390GA - M NOO
1335	Complete development of LC350GA - MWOOII
1340	
	LC390GA-MWOON
1355	Complete well pad construction . Pack
	of simple dum
	of simple dum
1400 D	uport LC390ChA for CCF.
1405	Arme at CCF and piece dum on wood
	pellet.
1430	All off-site. End of day
	8F

NASA VABLIM LC3906A+FS3 2-19-24 19 lof 2 0630 Devin K. + Madan P. arrive at A Ecom depot to load vehicles DK+MP Mobilize to site (2 trucks 427(P250)) 0700 Arrive atsite, meet Dustin S. (F150, 275) 0800 0815 Calibrate equipment and begin collecting WLS at LC3906A Weather: High 50s, rain SOW: LTM sampling for LC390GA + F53 0825 DK goes to F53 to check conditions -Site flooded which prevents LTM sampling from ocurring 0855 Surveyors arrive at LC390GA to survey MW00011 + MW0012 Begin Sampling 1006 Mw0063-010.0 Sampled @ 10'b/s 1012 MW0006 Sampled CO 16/6/5 1030 SWGOOZ Sumpled @ 1 his 1037 MW0008 sampled 00 24,5765 1047 MW0005 sampled @ 10' bls 1103 5 WOODY Sampled @ 1 Ns 1118 Mwoody sumpled @24,5 615 1172 MWOOOY Sumpled @ 10' bls 1134 5 W0005 Sampled @ 1'615 1202 Mw0007 Sampled @ 24,5'615 1208 SWOOD & Sampled @ 1'bls

NASA VABLIM LC390GA + FS3 DKMP/DS 2-19-24 Pg 20 + 2 240 MWOOLL Samples 1015 101 615 MWOOD Sampled Myrocal sample -IDW0001-20240219 ves site for Eurofins DIC dropoff samples at Eurofins Endorda



APPENDIX D GROUNDWATER SAMPLING AND CALIBRATION LOGS





Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

NM

7.95

Project #: 60615547

Sample ID: LC390GA-MW0001-010.0-20240219

Monitoring Well

Sample Date: 2/19/2024 1:22:00 PM

Madan Parsotan

Select VOCs

Well ID: LC390GA-MW0001

1.3

4.6

1.32

Comments:

Location Type:

Measured Well Depth

(ft-BTOC):

1:21 PM

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.05
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	15.00	Purge/Sample Method:	PP

Sampler:

Sample Analysis:

Purge Information Purge COND DO Temp ORP Vol Cumul. Depth to Turb Salinity Color Odor рΗ Rate Purged Vol Water (S.U.) (US/CM) (MG/L) (NTU) (C) (MV) (PSU) (NA) (NA) Time (gal/mi (gal) Purged (FT) n) (gal) 12:45 PM 1.05 Clear 0 None 1:15 PM 1 1 1.32 8.01 1633 0.04 21.23 21.39 -320.1 0.83 Clear None 1:17 PM 1.1 2.1 1.32 8 1659.6 0.04 16.79 21.37 -321.1 0.85 Clear None 1:19 PM 1.2 3.3 7.97 1730.2 0.06 -323.2 0.89 Clear 1.32 16.88 21.35 None

Start Purge:	2/19/2024 12:45:00 PM	End Purge:	2/19/2024 1:21:00 PM	Total Volume (gal):	4.6	
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0.06

16.78

21.37

-324.5

0.92

Clear

None

1801.1



Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Bottom of Screen (ft-BTOC):

Sample ID: LC390GA-MW0002-010.0-20240219

Well ID: LC390GA-MW0002 Sampler:

Location Type: Monitoring Well

Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.21
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0

Sample Date:

Purge/Sample Method:

2/19/2024 12:32:00 PM

Madan Parsotan

Measured Well Depth (ft-BTOC): Sample Analysis: Select VOCs

15.00

Purge Info	ormation	า											
Time	Purge Rate (gal/mi n)	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)
12:05 PM			0	1.21								Clear	None
12:25 PM		1	1	1.36	7.36	2617.4	0.03	22.34	21.03	-340.6	1.37	Clear	None
12:27 PM		1.1	2.1	1.36	7.36	2612.8	0.03	21.8	20.97	-341.1	1.37	Clear	None
12:29 PM		1.2	3.3	1.36	7.36	2613.3	0.02	21.03	20.99	-342	1.37	Clear	None
12:31 PM		1.3	4.6	1.36	7.35	2567.4	0.02	18.14	20.88	-343.3	1.34	Clear	None

Start Purge: 2/19/2024 12:05:00 PM End	nd Purge: 2/19/2024 12:31:00 PM	Total Volume (gal): 4.6
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC390GA-MW0003-010.0-20240219 S

Sample Date: 2/19/2024 10:06:00 AM
Sampler: Dustin Slater

Well ID: LC390GA-MW0003

Location Type: Comments:

Monitoring Well

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.52
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	15.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	ormation	1											
Time	Purge Rate (gal/mi n)	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)
9:39 AM			0	1.52	6.91	1335	0.24	3.45	17	-224.3	0.79	Yellow	Sulfur
9:59 AM	0.05	0.1	0.1	1.59								Clear	None
10:01 AM	0.05	0.1	0.2	1.59	6.94	1311	0.23	2.87	17	-226.7	0.78	Yellow	Sulfur
10:03 AM	0.05	0.1	0.3	1.59	6.94	1300	0.23	2.67	17	-228.5	0.78	Yellow	Sulfur
10:05 AM	0.05	0.1	0.4	1.59	6.93	1299	0.22	2.48	17	-230.6	0.78	Yellow	Sulfur



Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-MW0004-010.0-20240219

Monitoring Well

Sample Date: 2/19/2024 11:22:00 AM

Madan Parsotan

Well ID: LC390GA-MW0004

Comments:

Location Type:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.64
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	15.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Sampler:

Purge Info	ormation	1											
Time	Purge Rate (gal/mi n)	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)
10:45 AM			0	1.64								Clear	None
11:15 AM		1	1	1.98	7.31	1196.4	0.04	24.1	20.41	-324.3	0.6	Clear	None
11:17 AM		1.1	2.1	1.98	7.32	1197.3	0.04	22.89	20.44	-325.6	0.6	Clear	None
11:19 AM		1.2	3.3	1.98	7.31	1198.5	0.03	20.16	20.35	-326.8	0.6	Clear	None
11:21 AM		1.3	4.6	1.98	7.32	1198.1	0.03	19.2	20.25	-325.1	0.6	Clear	None
11:36 AM			4.6									Clear	None

Start Purge:	2/19/2024 10:45:00 AM	End Purge:	2/19/2024 11:36:00 AM	Total Volume (gal):	4.6
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-MW0005-010.0-20240219 Sample Date: 2/19/2024 10:47:00 AM

Well ID: LC390GA-MW0005 Sampler: Devin Kehoe

Location Type: Monitoring Well

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.70
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	15.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	Purge Information												
Time	Purge Rate (gal/mi n)	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)
10:26 AM	0.08		0	1.7								Clear	None
10:38 AM		0.96	0.96	2.08	8.55	1249	0.15	1.74	19.2	-324.6	0.71	Clear	None
10:41 AM		0.24	1.2	2.08	8.55	1256	0.18	1.36	19.3	-325.2	0.71	Clear	None
10:44 AM		0.24	1.44	2.08	8.54	1256	0.19	1.41	19.3	-325.8	0.71	Clear	None

Start Purge:	2/19/2024 10:26:00 AM	End Purge:	2/19/2024 10:44:00 AM	Total Volume (gal):	1.44	
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC390GA-MW0006-024.5-20240219

Sample Date: 2/19/2024 10:12:00 AM

Devin Kehoe

Well ID: LC390GA-MW0006

Location Type: Monitoring Well

Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.41
Top of Screen (ft-BTOC):	22.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	27.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Sampler:

Purge Info	ormation	1											
Time	Purge Rate (gal/mi n)	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)
9:50 AM	0.08		0	1.41								Clear	None
10:02 AM		0.96	0.96	1.74	8.36	22402	0	14.2	21.1	290.8	14.89	Clear	None
10:05 AM		0.24	1.2	1.74	8.26	23345	0.06	13.3	21.1	290.9	15.38	Clear	None
10:08 AM		0.24	1.44	1.74	8.36	23244	0.09	3.48	21.1	315.5	16.79	Clear	None

Start Purge:	2/19/2024 9:50:00 AM	End Purge:	2/19/2024 10:08:00 AM	Total Volume (gal):	1.44



Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC390GA-MW0007-024.5-20240219

LC390GA-MW0007 Sampler: Brittany Follett

Sample Date:

2/19/2024 12:02:00 PM

Location Type: Monitoring Well

Comments:

Well ID:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.58
Top of Screen (ft-BTOC):	22.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	27.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	ormation	า											
Time	Purge Rate (gal/mi n)	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)
11:35 AM			0	1.58								Clear	None
11:55 AM		1	1	1.78	7.2	27062.1	0.06	10.33	22.66	-340.8	16.82	Clear	None
11:57 AM		1.1	2.1	1.78	7.2	27151.8	0.06	6.74	22.53	-341.3	16.88	Clear	None
11:59 AM		1.2	3.3	1.78	7.2	27111	0.06	11.63	22.53	-342.2	16.85	Clear	None
12:01 PM		1.3	4.6	1.78	7.2	27127.8	0.06	17.73	22.51	-345.5	16.86	Clear	None

Start Purge: 2/19/2024 11:35:00 AM End Purge: 2/19/2024 12:01:00 PM	Total Volume (gal): 4.6
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107) Site Name:

Project #: 60615547

Sample ID: LC390GA-MW0008-024.5-20240219

Sample Date: 2/19/2024 10:37:00 AM LC390GA-MW0008 Sampler: **Brittany Follett**

Location Type: Monitoring Well

Comments:

Well ID:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.74
Top of Screen (ft-BTOC):	22.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	27.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	Purge Information												
Time	Purge Rate (gal/mi n)	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)
9:50 AM			0	1.74								Clear	None
10:30 AM		2	2	2.11	7.37	7791.7	0.16	229.72	22.48	-304.6	4.37	Clear	None
10:32 AM		2.1	4.1	2.11	7.38	7773.2	0.19	225.13	22.55	-304.3	4.36	Clear	None
10:34 AM		2.2	6.3	2.11	7.37	7826.7	0.16	208.63	22.54	-306.2	4.39	Clear	None
10:36 AM		2.3	8.6	2.11	7.37	7873.7	0.16	207.4	22.73	-305	4.42	Clear	None

Start Purge: 2/19/2024 9:47:00 AM End Purge: 2/19/2024 10:36:00 AM	Total Volume (gal): 8.6
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-MW0009-024.5-20240219 Sample Date: 2/19/2024 11:18:00 AM

Well ID: LC390GA-MW0009 Sampler: Devin Kehoe

Location Type: Monitoring Well

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.11
Top of Screen (ft-BTOC):	22.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	27.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	ormation	า											
Time	Purge Rate (gal/mi n)	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)
10:51 AM	0.08		0	2.11								Clear	None
11:07 AM		1.28	1.28	2.38	8.79	1474	0.49	4.82	21.7	-228.1	0.82	Clear	None
11:10 AM		0.24	1.52	2.38	8.8	1711	0.47	4.45	21.7	-234	0.88	Clear	None
11:13 AM		0.24	1.76	2.38	8.8	1736	0.46	3.61	21.7	239.3	0.96	Clear	None
11:16 AM		0.24	2	2.38	8.82	1795	0.45	3.44	21.7	-241.3	0.98	Clear	None

Start Purge: 2/19/2024 10:51:00 AM	End Purge:	2/19/2024 11:16:00 AM	Total Volume (gal):	2.00	
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-MW0010-010.0-20240219 Sample Date: 2/19/2024 12:49:00 PM

Well ID: LC390GA-MW0010 Sampler: Dustin Slater

Location Type: Monitoring Well

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	1.57
Top of Screen (ft-BTOC):	0.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	5.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	Purge Information												
Time	Purge Rate (gal/mi n)	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)
12:22 PM			0	1.57								Clear	None
12:42 PM	0.05	1	1	1.72	6.8	1466	0.55	3.41	21.5	-239.7	0.79	Yellow	Sulfur
12:44 PM	0.05	0.1	1.1	1.72	6.81	1478	0.59	2.97	21.5	-240.3	0.8	Yellow	Sulfur
12:46 PM	0.05	0.1	1.2	1.72	6.81	1487	0.61	2.49	21.5	-240.6	0.81	Yellow	Sulfur
12:48 PM	0.05	0.1	1.3	1.72	6.78	1495	0.62	2.09	21.5	-241.4	0.81	Yellow	Sulfur



2/19/2024 12:40:00 PM

Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-MW0011-010.0-20240219 Sample Date:

Well ID: LC390GA-MW0011 Sampler: Devin Kehoe

Location Type: Monitoring Well

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	2.00
Top of Screen (ft-BTOC):	5.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	15.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Purge Info	ormation	1											
Time	Purge Rate (gal/mi n)	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)
12:17 PM	0.08		0	2								Clear	None
12:29 PM		0.96	0.96	4.31	11.07	448.7	6.83	54.9	17.3	-112.4	0.26	Clear	None
12:32 PM		0.24	1.2	4.31	11.08	452	6.74	52.1	17.4	-105.5	0.26	Clear	None
12:35 PM		0.24	1.44	4.31	10.94	449.7	6.68	49.2	17.3	-91.8	0.26	Clear	None
12:38 PM		0.24	1.68	4.31	11.04	449.3	6.85	51.2	17.4	-88.6	0.26	Clear	None

Start Purge: 2/19/2024 12:17:00 PM End Purge: 2/19/2024 12:38:00 PM	Total Volume (gal): 1.68
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Event: LC39OGA VAB LTM GROUNDWATER SAMPLING

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC390GA-MW0012-024.5-20240219 Samp

Sample Date: 2/19/2024 1:22:00 PM

Devin Kehoe

Well ID: LC390GA-MW0012

Location Type: Monitoring Well

Comments:

Well Information			
Well Diameter (in):	1	Static Water Level (ft-BTOC):	5.22
Top of Screen (ft-BTOC):	22.00	H/S PID Monitor Reading: (ppm)	0
Bottom of Screen (ft-BTOC):	27.00	Purge/Sample Method:	PP
Measured Well Depth (ft-BTOC):	NM	Sample Analysis:	Select VOCs

Sampler:

Purge Info	ormation	1											
Time	Purge Rate (gal/mi n)	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)
1:00 PM	0.08		0	5.22								Clear	None
1:14 PM		1.12	1.12	5.35	10.81	849	0.24	3.26	22	-178.1	0.44	Clear	None
1:17 PM		0.24	1.36	5.35	10.81	847	0.31	5.43	21.9	-175.7	0.44	Clear	None
1:20 PM		0.24	1.6	5.35	10.8	844	0.31	6.42	21.8	-174.6	0.44	Clear	None

Start Purge: 2/19/2024 1:00:00 PM	End Purge:	2/19/2024 1:20:00 PM	Total Volume (gal):	1.60
-----------------------------------	------------	----------------------	---------------------	------



Event: LC39OGA VAB LTM Surface Water Sampling

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC390GA-SW0002-001.0-20240219 Sample Date: 2/19/2024 10:30:00 AM

Location ID:LC390GA-SW0002Sampler:Dustin SlaterLocation Type:Surface WaterSample Analysis:Select VOCs

Field Meas	surements									
Time	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	TDS (G/L)	Salinity (PSU)	Color (NA)	Odor (NA)
10:29 AM	7.24	17034	6.13	2.88	14.2	-95.5	13.96	12.94	Yellow	None



Event: LC39OGA VAB LTM Surface Water Sampling

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-SW0004-001.0-20240219 Sample Date: 2/19/2024 11:03:00 AM

Location ID: LC390GA-SW0004 Sampler: Dustin Slater
Location Type: Surface Water Sample Analysis: Select VOCs

1	Field Meas	urements									
	Time	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	TDS (G/L)	Salinity (PSU)	Color (NA)	Odor (NA)
	11:02 AM	7.43	17850	4.82	2.74	15.5	-64	14.18	13.17	None	None



Event: LC39OGA VAB LTM Surface Water Sampling

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-SW0005-001.0-20240219 Sample Date: 2/19/2024 11:34:00 AM

Location ID: LC390GA-SW0005 Sampler: Dustin Slater
Location Type: Surface Water Sample Analysis: Select VOCs

F	ield Meas	urements									
	Time	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	TDS (G/L)	Salinity (PSU)	Color (NA)	Odor (NA)
	11:33 AM	7.51	17837	4.49	2.01	15.6	-29.8	14.14	13.12	None	None



Event: LC39OGA VAB LTM Surface Water Sampling

Site Name: LAUNCH COMPLEX 39 OBSERVATION GANTRY AREA (SWMU 107)

Project #: 60615547

Sample ID: LC39OGA-SW0006-001.0-20240219 Sample Date: 2/19/2024 12:08:00 PM

Location ID: LC390GA-SW0006 Sampler: Dustin Slater
Location Type: Surface Water Sample Analysis: Select VOCs

Field Me	easurements									
Time	pH (S.U.)	COND (US/CM)	DO (MG/L)	Turb (NTU)	Temp (C)	ORP (MV)	TDS (G/L)	Salinity (PSU)	Color (NA)	Odor (NA)
12:07 PM	7.44	17889	7.66	1.97	16	10.3	13.9	12.88	None	None

FIELD INSTRUMENT CALIBRATION RECORDS - CALIBRATION LOG - PRP

Project Site/FacID:

CAL ICV CCV CAL ICV CCV

CAL ICV CCV

Boldly "X" this box if there is qualified data on this page.

Calibrated by (Print)/Affiliation: MADAN PARSOTAN/ACCOUNDERINKEDOR

TURBIDITY (REFERENCE: DEP SOP FT 1600) Meter/Instrument Name and Unique ID: Std=41-100 NTU +/-6.5% Std>100 NTU +/-5% Std#11-40 NTU +/-8% Std=0.1-10 NTU +/-10% Standard (NTU) Deviation (%) Time Exp. Date Lot # Response (NTU) Pass or Fail CAL ICV CCV Initials Date CAL ICV CCV DIC 7-19-74 0925 2.2 5.49 F 6.02 CAL ICV CCV F CAL ICV CCV 400 F 5.89 CAL ICV CCV CAL ICV CCV CAL ICV CCV F CAL ICV CCV F CAL ICV CCV F CAL ICV CCV _____ CAL ICV CCV _____ CAL ICV CCV CAL ICV CCV

pH (F				OP FT 1100)					Accepta	nce Criteria +/-0	.2 SU	18.18 18.18
CAL	ICV	ccv	Initials	Date	Time	Standard (SU)	Exp. Date	Lot#	Response (SU)	Deviation (SU)	Pass or	r Fail
CAL	ICV	CCV	Na	2-19-24	0925	7.00	4/24	2209224	7.00	0	P	F
CAL	ICV	CCV				4.00	6/24	221215A	4.00	0	P	F
CAL	ICV	CCV		1	V	10.00	6/24	221315B	10.00	0	0	F
CAL	ICV	ccv	9 79		1335	7.00	4/24	220922A	7.09	0.09	(P)	F
CAL	ICV	CCV				4.00	6/24	221215A	4.04	8.04	P	F
CAL	ICV	ccy	V		V	10.00	6/24	221215B	10.11	0.11	(3)	F
CAL	ICV	CCV		143,1		7.00	4/24	230923A			P	F
CAL	ICV	CCV				4.00	6/24	221215A			P	F
CAL	ICV	CCV				10.00	6/24	2212158			P	F
CAL	ICV	CCV									P	F
CAL	ICV	CCV									P	F
CAL	ICV	CCV									P	F
CAL	ICV	CCV			4						Р	F
CAL	ICV	CCV						The same of the sa			P	F
CAL	ICV	CCV									P	F

Perform ICVs and CCVs only in "READ/RUN" mode.

CAL - Calibration; ICV - Initial Calibration Verification; and, CCV - Continuing Calibration Verification.

Deviation (%) = 100-{(Response/Standard)*100}

F

F

FIELD INSTRUMENT CALIBRATION RECORDS - CALIBRATION LOG - PRP Project Site/FacID: Boldly "X" this box if there is - Pevin Kelzoe MADAN PARGOTAN (AECOM qualified data on this page. Calibrated by (Print)/Affiliation: Date of Last Temp Verification: See log book: Temperature (Quarterly) DISSOLVED OXYGEN (DO) (REFERENCE: DEP SOP FT 1500) Acceptance Criteria +/-0.3 mg DO/L Meter/Instrument Name and Unique ID: Standard DO Saturation Response DO Response Deviation CAL ICV CCV Initials (DO %) Date Time °C mg/L (100%)** Pass or Fail mg DO/L mg DO/L (%) 10.681 0.66 0.021 (P) CAL (ICV) CCV 0910 100.3 F 100% 0.600 CAL ICV CCV (P) F 100% CAL ICV CCV F 100% CAL ICV CCV 100% CAL ICV CCV F 100% CAL ICV CCV F 100% ** See Table FS 2200-2 and/or Table FT 1500-1 for Dissolved Oxygen 100% Saturation (mg/L) corresponding to Temperature. SPECIFIC CONDUCTANCE (REFERENCE: DEP SOP FT 1200) Acceptance Criteria +/-5% the standard Meter/Instrument Name and Unique ID: Standard Response CAL CCV Initials Date Exp. Date Deviation (%) Pass or Fail Lot # (umho/cm) (µmho/cm) 0915 CAL /ICV CCV DIC 104.9 100 12/24 P F 231213A P CAL ICY CCV 1413 F 230725C CAL ICV CCV 100 12/24 231213A F CAL ICV CC 8/24 1413 F 2307256 CAL ICV CCV 100 231213A F CAL ICV CCV 1413 230725C F

	NCE: E	PA Regio	n 4, Oper	TIAL (ORP) ating Proced d Unique ID:	ure, Field Measur	ement of Oxid	ation-Reductio		nce Criteria +/-10 P)	0 mV	
CAL I	cv cc	/ Initials	Date	Time	Standard (mV)	Exp. Date	Lot#	Response (mV)	Deviation (mV)	Pass o	r Fail
CAL	cc) cc	V DK	2-19	6920	238	7/28	236/0033	6 734.1	3.9	0	F
CAL I	cv (cc			1335	238	1		231.9	4.1-7.1	P	F
CAL I	cv cc	v								P	F
CAL I	cv cc	V								P	F
CAL I	cv cc	V							10000	D	
CAL I	cv cc	v							1		-

Perform ICVs and CCVs only in "READ/RUN" mode.

CAL ICV CCV

CAL ICV CCV

CAL ICV CCV

CAL - Calibration; ICV - Initial Calibration Verification; and, CCV - Continuing Calibration Verification.

Deviation (%) = 100-{(Response/Standard)*100}

F

F

F

Project Site/FacID:

KSC VAB LTM

on: Physica States Accom Calibrated by (Print)/Affiliation:

Boldly "X" this box if there is qualified data on this page.

TURBIDITY (REFERENCE	: DEP SOP	FT 1600)	Meter/Instr	rument Name a	nd Unique ID:	: Oakton TI	OOTR		
Std=0.1-10 N	TU +/-10%		Std=11-40 NTU +/-8	% Std=41	-100 NTU +	/-6.5%	Std>100 NTU +/	-5%	
CAL ICV CCV Initials	Date	Time	Standard (NTU)	Exp. Date	Lot#	Response (NTU)	Deviation (%)	Pass o	r Fail
(A) ICV CCV X	21974	6909	20		-	19.97	-121	9	F
CAD ICV CCV	1		100		-	99.5	507.	0	F
an icv ccv		1	800		_	196	-50%	Ø	F
CAL KY CCV		1300	20	-	-	19.95	-125%	D	F
CAL CV CCV			100	_	-	99.1	- 40%	6	F
CAL IN CCV	_ {	V	860	-	1	793	3370	0	F
CAL ICV CCV								Р	F
CAL ICV CCV								P	F
								P	F
								P	F
								Р	F
CAL ICV CCV				N.				Р	F
CAL ICV CCV								Р	F
CAL ICV CCV								Р	F
CAL ICV CCV								P	F

OH (REFERENCE: DEP SOP FT 1100)				Accepta	nce Criteria +/-0	.2 SU	
Meter/Instrument Name and Unique	ID: YST PRO	Quatro	SN 224	184309			
CAL ICV CCV Initials Date Time	Standard (SU)	Exp. Date	Lot#	Response (SU)	Deviation (SU)	Pass o	or Fail
(AL) ICV CCV 15 2/14/24 0911	1.00	4/24	220972A	7.66	1	P	F
CAD ICV CCV	4.60	6/24	2212154	4.00	-	4	F
COD ICV CCV	(0.00	6/24	2212KB	10-00	1	4	F
CAL @ CCV (30)	7.00			7.03	+.03	6	F
CAL O CCV	4.00			4.02	+.62	Ø	F
CAL MOV CCV	10.00	+	1	10.05	+,05	b	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F
CAL ICV CCV						P	F

Perform ICVs and CCVs only in "READ/RUN" mode.

CAL - Calibration; ICV - Initial Calibration Verification; and, CCV - Continuing Calibration Verification.

Deviation (%) = 100-{(Response/Standard)*100}

FIELD INSTRUMENT CALIBRATION RECORDS - CALIBRATION LOG - PRP

MIN BAL KSC Project Site/FacID: Boldly "X" this box if there is Moskin Slater AKCOM Calibrated by (Print)/Affiliation: qualified data on this page. Temperature (Quarterly) Date of Last Temp Verification: See log book: DISSOLVED OXYGEN (DO) (REFERENCE: DEP SOP FT 1500) Acceptance Criteria +/-0.3 mg DO/L PRO Quatro Meter/Instrument Name and Unique ID: N 22411048129 455 Temp | DO Saturation Standard Response DO Response Deviation CAL ICV CCV Initials Date mg/L (100%)** (DO %) Time (%) mg DO/L mg DO/L Pass or Fail CAD ICV CCV OX 2/19/24 0920 10.514 100% 140.87. 10,58 4,0 0 F

18.108

10,07

F

F

F

F

F

100%

100%

100%

100%

100%

					OP FT 1200)		Acce	ptance Criteria	a +/-5% the stand	ard	
1	Meter/I	nstrumer	nt Name and	Unique ID:	45t Pro	Quatro	3 N 22+	104309			
CAL IC	v ccv	Initials	Date	Time	Standard (µmho/cm)	Exp. Date	Lot#	Response (µmho/cm)	Deviation (%)	Pass o	or Fail
CAL IC	v ccv	05	2/19/14	0917	106	12/24	231213A	(40	~	B	F
CAL IC	V CCV			<u> </u>	1413	8/24	2307250	1413	-	Ð	F
CAL (O	v ccv			1304	loo		1	to1.9	+1.97.	6.	F
CAL (1)	v ccv		_ ₹		1413	4	+	1408	10 H - 35%	0	F
CAL IC	V CCV								.0	Р	F
CAL IC	V CCV									Р	F
CAL IC	V CCV									Р	F
CAL IC	v ccv									Р	F
CAL IC	v ccv									Р	F

				TAL (ORP) sting Proce d Unique ID:	dure, Field Measur		ntion-Reduction	on Potential (OR	nce Criteria +/-1	0 mV	
CAL		Initials	Date	Time	Standard (mV)	Exp. Date	Lot#	Response (mV)	Deviation (mV)	Pass o	r Fail
(A) 10	CV CCV	Ø	2 19/24	0915	238	7/22	236 100336	238.0	_	Po	F
CALR	y ccv	7	1	1303	238	¥	H	235.7	-2.3	6	F
CAL IC	CV CCV									P	F
CAL IC	CV CCV						-12 - 5			P	
CAL IC	cv ccv						100			,	-
CAL IC	v ccv									,	F

Perform ICVs and CCVs only in "READ/RUN" mode.

CAL CY CCV 1

CAL ICV CCV

CAL ICV CCV

CAL ICV CCV

CAL ICV CCV

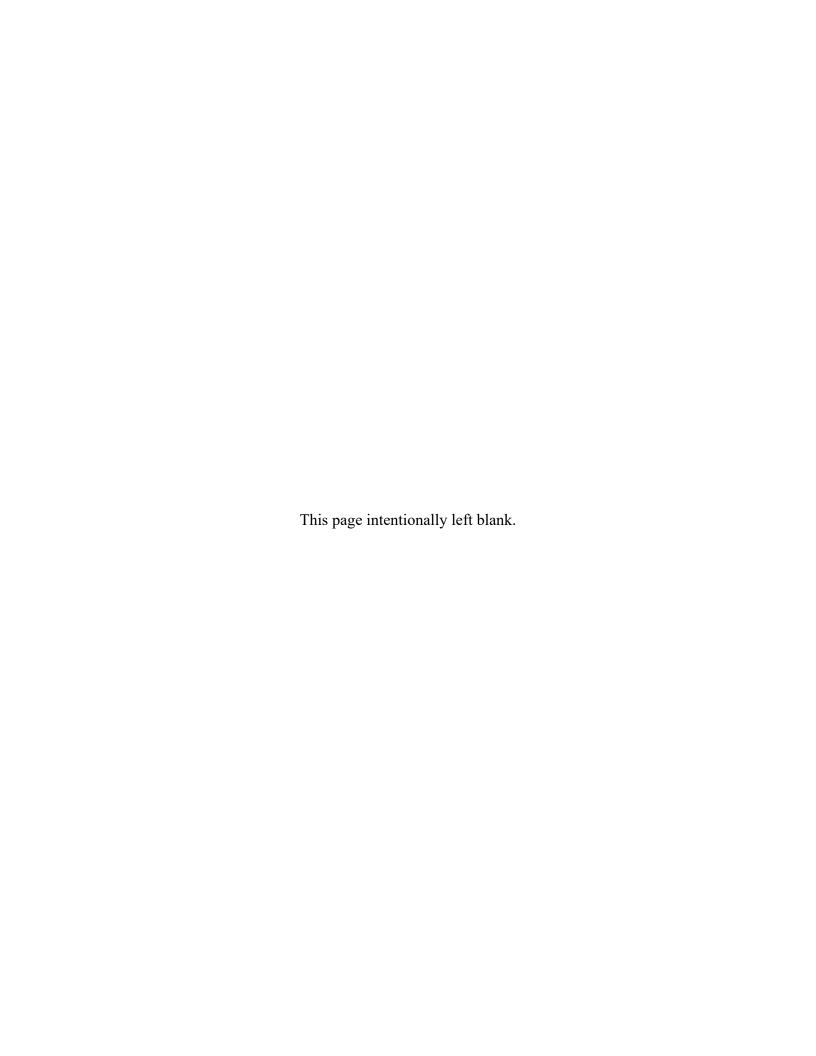
CAL - Calibration; ICV - Initial Calibration Verification; and, CCV - Continuing Calibration Verification.

Deviation (%) = 100-{(Response/Standard)*100}

^{**} See Table FS 2200-2 and/or Table FT 1500-1 for Dissolved Oxygen 100% Saturation (mg/L) corresponding to Temperature.

APPENDIX E

MONITORING WELL CONSTRUCTION LOGS, COMPLETION REPORTS, PERMITS, AND PROFESSIONAL LAND SURVEY



		WELL NUM	IBER LC39OGA-MW0011			
AECOM			TOTAL DEPTH 15 FT BGS PAGE 1 OF 1			
CLIENT NASA		PROJECT NAME Kennedy Space Center				
PROJECT NUMBER 60615547		SITE NAME LAUNCH COMPLEX	(39 OBSERVATION GANTRY AREA (SWMU 107)			
DATE STARTED 02/15/2024	COMPLETED 02/15/2024	SURVEYING BY Land & Sea S	urveying			
DRILLING CONTRACTOR Environ	mental Drilling Service	TOC Elevation 5.77	Ground Elevation 6.29 ft			
DRILLING METHOD Direct Push		EASTING 237131.675	NORTHING 472189.836			
TOTAL DEPTH 15 ft bgs		HOLE DIAMETER 1 in				
LOGGED BY Brittany Follett	CHECKED BY N/A	CASING TYPE Flushmount				
DEPTH O DEPTH (ft)		WELL DIAGRAM				
DRILLING CONTRACTOR _Environ DRILLING METHOD _Direct Push TOTAL DEPTH _15 ft bgs LOGGED BY _Brittany Follett ### Contract Push ### Contract Push		Well Casing LC39OGA-MW0011 Type: Schedule 40 PVC Diameter: 1 in Top: 0 ft bgs Bottom: 5 ft bgs Annular Seal Type: Portland Cement Top: 0.5 ft bgs Bottom: 4 ft bgs Type I/II Sand Type: Fine Sand Top: 4 ft bgs Bottom: 5 ft bgs Well Screen LC39OGA-MW0011 Type: Schedule 40 PVC Slot Size: 0.01 in Top: 5 ft bgs Bottom: 15 ft bgs Filter Pack Type: #0/30 Top: 5 ft bgs Bottom: 15 ft bgs Bottom: 15 ft bgs Pilter Pack Type: #0/30 Top: 5 ft bgs Bottom: 15 ft bgs				

	WELL NU	JMBER LC39OGA-MW0012
AECOM		TOTAL DEPTH 27 FT BGS PAGE 1 OF 1
CLIENT NASA	PROJECT NAME Kennedy	Space Center
PROJECT NUMBER 60615547	SITE NAME LAUNCH COMP	LEX 39 OBSERVATION GANTRY AREA (SWMU 107)
DATE STARTED 02/15/2024 COMPLETED	02/15/2024 SURVEYING BY Land & Se	ea Surveying
DRILLING CONTRACTOR Environmental Drilling Serv	rice TOC Elevation 5.91	Ground Elevation 6.15 ft
DRILLING METHOD _Direct Push	EASTING 237132.369	NORTHING 472190.187
TOTAL DEPTH 27 ft bgs	HOLE DIAMETER 1 in	
LOGGED BY Brittany Follett CHECKED BY	N/A CASING TYPE Flushmount	
(f)) (f)		
를 (##) 9 (#)	WELL DIAGRAM	
N/9		
6 0 		
	Well Casing	
#	Type: Schedule 40	
₽E 3 =	PVC Diameter: 1 in	
4 -	Top: 0 ft bgs Bottom: 22 ft bgs	
<u> </u>	Annular Seal Type: Portland	
<u> </u>	Cement Top: 0.5 ft bgs	
 	Bottom: 21 ft bgs	
8	Type I/II	
5E		
}		
2		
3 <u>F 3</u>		
<u>5 </u>		
₹ <u> </u>		
4 14 = 14 = 15 = 15 = 15 = 15 = 15 = 15		
<u> </u>		
5 16 =		
\$E 17 =		
5		
16		
5		
ŭĿ ∃	Sand Sand	
<u> </u>	Sand Type: Fine Sand	
Ď <u>22 </u>	∵ Top: 21 ft bgs ∴ Bottom: 22 ft bgs	
EE 23 ∃	Well Screen	
0	LC39OGA-MW0012	
2	Type: Schedule 40 PVC	
¥L ∃	Slot Size: 0.01 in Top: 22 ft bgs	
<u> </u>	Bottom: 27 ft bgs	
<u> </u>	<u>├∵├</u> ───── Filter Pack	
	Type: #0/30 Top: 22 ft bgs	
WOOD	Bottom: 27 ft bgs	
الِّا الا	20/30	

STATE OF FL	RIDA WELL COMPLETION REPORT	Date Stamp
Southwest		
Northwest	(*Denotes Required Fields Where Applicable)	onfirmation#
St. Johns R	l er	878399
South Florid		0040/0004
Suwannee	lver l □8	te:02/19/2024
DEP	B	
X Delegated A	thority (If Applicable) Brevard DOH C	ficial Use Only
. *Permit Number MW-215208-1 *C	P/WUP Number *DID Number 555750 62-524 Delineation	No.
AF = 1110 1111 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
*Number of permitted wells constructed, repair	dd, or abandoned 2 *Number of permitted wells not constructed, repaired, or abando	nea U
3. *Owner's Name United States Of America	4.*Completion Date 02/16/2024 5. Florida Unique ID	
5. NASA LC39, KSC, FL 32899		
*Well Location – Address, Road Name or Nu	per, City, ZIP	
	*Section 9 Land Grant *Township 22S	*Range 37E
7. *County Brevard		Kange 3/C
3. Latitude <u>283541.9264</u>	Langitude 803713.7052	
9. Data Obtained From:GPSX	Map Survey Datum: NAD 27 X NAD 83	WGS 84
10. *Type of Work: X Construction	epair Modification Abandonment Reason:	
11. *Specify Intended Use(s) of Well(s):	apair Modification Abandoninent Reason.	
Domestic	Landscape IrrigationAgricultural IrrigationSite inve	tigation
Bottled Water Supply	Possestion Area Irrigation Livestock X Monitorin	
Public Water Supply (Limited Use/DOH)	g (valsary migration coat]	ipted Geothermal
Public Water Supply (Community or Nor	community/DEP)Golf Course IrrigationHVAC St	pply
Class I Injection	HVAC R	turn
Class V Injection: Recharge Comr	rcial/Industrial DisposalAquifer Storage and RecoveryDrainage	ŀ
Remediation: Recovery Air Sparge		
Other (Describe)		
12 *Drill Method: Auger Cable	olRotaryCombination (Two or More Methods)JettedSonic	
13. Measured Static Water Level 7 ft.	X Hydraulic Point (Direct Push) Other Measured Pumping Water Level ft. After Hours at GPM	
14.*Measuring Point (Describe) TOC	Which is _,5_ftAboveX_Below Land Surface *Flowing:Yes	_ X _No
	alvanized X PVC Stainless Steel Not Cased Other	
16, *Total Well Depth <u>27</u> ft. Cased Depth	22 ft. *Open Hole: FromToft, *Screen: From _22 To _27 ft. Slot Size	01
Other(Explain		
17. *Abandonment:)	gs Seal Material (Check One): Neat Cement Bentonite Other	
From ft. To ft. No. of From ft. To ft. No. of	Table Court Middelian (Strooth Greek)	
Fromft. Toft. No. of	gsSeal Material (Check One):Neat CementBentoniteOther	
From the To the No. of	gs Seal Material (Check One): Neat Cement Bentonite Other gs Seal Material (Check One): Neat Cement Bentonite Other	
Fromft, Toft. No. of 18.*Surface Casing Diameter and Depth:	Seal Material (Check One). Near Centeric Doritonic Ones.	·
Diain. Fromft. To	ft. No. of Bags Seal Material (Check One):Neat CementBentonite	Other
Diain. Fromft. To	ft. No. of Bags Seal Material (Check One):Neat CementBentonite	Other
19.*Primary Casing Diameter and Depth:		Cement with
		Bentonite, <
Dia <u>1 in. From 0 ft. To 22</u> Dia in. From ft. To	ft. No. of Bags 5 Seal Material (Check One): Neat Cement Bentonite X ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other5% by weight Other
Dia in From ft To Dia in From ft To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in From ft, To	ft, No. of Bags Seal Material (Check One):Neat CementBentonite	Other
20.*Liner Casing Diameter and Depth: Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in From ft To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Diain, Fromft. To	ft. No. of BagsSeal Material (Check One):Neat CementBentonite	Other
21.*Telescope Casing Diameter and Depth: Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in. From ft. To Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat CementBentonite	Other
22.Pump Type (If known):	23, Chemical Analysis (When Required):	
Centrifugal Jet Subm		ppm
Horsepower Pump Capaci		
Pump Depthft, Intake Depth	Laboratory TestField Test Kit	
24, Water Well Contractor:		
*Contractor Name Carl A Leonhardt	E-mail *License Number 9521 Address carl@edsenvironmental.cor	
*Contractor's Signature Carl A Leonhardt	*Driller's Name (Print or Type) Chris Phelps	4

*Permit No. MW-215208-1

SOUTHWEST FLORIDA WATER MAN SEMENT DISTRICT 2379 BROAD STREET, BROOKSVILLE L 34604-6899 PHONE: (352) 796-7211 or (800) 423-146

WWW.SWFWMD.STATE.FL.US

ST. JOHNS RIVER WATER MANAGEN INT DISTRICT 4049 REID STREET, PALATKA, FL 321 3-1429

PHONE: (386) 329-4500 WWW.SJRWMD.COM

NORTHWEST FLORIDA WATER MAN BEMENT DISTRICT 152 WATER MANAGEMENT DR., HAV. NA, FL 32333-4712 (U.S. Highway 90, 10 miles west of Talla assee)

PHONE: (850) 539-5999

SOUTH FLORIDA WATER MANAGEMENT DISTRIC

P.O. BOX 24680 3301 GUN CLUB ROAD WEST PLAM BEACH, FL 33416-4680

PHONE: (561) 686-8800 WWW.SFWMD.GOV

SUWANNEE RIVER WATER MANAGEMENT DISTRICT

9225 CR 49

LIVE OAK, FL 32060

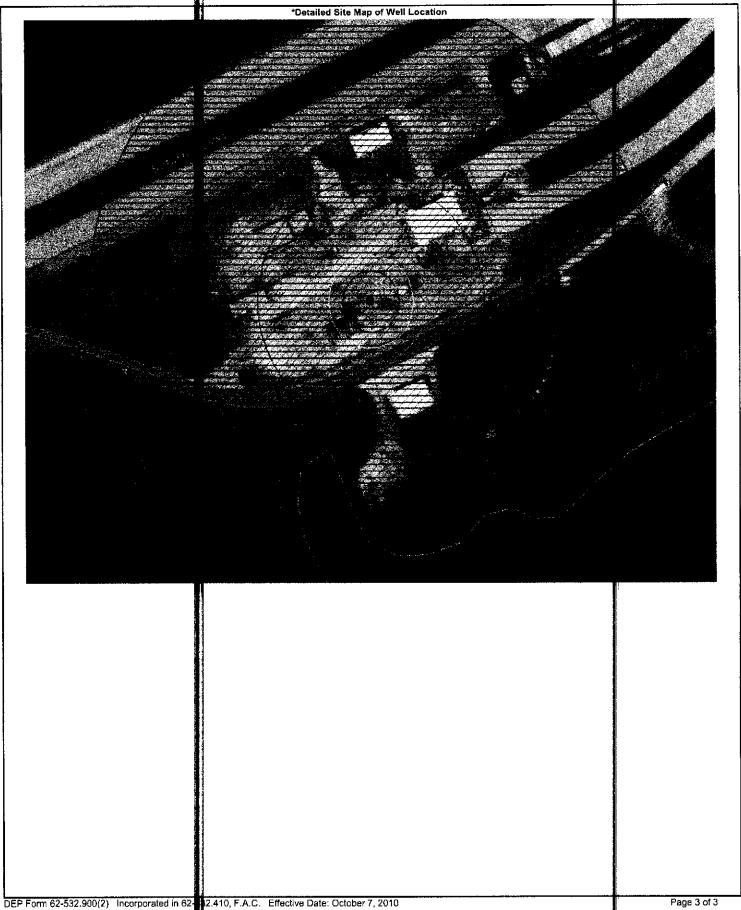
PHONE: (386) 362-1001 or (800) 226-1066 (Florida o ly)

WWW.MYSUWANNEERIVER.COM

WWW.NV								
*DRILL C	UTTINGS L	OG (E	kamine cuttings (ery 20 ft, or at form	ation changes. Note cavities and depth to produc	cing zone. Gra	iin Size: F=Fine, I	l≔Medium, and
C=Coarse	•)							
From	<u>0</u> ft.	To	<u>10</u> ft. C	or <u>Tan</u>			Sand with Shell	
From	10 ft.	To_	<u>20</u> ft. C	or Brown	Grain Size (F, M, C) Gravel		and with Clay	·
From	20 ft.	To	27 ft. C	or <u>Gray</u>	Grain Size (F, M, C) Fine	_	and with Shell	
From	ft.	To_	ft. C	or	Grain Size (F, M, C)			
From		To	ft, C	ог	Grain Size (F, M, C)	Material _		
From	ft.	To	ft. C	or	Grain Size (F, M, C)		.,,	
From	ft.	To_	ft.	or				
From	ft.	To	ft. C	or		Material		
From	ft.	To_	ft. C	or	Grain Size (F, M, C)			
From	ft.	To_	ft. C	or	Grain Size (F, M, C)	-		i
From	ft.	To	ft. C	or				
From		To_	ft. C	or				
From	ft.	To	ft. C	or	Grain Size (F, M, C)			<u></u>
From	ft.	To	ft. C	or	Grain Size (F, M, C)			
From	ft.	To	ft. C	or	Grain Size (F, M, C)	Material _		
From	ft.	To	ft. C	or	Grain Size (F, M, C)	Material _		
From	ft.	To	ft. C	or	Grain Size (F, M, C)	Material _		
From	ft.	To_	ft, C	or	Grain Size (F, M, C)		,	
From	ft.	Τo	ft. C	or	Grain Size (F, M, C)			
From	ft,	To_	ft. C	or	Grain Size (F, M, C)	Materiał _		
From	ft.	To	ft, C	or	Grain Size (F, M, C)			
From	ft.	To	ft. C	or		Material		
From	ft.	To_	ft. C	or				
From	ft.	Tα	ft. C	Or	Grain Size (F, M, C)	Material _		
From	ft.	To	ft. C	or	- 1 -1 -1 -1	Material _		
From	ft.	To_	ft. C	or		Material		
Comment	s:							
								

DEP Form 62-532.900(2) Incorporated in 62-12.410, F.A.C. Effective Date: October 7, 2010

Page 2 of 3



		1
STATE OF FL	RIDA WELL COMPLETION REPORT	Date Stamp
Southwest	ia I	
Northwest	[] (Confirmation#
St. Johns R		878400
		0.0100
South Florid		Date:02/19/2024
Suwannee I	ver	Dag.02/19/2024
DEP		i
Delegated A	thority (If Applicable) Brevard DOH	Official Use Only
*Permit Number MW-215208-1 *C	P/WUP Number	ation No.
	ed, or abandoned 2 *Number of permitted wells not constructed, repaired, or aba	
2. Number of permitted wells constructed, repa		
3. *Owner's Name United States Of America	4,*Completion Date 02/16/2024 5. Florida Unique	·ID
3, Unknown, KSC, FL 32899		
*Well Location - Address, Road Name or Nu	ber. City. ZIP	
7. *County Brevard	*Section 9 Land Grant *Township 22S	*Range 37E
3. Latitude 283541,706	Longitude 803713.7245	
Data Obtained From: GPS X		WGS 84
10. *Type of Work: X Construction	epair Modification Abandonment Reason:	
11.*Specify Intended Use(s) of Well(s):		
Domestic	Landscape inigation	Investigation
Bottled Water Supply	Recreation Area Irrigation Livestock X Moni Nursery Irrigation Test	T-1
Public Water Supply (Limited Use/DOH)	Commercial/Industrial Earth	n-Coupled Geothermal
Public Water Supply (Community or Nor	ommunity/DEP) Golf Course Irrigation HVA	C Supply
Class I Injection	HVA	C Return
Class V Injection: Recharge Comr	rcial/Industrial DisposalAquifer Storage and RecoveryDrainage	1
	Other (Describe)	
Other (Describe)		
	olRotaryCombination (Two or More Methods)JettedSonic	С
	X Hydraulic Point (Direct Push)Other	
13, *Measured Static Water Level7ft.	Measured Pumping Water Levelft. AfterHours atGPM	
14. *Measuring Point (Describe) TOC	Which is .5 ft. Above X Below Land Surface *Flowing:	Yes No
	alvanized X PVC Stainless Steel Not Cased Other	
16. *Total Well Depth 15 ft, Cased Depth	5 ft. *Open Hole: FromToft. *Screen: From5_To15_ft. Slot S	ize <u>01</u>
Other(Explain		
17. *Abandonment:	gsSeal Material (Check One):Neat CementBentoniteOther	
From ft. To ft. No. of	gs Seal Material (Check One); Neat Cement Bentonite Other	
Fromft. To ft. No. of	gs Seal Material (Check One): Neat Cement Bentonite Other	
Fromft. Toft. No. of	gsSeal Material (Check One):Neat CementBentoniteOther	
Fromft, Toft. No. of	gsSeal Material (Check One):Neat CementBentoniteOther	
18.*Surface Casing Diameter and Depth: Dia in, From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Diain, Fromft, To Dia in, From ft, To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
19,*Primary Casing Diameter and Depth:	1	
		Cement with
Dio 1 in Erom 0 4 to 5	Ift, No. of Bags .5 Seal Material (Check One): Neat Cement Bentonite	Bentonite, < X Other5% by weight
Dia 1 in. From 0 ft. To 5 Dia in. From ft. To	ft. No. of Bags 5 Seal Material (Check One): Neat Cement Bentonite ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other Other
Dia in From ft To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in From ft To	ft. No. of Bags Seal Material (Check One); Neat Cement Bentonite	Other
Dia in. From ft. To	ft. No. of Bags Seal Material (Check One):Neat CementBentonite	Other
20. Liner Casing Diameter and Depth:	4 No of Bogs Cond Material (Charle One) - Next Compart - Boutswise	Other
Dia in From ft To Dia in From ft To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Dia in From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
21.*Telescope Casing Diameter and Depth:	<u> </u>	T -
Diain. Fromft. To	ft. No. of Bags Seal Material (Check One):Neat CementBentonite	Other
Dia in. From ft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
Diafn. Fromft. To	ft. No. of Bags Seal Material (Check One): Neat Cement Bentonite	Other
22. Pump Type (If known):	23. Chemical Analysis (When Required):	
Centrifugal Jet Subme		ррт
Horsepower Pump Capaci		
Pump Depth ft. Intake Depth	Laboratory TestField Test Kit	1
		a .

*License Number 9521

E-mail

__ Address

*Driller's Name (Print or Type) Chris Phelps

carl@edsenvironmental.cor

24. Water Well Contractor:

*Contractor Name Carl A Leonhardt

*Permit No. <u>MW-215208-1</u>

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT 2379 BROAD STREET, BROOKSVILLE FL 34604-6899 PHONE: (352) 796-7211 or (800) 423-14 6

WWW.SWFWMD.STATE.FL.US

ST. JOHNS RIVER WATER MANAGEM INT DISTRICT 4049 REID STREET, PALATKA, FL 321 8-1429

PHONE: (386) 329-4500 WWW.SJRWMD.COM

NORTHWEST FLORIDA WATER MANA GEMENT DISTRICT 152 WATER MANAGEMENT DR., HAV JIA, FL 32333-4712 (U.S. Highway 90, 10 miles west of Talla passee)

PHONE: (850) 539-5999

WWW.NWFWMD.STATE.FL.US

SOUTH FLORIDA WATER MANAGEMENT DISTRIC

P.O. BOX 24680

3301 GUN CLUB ROAD WEST PLAM BEACH, FL 33416-4680

PHONE: (561) 686-8800 WWW.SFWMD.GOV

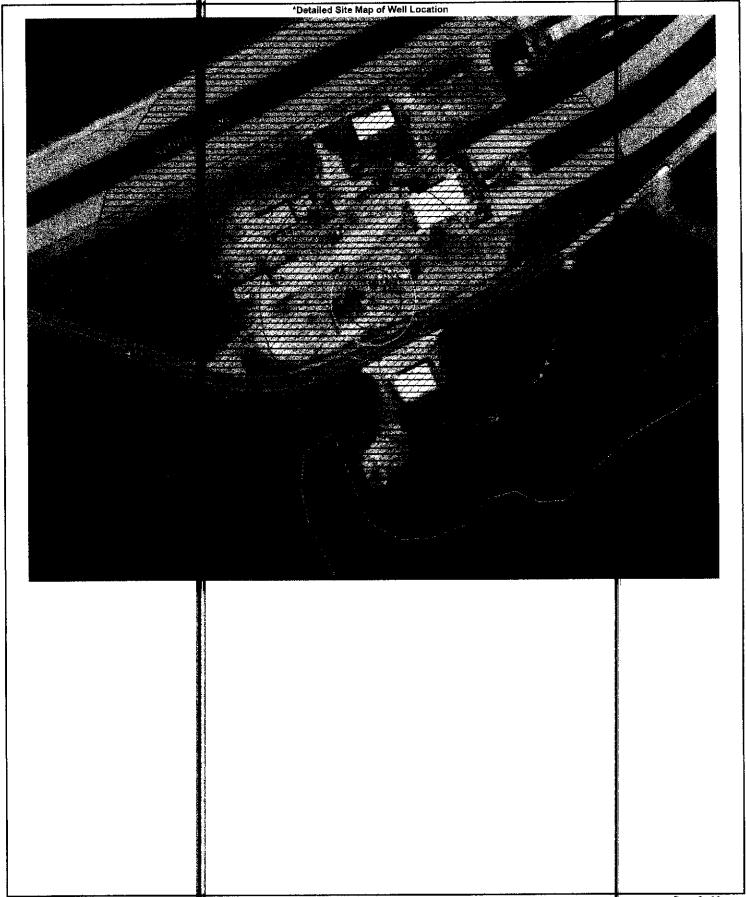
SUWANNEE RIVER WATER MANAGEMENT DISTRICT

9225 CR 49

LIVE OAK, FL 32060

PHONE: (386) 362-1001 or (800) 226-1066 (Florida orly) WWW.MYSUWANNEERIVER.COM

VVVVV.IVVVFVVIVID.GTATE.FE.US			21 –						
*DRILL CL C=Coarse)		. OG (E)	camine cuttings	ÞŊ	20 ft, or at form	nation changes. Note cavities and depth to			⊫Medium, and
From	Oft.	Tα	10 ft. C	br	Tan	Grain Size (F, M, C) Medium	m Material	Sand with Shell	
From	10 ft.	To	15 ft. C	br	Brown	Grain Size (F, M, C) Medium	m Material	Sand with Clay	
From	ft.	To_	ft. C	рг		Grain Size (F, M, C)			
From	ft.	To_	ft. d	or		Grain Size (F, M, C)			
From	ft.	То	ft. d	or		Grain Size (F, M, C)	Material		
From	ft,	To	ft, d	M or		Grain Size (F, M, C)	Material		
From	ft.	To_	ft.	Юг		Grain Size (F, M, C)	Material		
From	ft.	To	ft. Q	Юг		Grain Size (F, M, C)	Material		
From	ft.	To_	#. d	þγ			Material		
From	ft.	To	ft. g	or		Grain Size (F, M, C)	Material		
From	ft.	To _	ft. C	or		Grain Size (F, M, C)	Material		
From	ft,	To	ft. d	or		Grain Size (F, M, C)	Material Material		<u>.</u>
From	ft.	Ta		or			Material		
From	ft.	To —	ft. d	or		0 : 0: /5 !! (0)			
From	ft.	To	ft. g	or		Grain Size (F, M, C)	Material Material		
From	ft.	To	ft. d	or		Grain Size (F, M, C)			
From	ft.	To	ft. d	or		Grain Size (F, M, C)	Material		
From	ft.	To	ft. C	Ог		Grain Size (F, M, C)	Material		
From	ft.	To	ft. d	ог		0 0 0 0			
From	ft.	To	ft. d	ю					
From	ft.		ft. d	or		A . A . /E . A . A	Material		
From	ft.	To_	ft. C	or		0 1 0 2 (5 14 0)			
From	ft.	To_	ft. d	ог			Material		
From		To	ft. d	or					
From		To	ft. d	or					
From	ft.	To	ft. d	ar		e ' e' (F N O)			
Comments	3;								
				1					
				5 d					<u> </u>



Print Date: Feb 13, 2024

Brevard County DOH Fee Receipt

Receipt Date: Feb 13, 2024

Receipt #: 111125

Total Amount: \$100.00

Received By: System Generated

Fee Category: WELL

Payment Reason: Application Fee

Payment Method: Offine

Payment Details: OLine-8644853-877510

Received From:

ePermit Account: Carl Leonhardt, Environmental Drilling Service, Inc, 4712 OLD WINTER GARDEN ROAD, Street Address 2, Orlando, FL 32811 United States

Comments: Online Fee from ePermit

Payor Information: Call Leonhardt , 4712 OLD WINTER GARDEN ROAD, ORLANDO FL

32811, US

Line Item(s):

Reference # **Received Amount** Refund Amount Reason

PROJ: 215208-1

\$100.00 \$0.00 Application Fee

Contact(s):

Reference # Contacts

Overer: United States Of America, 1849 Nw C St Rm 5665, Department Of The Interior,

PROJ: MW-215208-

hington, DC 20240 ractor: Carl Leonhardt, Environmental Drilling Services Inc, 4712 Old Winter Barden

Orlando, FL 32811-1740

South Florid

Suwannee DEP

STATE OF FLORIDA PERMIT APPLICATION TO CONSTRUCT, REPAIR, MOUNTY, OR ABANDON A WELL

Southwest PLEASE, FILL OUT ALL APPLICABLE FIELDS Northwest (*Denotes Required Fields Where Applicable) St. Johns R

X Delegated thority (If Applicable) Brevard DOH

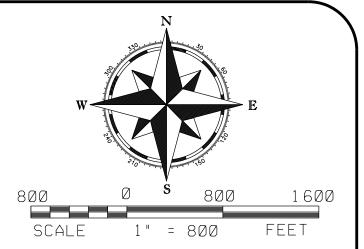
The water well contractor is responsible for completing this form and forwarding the permit application to the appropriate

delegated authority where applicable.

		l
Permit No:	MW-215208	1
Florida Unique I	О	
Permit Stipulation	ns Required (See Attached)
MW-2		
62-524 Quad No.	3705NW	Delineation No.
CUP/WUP Appl	ication No.	
AROVE T	HIS LINE FO	OFFICIAL USE ONLY

1.United States Of America	1849 Nw C St Rm 5665	Washington	DC	20240	40729	3532
*Owner, Legal Name if Corporation	Address	*City	*State	*Zip	*Telep	pne Number
2.NASA LC39, KSC, FL 32899						
*Well Location – Address, Road Name or N	ber, City					
3. 22-37-09-00-1						
*Parcel ID No. (PIN) or Alternate Key (Circle	ne)		Lot	Block		Unit
4.9 228 37	4					
*Section or Land Grant *Township *Ri	ge *County	Subdivision	C	heck if 62-524:	Yes	X No
5. Carl Leonhardt	9521	4072953532		rl@edsenvironme	ntal.com	
*Water Well Contractor	*License Number	*Telephone Num	nber E-r	mail Address		
6.4712 Old Winter Garden Rd *Water Well Contractor's Address		Orlando		<u>FL</u> State		32811-1740 7IP
		City		State		ZIP
7.*Type of Work: X Construction	pairModification	Abandonment	or Repair. Modification.	or Abandonment		
8.*Number of Proposed Wells 2						
9.*Specify Intended Use(s) of Well(s):	1				į	Date Stamp
DomesticLandscape II	ation	Agricultural Irrigation	s	Site Investigation		
Bottled Water SupplyRecreation A	81	Livestock		Monitoring		Confirmation#
Public Water Supply (Limited Use/DOH)		_Nursery trrigation Commercial/Industrial		Fest Earth-Coupled Geot	harmal	877510
Public Water Supply (Community orNon-	pmmunity/DEP)	_Confinerciating attention		-arm-Coupled Geor	i)e(iiiai	Date: 02/13/2024
Class I Injection		· · · · · · · . - · · · · ·		IVAC Return		Cate. 52 13/2024
Class V Injection:RechargeC			nd Recovery _	Drainage		Official Use Only
Remediation:RecoveryAir Spa	eOther (Describe)					
Other (Describe) 10. *Distance from Septic System if ≤ 200 ft.	4	(Note: Not all types	of wells are permitte	ed by a given permittin	g authority)	
10. *Distance from Septic System if ≤ 200 ft.	11. Facility D	escription <u>Undefined</u>	Reserved For Futu	ire Use 12	. Estimated	\$tart Date
13. *Estimated Well Depth <u>27</u> ft. *Es		ft. *Primary Casing	Diameter1	I <u>i</u> in. Ope	n Hole: Fr	imft.
14. Estimated Screen Interval: From 22						
		nized XPV	'C	Stainless Steel		
	asedOther:				—	
16. Secondary Casing:Telescope						
17. Secondary Casing Material: Bl						
18. *Method of Construction, Repair, or Abanc		Cable Tool				nic
Combination (Two or More Me						
Horizontal Drilling 19. Proposed Grouting Interval for the Priman						
From <u>0</u> To <u>22</u> Seal Mat	al (Bentonite	Neat Cement	X Other Cer	nent)	
FromToSeal Mate	tal (Bentonite	Neat Cement	Other)	
	al (Bentonite					
FromToSeal Mat 20. Indicate total number of existing wells on a		List number of existing			'	
21. *Is this well or any existing well or water w					mit (CLIB/	עםו ווא
or CUP/WUP Application?Yes		guous property covered ate the following: CUPA				'No. 555750
22, Latitude 283541.9264	Longitude 803713,7052	ne tris rollowing. COI /	VOI 140.		ITHEL TABIL IS	160, 200720
23. Data Obtained From: GPS	Map Survey	 Da	tum: I	NAD 27 X	NAD 83	. WGS 84
I hereby certify that I will comply with the applicable rules of I use permit or artificial recharge permit, if needed, has been a construction. I further certify that information provided in this approval from other federal state, or local governments, if ap the District within 30 days after completion of the construction this country at the permit permitting the provided provided in the construction.	III be obtained prior to commencement of	of well res	ponsibilities under Chapt	er 373, Florida Statutes, to	maintain or pro	d is accurate, and that I am aware of my enty apardon this well: or, I centify that I am that I have informed the owner of his of this WMD or Delegated Authority access ment author zed by this permit.
approval from other federal state, or local governments, if ap	table. I agree to provide a well completion	on report to res	ponsibilities as stated ab	ove. Owner consents to all	owing personne	of this WMD or Delegated Authority access
the District within 30 days after completion or the construction this permit, or the permit expiration, whichever occurs first.			ne weil site during the co	instruction, repair, modifica	don, or abando	
Carl Leonhardt *Signature of Contractor	9521		rt Leonhardt ignature of Owne	r or Agent		02/13/2024 *Date
Organization Contractor	License No. BELOW TH	IIS LINE – FOR OFFIC		o Ayon		; Date
Yanda Danis	ļ					
Approval Granted By Kayla Davis	Issue	Date 02/14/2024	Expiration	Date <u>02/13/2025</u>	ţ	ydrologist Approvalinitials
Fee Received \$ 100	Receipt No. 111125		Check No			
THIS PERMIT IS NOT VALID UNTIL PROP SHALL BE AVAILABLE AT THE WELL SIT					DELEGATE	D AUTHORITY. THE PERMIT

AECOM LONG TERM MONITORING WELLS AT VEHICLE ASSEMBLY BUILDING AREA

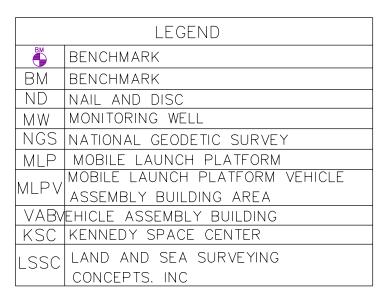


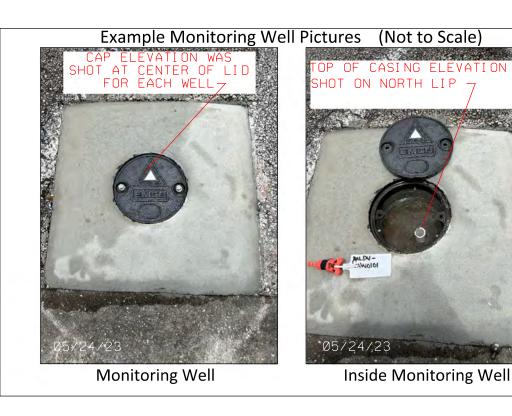
CONTROL CHART AS PER LSSC						
NORTHING	EASTING	ELEVATION	DESCRIPTION	SYMBOL		
1545727.20	7666Ø1.25	4.87′	SET ND5170 BM1	BM1		
1546468.59	768010.24	7.79′	SET ND5170 BM2	BM2		
1546493.67	769365.61	5.40′	NGS MONUMENT "ODOP 1.39.7"	BM3		
1544816.33	768783.06	7.45′	NGS MONUMENT "WRIGHT"	BM4		
1551761.54	782985.40	4.30′	NGS MONUMENT "MURPHY AZ"	BM5		
1550895.84	778725.28	4. 93′	NGS MONUMENT "J 216"	BM6		

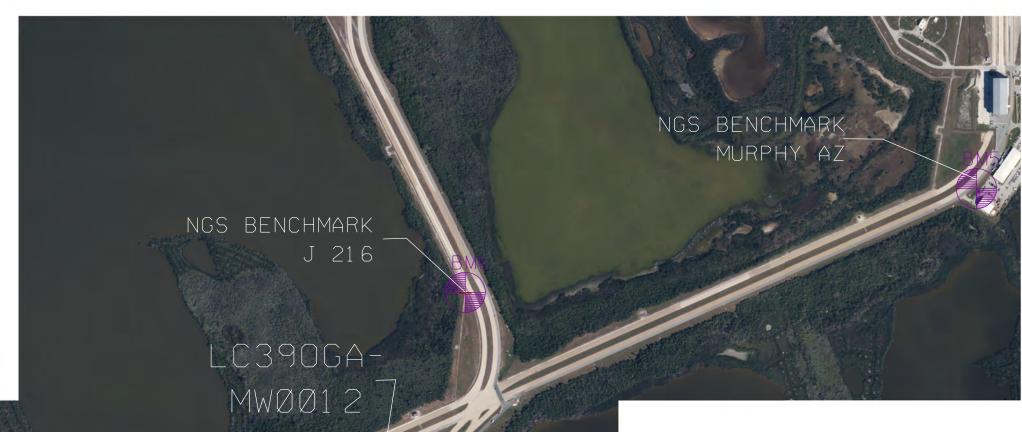


SITE LOCATION MA	Ρ
------------------	---

MONITORING WELL COORDINATES AND ELEVATIONS							
MONITORING WELL #	NORTHING	EASTING	CAP ELEVATION	TOP OF CASING ELEVATION			
LC390GA-MWØØ1Ø	1548883.2519	777986.6294	1.60	1.32			
SFOC-IWØØØ9	1541268.9843	768Ø89.1534	5.13	4. 78			
LC390GA-MWØØ11	1549176.1519	777989.5049	6. 29	5. 77			
LC390GA-MWØØ12	1549177.3061	777991.7797	6.15	5. 91			





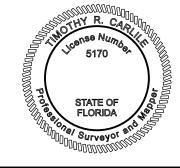




NOTES

- 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 5J-17, 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 02-19-24. 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".



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.

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

02-22-2024



WWW. LAND-AND-SEA-SURVEYING. COM

MAPPER NAMED HEREIN.

SHEET: 1 OF 1 AECOM MONITORING WELLS JOB NUMBER: 2023-019 LAND BUSINESS #6447 PHONE: 321-454-6310 FAX: 321-454-6998 E-MAIL: TC5170@AOL.COM 1605 CHASE HAMMOCK RD. MERRITT ISLAND, FL 32953

SURVEY FOR: AECOM

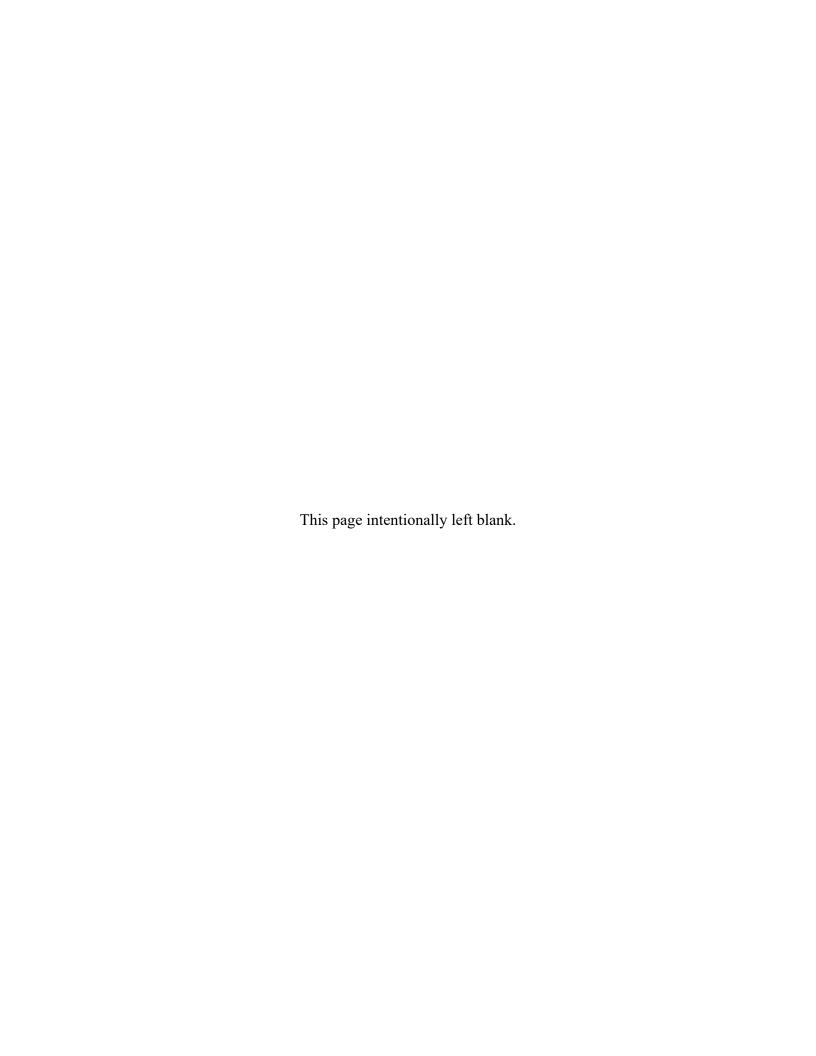
AECOM LONG TERM MONITORING WELLS

	RE	VISION	15			ВҮ	DATE	١
DED	WELLS	MWØØ11	&	MWØØ1	2	SCC	2-22-24	1
								ı
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								1
								1
								1
	<u>- S</u> (`ALF			1 " =	80	<u> </u>	
	DA	ATE			<u>Ø6-1</u>	6-2	<u> </u>	'



APPENDIX F LABORATORY ANALYTICAL REPORT

(only included in the electronic copy)





Environment Testing

PERMISSION TO PUBLISH

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Abel Mi	10.14.2022
Signature	Date
Signature	Bate

Eurofins Environment Testing Southeast, LLC Alex Montoya President 5102 LaRoche Avenue Savannah, GA 31404

12 12

14

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PREPARED FOR

Attn: Teresa Amentt Jennings AECOM Technical Services Inc. 150 North Orange Avenue Suite 200 Orlando, Florida 32801

ANALYTICAL REPORT

Generated 3/4/2024 12:34:42 PM

JOB DESCRIPTION

NASA KSC VAB LTM Program

JOB NUMBER

670-34991-1

Eurofins Orlando 481 Newburyport Avenue Altamonte Springs FL 32701



Eurofins Orlando

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization

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Authorized for release by Kaitlin Dylnicki, Project Manager kaitlin.dylnicki@et.eurofinsus.com (407)339-5984

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15

Definitions/Glossary

Client: AECOM Technical Services Inc.

Project/Site: NASA KSC VAB LTM Program

Job ID: 670-34991-1

Qualifiers

GC/MS VOA

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

U Indicates that the compound was analyzed for but not detected.

General Chemistry

Qualifier Qualifier Description

U Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

Listed under the "D" column to designate that the result is reported on a dry weight basis

%R Percent Recovery
CFL Contains Free Liquid
CFU Colony Forming Unit
CNF Contains No Free Liquid

DER Duplicate Error Ratio (normalized absolute difference)

Dil Fac Dilution Factor

DL Detection Limit (DoD/DOE)

DL, RA, RE, IN Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample

DLC Decision Level Concentration (Radiochemistry)

EDL Estimated Detection Limit (Dioxin)

LOD Limit of Detection (DoD/DOE)

LOQ Limit of Quantitation (DoD/DOE)

MCL EPA recommended "Maximum Contaminant Level"

MDA Minimum Detectable Activity (Radiochemistry)

MDC Minimum Detectable Concentration (Radiochemistry)

MDL Method Detection Limit
ML Minimum Level (Dioxin)
MPN Most Probable Number
MQL Method Quantitation Limit

NC Not Calculated

ND Not Detected at the reporting limit (or MDL or EDL if shown)

NEG Negative / Absent POS Positive / Present

PQL Practical Quantitation Limit

PRES Presumptive QC Quality Control

RER Relative Error Ratio (Radiochemistry)

RL Reporting Limit or Requested Limit (Radiochemistry)

RPD Relative Percent Difference, a measure of the relative difference between two points

TEF Toxicity Equivalent Factor (Dioxin)
TEQ Toxicity Equivalent Quotient (Dioxin)

TNTC Too Numerous To Count

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Case Narrative

Client: AECOM Technical Services Inc. Project: NASA KSC VAB LTM Program

Job ID: 670-34991-1

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Job ID: 670-34991-1

Job Narrative 670-34991-1

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 2/19/2024 4:07 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 4.6°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

Method PFC_IDA: Reporting limits were raised for the following sample: LC390GA-IDW0001-20240219 (670-34991-18) due to interference from the sample matrix.

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.

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Client: AECOM Technical Services Inc.
Project/Site: NASA KSC VAB LTM Program

Job ID: 670-34991-1

Client Sample ID: LC39	0GA-MW0010-010.0-2	0240219			Lab Sa	mple ID:	670-34991-
- Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
trans-1,2-Dichloroethene	3.2	1.0	0.73	ug/L		8260D	Total/NA
Vinyl chloride	5.0	1.0	0.71	ug/L	1	8260D	Total/NA
lient Sample ID: LC39	0GA-MW0005-010.0-2	0240219			Lab Sa	mple ID:	670-34991-
No Detections.							
Client Sample ID: LC39	0GA-MW0009-024.5-2	0240219			Lab Sa	mple ID:	670-34991-
Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
cis-1,2-Dichloroethene	1.2	1.0	0.53	ug/L		8260D	Total/NA
Vinyl chloride	1.0	1.0	0.71	ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0011-010.0-2	0240219			Lab Sa	mple ID:	670-34991-4
No Detections.							
Client Sample ID: LC39	0GA-MW0012-024.5-2	0240219			Lab Sa	mple ID:	670-34991-
Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
cis-1,2-Dichloroethene		1.0	0.53	ug/L		8260D	Total/NA
Vinyl chloride	8.5	1.0		ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0004-010.0-2	0240219			Lab Sa	mple ID:	670-34991-6
- Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
trans-1,2-Dichloroethene	0.85 I	1.0	0.73	ug/L		8260D	Total/NA
Vinyl chloride	5.1	1.0		ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0008-024.5-2	0240219			Lab Sa	mple ID:	670-34991-7
- Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
cis-1,2-Dichloroethene	2.2	1.0	0.53	ug/L		8260D	Total/NA
Vinyl chloride	0.73 I	1.0	0.71	ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0002-010.0-2	0240219			Lab Sa	mple ID:	670-34991-8
- Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
trans-1,2-Dichloroethene	3.6	1.0	0.73	ug/L		8260D	Total/NA
Vinyl chloride	3.7	1.0	0.71	ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0007-024.5-2	0240219			Lab Sa	mple ID:	670-34991-9
- Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
cis-1,2-Dichloroethene	0.72 I	1.0	0.53	ug/L		8260D	Total/NA
Client Sample ID: LC39	0GA-MW0001-010.0-2	0240219			Lab San	nple ID: 6	70-34991-10
Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac D	Method	Prep Type
trans-1,2-Dichloroethene	5.9	1.0	0.73	ug/L		8260D	Total/NA
Vinyl chloride	0.89 I	1.0	0.71	ug/L	1	8260D	Total/NA
Client Sample ID: LC39	0GA-MW0006-024.5-2	0240219			Lab San	nple ID: 6	70-34991-11

This Detection Summary does not include radiochemical test results.

Result Qualifier

0.69 I

Analyte

cis-1,2-Dichloroethene

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PQL

1.0

MDL Unit

0.53 ug/L

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13

15

4.6

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Prep Type

Total/NA

Dil Fac D Method

8260D

Detection Summary

Project/Site: NASA KSC VAB LTM Program Client Sample ID: LC390GA-MW0003-010.0-20240219 Lab Sample ID: 670-34991-12 No Detections. Client Sample ID: LC390GA-SW0002-001.0-20240219 Lab Sample ID: 670-34991-13 No Detections. Client Sample ID: LC390GA-SW0004-001.0-20240219 Lab Sample ID: 670-34991-14 No Detections. Client Sample ID: LC390GA-SW0005-001.0-20240219 Lab Sample ID: 670-34991-15 No Detections. Client Sample ID: LC390GA-SW0006-001.0-20240219 Lab Sample ID: 670-34991-16 No Detections. Client Sample ID: LC390GA-TB0001-20240219 Lab Sample ID: 670-34991-17 No Detections.

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Analyte	Result Qualifier	PQL	MDL	Unit	Dil Fac I) Method	Prep Type
cis-1,2-Dichloroethene	1.4	1.0	0.53	ug/L		8260D	Total/NA
Nitrate as N	1100	800	400	ug/L	2	300.0	Total/NA
Total Phosphorus as P	2300	100	40	ug/L	1	365.4	Total/NA

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Job ID: 670-34991-1

Lab Sample ID: 670-34991-18

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Client Sample ID: LC390GA-IDW0001-20240219

Client: AECOM Technical Services Inc.

Client: AECOM Technical Services Inc.

Job ID: 670-34991-1

Project/Site: NASA KSC VAB LTM Program

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Client Sample ID: LC390GA-MW0010-010.0-20240219 Lab Sample ID: 670-34991-1

Date Collected: 02/19/24 12:49

Date Received: 02/19/24 16:07

Matrix: Water

Method: SW846 8260D - Vo	olatile Organic	Compound	ds 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			02/21/24 19:16	1
trans-1,2-Dichloroethene	3.2		1.0	0.73	ug/L			02/21/24 19:16	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 19:16	1
Vinyl chloride	5.0		1.0	0.71	ug/L			02/21/24 19:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	106		40 - 146			-		02/21/24 19:16	1
4-Bromofluorobenzene (Surr)	96		41 - 142					02/21/24 19:16	1
Dibromofluoromethane (Surr)	98		53 - 146					02/21/24 19:16	1

Date Collected: 02/19/24 10:47 Matrix: Water

Date Received: 02/19/24 16:07

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 19:34	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 19:34	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 19:34	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 19:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		40 - 146					02/21/24 19:34	1
4-Bromofluorobenzene (Surr)	99		41 - 142					02/21/24 19:34	1
Dibromofluoromethane (Surr)	99		53 - 146					02/21/24 19:34	1

Client Sample ID: LC390GA-MW0009-024.5-20240219

Date Collected: 02/19/24 11:18

Lab Sample ID: 670-34991-3

Matrix: Water

Date Received: 02/19/24 16:07

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1.2		1.0	0.53	ug/L			02/21/24 19:52	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 19:52	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 19:52	1
Vinyl chloride	1.0		1.0	0.71	ug/L			02/21/24 19:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	106		40 - 146					02/21/24 19:52	1
4-Bromofluorobenzene (Surr)	102		41 - 142					02/21/24 19:52	1

Client Sample ID: LC390GA-MW0011-010.0-20240219 Lab Sample ID: 670-34991-4

53 - 146

101

Date Collected: 02/19/24 12:40 Matrix: Water

Date Received: 02/19/24 16:07

Dibromofluoromethane (Surr)

Method: SW846 8260D - Vo	latile 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			02/21/24 20:09	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 20:09	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 20:09	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 20:09	1

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02/21/24 19:52

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Client Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-MW0011-010.0-20240219

Date Collected: 02/19/24 12:40

Date Received: 02/19/24 16:07

Lab Sample ID: 670-34991-4

Matrix: Water

Job ID: 670-34991-1

Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Toluene-d8 (Surr) 105 40 - 146 02/21/24 20:09 4-Bromofluorobenzene (Surr) 98 41 - 142 02/21/24 20:09 Dibromofluoromethane (Surr) 101 02/21/24 20:09 53 - 146

Client Sample ID: LC390GA-MW0012-024.5-20240219

Date Collected: 02/19/24 13:22

Date Received: 02/19/24 16:07

Lab Sample ID: 670-34991-5

Matrix: Water

Method: SW846 8260D - Vo	platile Organic	Compoun	ds 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			02/21/24 20:27	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 20:27	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 20:27	1
Vinyl chloride	8.5		1.0	0.71	ug/L			02/21/24 20:27	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		40 - 146					02/21/24 20:27	1
4-Bromofluorobenzene (Surr)	100		41 - 142					02/21/24 20:27	1

53 - 146

Client Sample ID: LC390GA-MW0004-010.0-20240219

98

Date Collected: 02/19/24 11:22

Dibromofluoromethane (Surr)

Date Received: 02/19/24 16:07

Lab Sample ID: 670-34991-6

02/21/24 20:27

Matrix: Water

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 14:38	1
trans-1,2-Dichloroethene	0.85	1	1.0	0.73	ug/L			02/21/24 14:38	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 14:38	1
Vinyl chloride	5.1		1.0	0.71	ug/L			02/21/24 14:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	92		40 - 146			-		02/21/24 14:38	1

Toluene-d8 (Surr) 40 - 146 02/21/24 14:38 4-Bromofluorobenzene (Surr) 102 41 - 142 02/21/24 14:38 1 97 Dibromofluoromethane (Surr) 53 - 146 02/21/24 14:38

Client Sample ID: LC390GA-MW0008-024.5-20240219

102

97

Date Collected: 02/19/24 10:37

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Date Received: 02/19/24 16:07

Lab Sample I	ID: 670-34991-7

Matrix: Water

Method: SW846 8260D - \ Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	2.2		1.0	0.53	ug/L			02/21/24 16:20	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 16:20	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 16:20	1
Vinyl chloride	0.73	I	1.0	0.71	ug/L			02/21/24 16:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146			•		02/21/24 16:20	1

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02/21/24 16:20

02/21/24 16:20

41 - 142

53 - 146

1

Job ID: 670-34991-1

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-MW0002-010.0-20240219

Lab Sample ID: 670-34991-8 Date Collected: 02/19/24 12:32 **Matrix: Water**

Date Received: 02/19/24 16:07

Method: SW846 8260D - Vo	latile Organic	Compoun	ds 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			02/21/24 16:38	1
trans-1,2-Dichloroethene	3.6		1.0	0.73	ug/L			02/21/24 16:38	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 16:38	1
Vinyl chloride	3.7		1.0	0.71	ug/L			02/21/24 16:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146					02/21/24 16:38	1
4-Bromofluorobenzene (Surr)	105		41 - 142					02/21/24 16:38	1
Dibromofluoromethane (Surr)	99		53 - 146					02/21/24 16:38	1

Client Sample ID: LC390GA-MW0007-024.5-20240219 Lab Sample ID: 670-34991-9

Date Collected: 02/19/24 12:02 **Matrix: Water**

Date Received: 02/19/24 16:07

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.72	I	1.0	0.53	ug/L			02/21/24 16:55	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 16:55	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 16:55	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 16:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	94		40 - 146					02/21/24 16:55	1
4-Bromofluorobenzene (Surr)	104		41 - 142					02/21/24 16:55	1
Dibromofluoromethane (Surr)	100		53 - 146					02/21/24 16:55	1

Lab Sample ID: 670-34991-10 Client Sample ID: LC390GA-MW0001-010.0-20240219 Date Collected: 02/19/24 13:22 **Matrix: Water**

Date Received: 02/19/24 16:07

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 17:12	1
trans-1,2-Dichloroethene	5.9		1.0	0.73	ug/L			02/21/24 17:12	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 17:12	1
Vinyl chloride	0.89	I	1.0	0.71	ug/L			02/21/24 17:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	92		40 - 146			•		02/21/24 17:12	1
4-Bromofluorobenzene (Surr)	102		41 - 142					02/21/24 17:12	1
Dibromofluoromethane (Surr)	96		53 - 146					02/21/24 17:12	1

Client Sample ID: LC390GA-MW0006-024.5-20240219 Lab Sample ID: 670-34991-11

Date Collected: 02/19/24 10:12 **Matrix: Water**

Date Received: 02/19/24 16:07

Method: SW846 8260D - Vo	latile Organic	Compounds	s by GC/MS						
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.69	I	1.0	0.53	ug/L			02/21/24 17:29	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 17:29	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 17:29	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 17:29	1

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Client Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-MW0006-024.5-20240219

Date Collected: 02/19/24 10:12

Date Received: 02/19/24 16:07

Lab Sample ID: 670-34991-11

Matrix: Water

Job ID: 670-34991-1

	Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
	Toluene-d8 (Surr)	92		40 - 146	$\overline{}$ $\overline{}$	2/21/24 17:29	1
	4-Bromofluorobenzene (Surr)	102		41 - 142	02	2/21/24 17:29	1
Į	Dibromofluoromethane (Surr)	98		53 - 146	02	2/21/24 17:29	1

Client Sample ID: LC390GA-MW0003-010.0-20240219

Date Collected: 02/19/24 10:06

Date Received: 02/19/24 16:07

Lab Sample ID: 670-34991-12

Matrix: Water

Method: SW846 8260D - Vo	_	Qualifier	•	MDL	I Imit	D	Duamanad	Amalumad	Dil Fac
Analyte	Result	Qualifier	PQL _	MDL	Unit		Prepared	Analyzed	Dii Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 17:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 17:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 17:46	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 17:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146			•		02/21/24 17:46	1
4-Bromofluorobenzene (Surr)	103		41 - 142					02/21/24 17:46	1
Dibromofluoromethane (Surr)	98		53 - 146					02/21/24 17:46	1

Client Sample ID: LC390GA-SW0002-001.0-20240219

Date Collected: 02/19/24 10:30

Date Received: 02/19/24 16:07

Lab	Sample	ID:	67	0-	349	9 91	-13	

Matrix: Water

Method: SW846 8260D - Vo	latile Organic	Compound	ds 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			02/21/24 18:03	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 18:03	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 18:03	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 18:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146			•		02/21/24 18:03	1
4-Bromofluorobenzene (Surr)	100		41 - 142					02/21/24 18:03	1

53 - 146

Client Sample ID: LC390GA-SW0004-001.0-20240219

103

98

Date Collected: 02/19/24 11:03 Date Received: 02/19/24 16:07

Dibromofluoromethane (Surr)

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Lab Sample ID: 670-34991-14

02/21/24 18:03

02/21/24 18:20

02/21/24 18:20

Matrix: Water

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 18:20	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 18:20	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 18:20	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 18:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146			-		02/21/24 18:20	1

41 - 142

53 - 146

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Job ID: 670-34991-1

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-SW0005-001.0-20240219

Lab Sample ID: 670-34991-15

Date Collected: 02/19/24 11:34 Date Received: 02/19/24 16:07 **Matrix: Water**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 18:38	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 18:38	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 18:38	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 18:38	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	93		40 - 146					02/21/24 18:38	1
4-Bromofluorobenzene (Surr)	101		41 - 142					02/21/24 18:38	1
Dibromofluoromethane (Surr)	98		53 - 146					02/21/24 18:38	1

Lab Sample ID: 670-34991-16 Client Sample ID: LC390GA-SW0006-001.0-20240219

Date Collected: 02/19/24 12:08

Matrix: Water Date Received: 02/19/24 16:07

Method: SW846 8260D - Vo	olatile Organic	Compoun	ds by GC/MS	1					
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 18:54	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 18:54	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 18:54	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 18:54	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	92		40 - 146			-		02/21/24 18:54	1
4-Bromofluorobenzene (Surr)	102		41 - 142					02/21/24 18:54	1
Dibromofluoromethane (Surr)	97		53 - 146					02/21/24 18:54	1

Client Sample ID: LC390GA-TB0001-20240219 Lab Sample ID: 670-34991-17 **Matrix: Water**

Date Collected: 02/19/24 08:00 Date Received: 02/19/24 16:07

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.53	U	1.0	0.53	ug/L			02/21/24 15:46	1
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 15:46	1
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 15:46	1
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 15:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
= / /2 /2 \						-			

Surrogate	%Recovery	Qualifier	Limits	Prepared Analyzed	DII Fac
Toluene-d8 (Surr)	91		40 - 146	02/21/24 15:46	1
4-Bromofluorobenzene (Surr)	101		41 - 142	02/21/24 15:46	1
Dibromofluoromethane (Surr)	95		53 - 146	02/21/24 15:46	1

Client Sample ID: LC390GA-IDW0001-20240219 Lab Sample ID: 670-34991-18

Date Collected: 02/19/24 13:55 Date Received: 02/19/24 16:07

Method: SW846 8260D - Volatile Organic Compounds by GC/MS											
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac		
cis-1,2-Dichloroethene	1.4		1.0	0.53	ug/L			02/21/24 19:12	1		
trans-1,2-Dichloroethene	0.73	U	1.0	0.73	ug/L			02/21/24 19:12	1		
Trichloroethene	0.89	U	1.0	0.89	ug/L			02/21/24 19:12	1		
Vinyl chloride	0.71	U	1.0	0.71	ug/L			02/21/24 19:12	1		

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Client Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

13C3 HFPO-DA

13C3 PFBS

13C4 PFBA

13C4 PFHpA

13C5 PFPeA

13C8 PFOA

Client Sample ID: LC390GA-IDW0001-20240219 Lab Sample ID: 670-34991-18 **Matrix: Water**

Date Collected: 02/19/24 13:55 Date Received: 02/19/24 16:07

Surrogate	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	92	40 - 146	02/	/21/24 19:12	1
4-Bromofluorobenzene (Surr)	102	41 - 142	02/	/21/24 19:12	1
Dibromofluoromethane (Surr)	98	53 - 146	02/	/21/24 19:12	1

	Method: EPA 300.0 - Anions, I	on Chromate	ography							
	Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
l	Nitrate as N	1100		800	400	ug/L			02/21/24 05:44	2

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11CI-PF3OUdS	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
4:2 Fluorotelomer sulfonic acid	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
6:2 Fluorotelomer sulfonic acid	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
8:2 Fluorotelomer sulfonic acid	0.00061	U	0.0020	0.00061	ug/L		02/27/24 15:33	02/29/24 17:13	1
9CI-PF3ONS	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
DONA	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
HFPODA	0.00041	U	0.0020	0.00041	ug/L		02/27/24 15:33	02/29/24 17:13	1
NEtFOSAA	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
NMeFOSAA	0.00041	U	0.0020	0.00041	ug/L		02/27/24 15:33	02/29/24 17:13	1
NMeFOSA	0.00071	U	0.0020	0.00071	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorobutanesulfonic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorobutanoic acid	0.0010	U	0.0020	0.0010	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorodecanesulfonic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorodecanoic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorododecanoic acid	0.00041	U	0.0020	0.00041	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluoroheptanesulfonic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluoroheptanoic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorohexanesulfonic acid	0.00020	U	0.0020	0.00020	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorohexanoic acid	0.0010	U	0.0020	0.0010	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorononanesulfonic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorononanoic acid	0.00020	U	0.0020	0.00020	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorooctanesulfonamide	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorooctanesulfonic acid	0.00051	U	0.0020	0.00051	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorooctanoic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluoropentanesulfonic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluoropentanoic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorotetradecanoic acid	0.00041	U	0.0020	0.00041	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluorotridecanoic acid	0.00041	U	0.0020	0.00041	ug/L		02/27/24 15:33	02/29/24 17:13	1
Perfluoroundecanoic acid	0.00031	U	0.0020	0.00031	ug/L		02/27/24 15:33	02/29/24 17:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
M2-4:2 FTS	123		35 - 200				<u> </u>	02/29/24 17:13	1
M2-6:2 FTS	126		40 - 200				02/27/24 15:33	02/29/24 17:13	1
M2-8:2 FTS	113		37 - 200				02/27/24 15:33	02/29/24 17:13	1
13C2 PFTeDA	116		10 - 171				02/27/24 15:33	02/29/24 17:13	1

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02/27/24 15:33 02/29/24 17:13

02/27/24 15:33 02/29/24 17:13

02/27/24 15:33 02/29/24 17:13

02/27/24 15:33 02/29/24 17:13

02/27/24 15:33 02/29/24 17:13

02/27/24 15:33 02/29/24 17:13

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34 - 200

22 - 174

40 - 165

33 - 196

52 - 153

111

122

110

118

116

117

Job ID: 670-34991-1

Client Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Total Phosphorus as P (EPA 365.4)

Client Sample ID: LC390GA-IDW0001-20240219 Lab Sample ID: 670-34991-18

Date Collected: 02/19/24 13:55 **Matrix: Water** Date Received: 02/19/24 16:07

Isotope Dilution	%Recovery Qualifier	Limits		Prepared	Analyzed	Dil Fac
13C8 PFOS	119	59 - 155		02/27/24 15:33	02/29/24 17:13	1
d3-NMeFOSAA	114	38 - 168		02/27/24 15:33	02/29/24 17:13	1
d5-NEtFOSAA	111	34 - 181		02/27/24 15:33	02/29/24 17:13	1
13C3 PFHxS	125	48 - 169		02/27/24 15:33	02/29/24 17:13	1
13C5 PFHxA	115	28 - 166		02/27/24 15:33	02/29/24 17:13	1
13C6 PFDA	110	53 - 151		02/27/24 15:33	02/29/24 17:13	1
13C7 PFUnA	116	41 - 163		02/27/24 15:33	02/29/24 17:13	1
d3-NMePFOSA	77	10 - 130		02/27/24 15:33	02/29/24 17:13	1
13C8 FOSA	98	10 - 155		02/27/24 15:33	02/29/24 17:13	1
13C2-PFDoDA	119	22 - 165		02/27/24 15:33	02/29/24 17:13	1
13C9 PFNA	115	52 - 168		02/27/24 15:33	02/29/24 17:13	1
General Chemistry						
Analyte	Result Qualifier	PQL	MDL Unit	D Prepared	Analyzed	Dil Fac

100

40 ug/L

2300

Job ID: 670-34991-1

02/20/24 14:02 02/21/24 09:51

Surrogate Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water Prep Type: Total/NA

			Pe	rcent Surrogate	Recovery (Acceptance Limits)
		TOL	BFB	DBFM	
_ab Sample ID	Client Sample ID	(40-146)	(41-142)	(53-146)	
370-34991-1	LC390GA-MW0010-010.0-2024	106	96	98	
70-34991-2	LC390GA-MW0005-010.0-2024 0219	103	99	99	
70-34991-3	LC390GA-MW0009-024.5-2024 0219	106	102	101	
70-34991-4	LC390GA-MW0011-010.0-2024 0219	105	98	101	
70-34991-5	LC390GA-MW0012-024.5-2024 0219	104	100	98	
70-34991-6	LC390GA-MW0004-010.0-2024 0219	92	102	97	
70-34991-6 MS	LC390GA-MW0004-010.0-2024 0219	93	103	98	
70-34991-6 MSD	LC390GA-MW0004-010.0-2024 0219	93	101	99	
70-34991-7	LC390GA-MW0008-024.5-2024 0219	93	102	97	
0-34991-8	LC390GA-MW0002-010.0-2024 0219	93	105	99	
70-34991-9	LC390GA-MW0007-024.5-2024 0219	94	104	100	
70-34991-10	LC390GA-MW0001-010.0-2024 0219	92	102	96	
70-34991-11	LC390GA-MW0006-024.5-2024 0219	92	102	98	
70-34991-12	LC390GA-MW0003-010.0-2024 0219	93	103	98	
70-34991-13	LC390GA-SW0002-001.0-2024 0219	93	100	99	
0-34991-14	LC390GA-SW0004-001.0-2024 0219	93	103	98	
0-34991-15	LC390GA-SW0005-001.0-2024 0219	93	101	98	
0-34991-16	LC390GA-SW0006-001.0-2024 0219	92	102	97	
70-34991-17	LC390GA-TB0001-20240219	91	101	95	
0-34991-18	LC390GA-IDW0001-20240219	92	102	98	
-35092-D-1 DU	Duplicate	105	98	100	
)-35092-F-2 MS	Matrix Spike	106	94	96	
S 670-77147/4	Lab Control Sample	107	96	98	
CS 670-77182/4	Lab Control Sample	94	102	98	
B 670-77147/7	Method Blank	106	99	98	
	ooa Diariit	100	00	00	

Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

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3

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12

4.1

I.e

Isotope Dilution Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		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)
670-34991-18	LC390GA-IDW0001-20240219	123	126	113	116	111	122	110	118
LCS 410-477531/2-A	Lab Control Sample	124	134	125	123	104	124	123	119
LCSD 410-477531/3-A	Lab Control Sample Dup	139	135	133	119	95	131	118	117
MB 410-477531/1-A	Method Blank	137	134	138	126	107	120	134	128
			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		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)
670-34991-18	LC390GA-IDW0001-20240219	116	117	119	114	111	125	115	110
LCS 410-477531/2-A	Lab Control Sample	118	122	120	120	120	125	113	112
LCSD 410-477531/3-A	Lab Control Sample Dup	116	122	121	122	117	122	109	113
MB 410-477531/1-A	Method Blank	127	133	131	124	122	133	116	122
			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		13C7PUA	d3NMFSA	PFOSA	PFDoDA	C9PFNA			
Lab Sample ID	Client Sample ID	(41-163)	(10-130)	(10-155)	(22-165)	(52-168)			
670-34991-18	LC390GA-IDW0001-20240219	116	77	98	119	115			
LCS 410-477531/2-A	Lab Control Sample	117	72	105	120	115			
LCSD 410-477531/3-A	Lab Control Sample Dup	119	75	107	118	115			
MB 410-477531/1-A	Method Blank	130	81	109	133	125			
Surrogate Legend									

Surrogat	te Legend
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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

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QC Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 8260D - Volatile Organic Compounds by GC/MS

98

Lab Sample ID: MB 670-77147/7

Matrix: Water

Trichloroethene

Vinyl chloride

Surrogate

Analyte

Analysis Batch: 77147

Client Sample ID: Method Blank **Prep Type: Total/NA**

MB MB Result Qualifier PQL **MDL** Unit Dil Fac D Prepared Analyzed cis-1,2-Dichloroethene 0.53 U 1.0 0.53 ug/L 02/21/24 13:39 trans-1,2-Dichloroethene 0.73 U 1.0 0.73 ug/L 02/21/24 13:39 0.89 U 1.0 0.89 ug/L 02/21/24 13:39 0.71 U 02/21/24 13:39 1.0 0.71 ug/L

> MB MB Qualifier Limits Prepared Dil Fac %Recovery Analyzed 106 40 - 146 02/21/24 13:39 99 41 - 142 02/21/24 13:39

Lab Sample ID: LCS 670-77147/4

Matrix: Water

Toluene-d8 (Surr)

Analysis Batch: 77147

4-Bromofluorobenzene (Surr)

Dibromofluoromethane (Surr)

Client Sample ID: Lab Control Sample Prep Type: Total/NA

02/21/24 13:39

Spike LCS LCS %Rec Analyte Added Result Qualifier Unit D %Rec Limits 20.0 cis-1,2-Dichloroethene 18.4 ug/L 92 56 - 128 20.0 trans-1,2-Dichloroethene 18.4 ug/L 92 54 - 134 Trichloroethene 20.0 17.6 ug/L 88 62 - 135 20.0 25.4 Vinyl chloride ug/L 127 20 - 167

53 - 146

LCS LCS %Recovery Qualifier Surrogate Limits Toluene-d8 (Surr) 107 40 - 146 4-Bromofluorobenzene (Surr) 96 41 - 142 Dibromofluoromethane (Surr) 98 53 - 146

Lab Sample ID: 670-35092-F-2 MS

Matrix: Water

Analysis Batch: 77147

Client Sample ID: Matrix Spike Prep Type: Total/NA

Sample Sample Spike MS MS %Rec Result Qualifier Result Qualifier Unit Added %Rec Limits Analyte cis-1,2-Dichloroethene 0.53 U 20.0 19.6 ug/L 98 56 - 128 ug/L trans-1,2-Dichloroethene 0.73 U 20.0 20.0 100 54 - 134 Trichloroethene 0.89 U 20.0 18.9 ug/L 95 62 - 135 Vinyl chloride 0.71 U 20.0 27.0 ug/L 135 20 - 167

MS MS %Recovery Surrogate Qualifier Limits Toluene-d8 (Surr) 106 40 - 146 4-Bromofluorobenzene (Surr) 94 41 - 142 Dibromofluoromethane (Surr) 96 53 - 146

Analysis Batch: 77147

Client Sample ID: Duplicate Lab Sample ID: 670-35092-D-1 DU **Matrix: Water Prep Type: Total/NA**

	Sample	Sample		טט	טט				RPD	
Analyte	Result	Qualifier	Re	sult	Qualifier	Unit	D	RPD	Limit	
cis-1,2-Dichloroethene	0.53	U	(0.53	U	ug/L		NC	30	
trans-1,2-Dichloroethene	0.73	U	(0.73	U	ug/L		NC	20	
Trichloroethene	0.89	U	(0.89	U	ug/L		NC	30	

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Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

02/21/24 14:20

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

0.71 U

Lab Sample ID: 670-35092-D-1 DU

Matrix: Water

Analysis Batch: 77147

Client Sample ID: Duplicate Prep Type: Total/NA

DU DU **RPD** Sample Sample Analyte Result Qualifier Result Qualifier Unit **RPD** Limit Vinyl chloride 0.71 U 0.71 U ug/L NC 30

DU DU Surrogate %Recovery Qualifier Limits Toluene-d8 (Surr) 105 40 - 146 4-Bromofluorobenzene (Surr) 98 41 - 142 Dibromofluoromethane (Surr) 100 53 - 146

Lab Sample ID: MB 670-77182/7 **Client Sample ID: Method Blank** Prep Type: Total/NA

Matrix: Water

Vinyl chloride

Analysis Batch: 77182

MB MB Analyte Result Qualifier **PQL MDL** Unit Prepared Analyzed Dil Fac cis-1,2-Dichloroethene 0.53 U 1.0 0.53 ug/L 02/21/24 14:20 0.73 ug/L trans-1,2-Dichloroethene 0.73 U 1.0 02/21/24 14:20 0.89 ug/L 02/21/24 14:20 Trichloroethene 0.89 U 1.0

1.0

0.71 ug/L

MB MB Surrogate %Recovery Qualifier Limits Prepared Analyzed Dil Fac Toluene-d8 (Surr) 92 40 - 146 02/21/24 14:20 4-Bromofluorobenzene (Surr) 104 41 - 142 02/21/24 14:20 Dibromofluoromethane (Surr) 53 - 146 02/21/24 14:20 96

Lab Sample ID: LCS 670-77182/4

Client Sample ID: Lab Control Sample Matrix: Water Prep Type: Total/NA **Analysis Batch: 77182**

	Бріке	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
cis-1,2-Dichloroethene	20.0	16.7		ug/L		84	56 - 128	
trans-1,2-Dichloroethene	20.0	16.6		ug/L		83	54 - 134	
Trichloroethene	20.0	16.5		ug/L		83	62 - 135	
Vinyl chloride	20.0	11.8		ug/L		59	20 - 167	

LCS LCS Surrogate %Recovery Qualifier Limits Toluene-d8 (Surr) 94 40 - 146 4-Bromofluorobenzene (Surr) 41 - 142 102 Dibromofluoromethane (Surr) 53 - 146 98

Client Sample ID: LC390GA-MW0004-010.0-20240219 Lab Sample ID: 670-34991-6 MS

Matrix: Water Analysis Batch: 77182

Spike MS MS %Rec Sample Sample Result Qualifier Added Result Qualifier Unit %Rec Limits 0.53 U 20.0 16.8 84 56 - 128 cis-1,2-Dichloroethene ug/L trans-1,2-Dichloroethene 0.85 I 20.0 17.9 ug/L 85 54 - 134 ug/L Trichloroethene 0.89 U 20.0 17.3 87 62 - 135 Vinyl chloride 5.1 20.0 17.9 ug/L 64 20 - 167

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Prep Type: Total/NA

Client: AECOM Technical Services Inc. Job ID: 670-34991-1 Project/Site: NASA KSC VAB LTM Program

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 670-34991-6 MS

Matrix: Water

Analysis Batch: 77182

Client Sample ID: LC390GA-MW0004-010.0-20240219

Prep Type: Total/NA

MS MS %Recovery Qualifier Surrogate Limits Toluene-d8 (Surr) 93 40 - 146 4-Bromofluorobenzene (Surr) 103 41 - 142 Dibromofluoromethane (Surr) 98 53 - 146

Lab Sample ID: 670-34991-6 MSD Client Sample ID: LC390GA-MW0004-010.0-20240219

Matrix: Water Prep Type: Total/NA

Analysis Batch: 77182

		Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte		Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
cis-1,2-Dichle	oroethene	0.53	U	20.0	16.4		ug/L		82	56 - 128	2	17
trans-1,2-Dic	hloroethene	0.85	I	20.0	17.1		ug/L		81	54 - 134	5	20
Trichloroethe	ne	0.89	U	20.0	15.9		ug/L		79	62 - 135	9	20
Vinyl chloride)	5.1		20.0	16.7		ug/L		58	20 - 167	7	24

MSD MSD %Recovery Qualifier Surrogate Limits Toluene-d8 (Surr) 93 40 - 146 101 4-Bromofluorobenzene (Surr) 41 - 142 Dibromofluoromethane (Surr) 99 53 - 146

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 670-76929/11 Client Sample ID: Method Blank **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 76929

	MB	MB						
Analyte	Result	Qualifier	PQL	MDL Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U –	400	200 ug/l			02/20/24 14:36	

Lab Sample ID: MB 670-76929/52 Client Sample ID: Method Blank Prep Type: Total/NA

Matrix: Water

Analysis Batch: 76929

		141.0							
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			02/21/24 03:34	1

MR MR

Lab Sample ID: LCS 670-76929/50 **Client Sample ID: Lab Control Sample** Prep Type: Total/NA

Matrix: Water

Analysis Batch: 76929

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Nitrate as N	4000	3680		ua/L		92	90 - 110	

Lab Sample ID: LCSD 670-76929/51 Client Sample ID: Lab Control Sample Dup **Matrix: Water** Prep Type: Total/NA

Analysis Ratch: 76020

Alialysis Dalcii. 10323									
	Spike	LCSD	LCSD				%Rec		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Nitrate as N	4000	3960		ug/L		99	90 - 110	7	20

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3/4/2024

QC Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 670-34977-A-1 MS **Client Sample ID: Matrix Spike Matrix: Water** Prep Type: Total/NA

Analysis Batch: 76929

Sample Sample Spike MS MS %Rec Analyte Result Qualifier Added Result Qualifier Limits Unit D %Rec 5000 Nitrate as N 200 U 5590 ug/L 112 80 - 120

Lab Sample ID: 670-34977-A-1 MSD Client Sample ID: Matrix Spike Duplicate **Matrix: Water** Prep Type: Total/NA

Analysis Batch: 76929

Sample Sample Spike MSD MSD %Rec **RPD** Analyte Result Qualifier Added Result Qualifier Unit D %Rec Limits RPD Limit Nitrate as N 200 U 5000 5420 108 ug/L 80 - 120 3 20

Method: 537 IDA - EPA 537 Isotope Dilution

Lab Sample ID: MB 410-477531/1-A **Client Sample ID: Method Blank Matrix: Water** Prep Type: Total/NA Analysis Batch: 478276 Prep Batch: 477531

Analysis Batch: 4/82/6								Prep Batch:	4//531
	MB	MB							
Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11CI-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
6:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
8:2 Fluorotelomer sulfonic acid	0.00060	U	0.0020	0.00060	ug/L		02/27/24 15:33	02/29/24 14:30	1
9CI-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
DONA	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
HFPODA	0.00040	U	0.0020	0.00040	ug/L		02/27/24 15:33	02/29/24 14:30	1
NEtFOSAA	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
NMeFOSAA	0.00040	U	0.0020	0.00040	ug/L		02/27/24 15:33	02/29/24 14:30	1
NMeFOSA	0.00070	U	0.0020	0.00070	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorobutanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorobutanoic acid	0.0010	U	0.0020	0.0010	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorodecanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorodecanoic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorododecanoic acid	0.00040	U	0.0020	0.00040	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluoroheptanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluoroheptanoic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorohexanesulfonic acid	0.00020	U	0.0020	0.00020	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorohexanoic acid	0.0010	U	0.0020	0.0010	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorononanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorononanoic acid	0.00020	U	0.0020	0.00020	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorooctanesulfonamide	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorooctanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorooctanoic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluoropentanesulfonic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluoropentanoic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorotetradecanoic acid	0.00040	U	0.0020	0.00040	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluorotridecanoic acid	0.00040	U	0.0020	0.00040	ug/L		02/27/24 15:33	02/29/24 14:30	1
Perfluoroundecanoic acid	0.00030	U	0.0020	0.00030	ug/L		02/27/24 15:33	02/29/24 14:30	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-4:2 FTS	137		35 - 200	02/27/24 15:33	02/29/24 14:30	1
M2-6:2 FTS	134		40 - 200	02/27/24 15:33	02/29/24 14:30	1

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QC Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

MB MB

Lab Sample ID: MB 410-477531/1-A

Matrix: Water

Analysis Batch: 478276

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 477531

Isotope Dilution	%Recovery (Qualifier l	imits.	Prepared	Analyzed	Dil Fac
M2-8:2 FTS	138		37 - 200	02/27/24 15:33	02/29/24 14:30	1
13C2 PFTeDA	126		0 - 171	02/27/24 15:33	02/29/24 14:30	1
13C3 HFPO-DA	107	7	3 - 170	02/27/24 15:33	02/29/24 14:30	1
13C3 PFBS	120	3	34 - 200	02/27/24 15:33	02/29/24 14:30	1
13C4 PFBA	134	2	22 - 174	02/27/24 15:33	02/29/24 14:30	1
13C4 PFHpA	128	4	!0 ₋ 165	02/27/24 15:33	02/29/24 14:30	1
13C5 PFPeA	127	3	33 - 196	02/27/24 15:33	02/29/24 14:30	1
13C8 PFOA	133		52 - 153	02/27/24 15:33	02/29/24 14:30	1
13C8 PFOS	131		59 ₋ 155	02/27/24 15:33	02/29/24 14:30	1
d3-NMeFOSAA	124	3	38 - 168	02/27/24 15:33	02/29/24 14:30	1
d5-NEtFOSAA	122		34 - 181	02/27/24 15:33	02/29/24 14:30	1
13C3 PFHxS	133	2	18 - 169	02/27/24 15:33	02/29/24 14:30	1
13C5 PFHxA	116	2	28 - 166	02/27/24 15:33	02/29/24 14:30	1
13C6 PFDA	122		53 - 151	02/27/24 15:33	02/29/24 14:30	1
13C7 PFUnA	130	2	11 - 163	02/27/24 15:33	02/29/24 14:30	1
d3-NMePFOSA	81		0 - 130	02/27/24 15:33	02/29/24 14:30	1
13C8 FOSA	109		0 - 155	02/27/24 15:33	02/29/24 14:30	1
13C2-PFDoDA	133	2	22 - 165	02/27/24 15:33	02/29/24 14:30	1
13C9 PFNA	125	ŧ	52 - 168	02/27/24 15:33	02/29/24 14:30	1

Lab Sample ID: LCS 410-477531/2-A

Matrix: Water

Client Sample ID: Lab Control Sample

Prep Type: Total/NA **Prep Batch: 477531 Analysis Batch: 478276** Spike LCS LCS %Rec

Analyte	Added	Result Qualifier	Unit	D %Rec	Limits	
11CI-PF3OUdS	0.0238	0.0176	ug/L	74	57 - 130	
4:2 Fluorotelomer sulfonic acid	0.0239	0.0184	ug/L	77	61 - 131	
6:2 Fluorotelomer sulfonic acid	0.0243	0.0179	ug/L	74	61 - 132	
8:2 Fluorotelomer sulfonic acid	0.0245	0.0190	ug/L	77	55 - 134	
9CI-PF3ONS	0.0238	0.0183	ug/L	77	60 - 130	
DONA	0.0242	0.0190	ug/L	78	61 - 130	
HFPODA	0.0256	0.0207	ug/L	81	53 - 131	
NEtFOSAA	0.0256	0.0192	ug/L	75	63 - 130	
NMeFOSAA	0.0256	0.0196	ug/L	77	62 - 131	
NMeFOSA	0.0256	0.0237	ug/L	92	53 - 167	
Perfluorobutanesulfonic acid	0.0227	0.0172	ug/L	76	64 - 132	
Perfluorobutanoic acid	0.0256	0.0200	ug/L	78	58 - 130	
Perfluorodecanesulfonic acid	0.0247	0.0187	ug/L	76	55 - 130	
Perfluorodecanoic acid	0.0256	0.0207	ug/L	81	62 - 133	
Perfluorododecanoic acid	0.0256	0.0198	ug/L	77	61 - 132	
Perfluoroheptanesulfonic acid	0.0244	0.0187	ug/L	77	59 - 130	
Perfluoroheptanoic acid	0.0256	0.0205	ug/L	80	64 - 130	
Perfluorohexanesulfonic acid	0.0233	0.0175	ug/L	75	62 - 130	
Perfluorohexanoic acid	0.0256	0.0211	ug/L	83	59 - 130	
Perfluorononanesulfonic acid	0.0246	0.0188	ug/L	77	56 - 130	
Perfluorononanoic acid	0.0256	0.0193	ug/L	75	63 - 133	
Perfluorooctanesulfonamide	0.0256	0.0211	ug/L	82	67 - 132	
Perfluorooctanesulfonic acid	0.0237	0.0172	ug/L	73	62 - 130	
Perfluorooctanoic acid	0.0256	0.0189	ug/L	74	58 - 132	

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QC Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCS 410-477531/2-A

Matrix: Water

Analysis Batch: 478276

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 477531

		Spike	LCS	LCS				%Rec	
	Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
	Perfluoropentanesulfonic acid	0.0240	0.0195		ug/L		81	64 - 132	
İ	Perfluoropentanoic acid	0.0256	0.0199		ug/L		78	60 - 130	
	Perfluorotetradecanoic acid	0.0256	0.0191		ug/L		75	62 - 131	
İ	Perfluorotridecanoic acid	0.0256	0.0208		ug/L		81	59 - 136	
	Perfluoroundecanoic acid	0.0256	0.0201		ug/L		78	62 - 131	

LCS LCS

	LCS LCS	
Isotope Dilution	%Recovery Qualifie	r Limits
M2-4:2 FTS	124	35 - 200
M2-6:2 FTS	134	40 - 200
M2-8:2 FTS	125	37 - 200
13C2 PFTeDA	123	10 - 171
13C3 HFPO-DA	104	13 - 170
13C3 PFBS	124	34 - 200
13C4 PFBA	123	22 - 174
13C4 PFHpA	119	40 - 165
13C5 PFPeA	118	33 - 196
13C8 PFOA	122	52 - 153
13C8 PFOS	120	59 ₋ 155
d3-NMeFOSAA	120	38 - 168
d5-NEtFOSAA	120	34 - 181
13C3 PFHxS	125	48 - 169
13C5 PFHxA	113	28 - 166
13C6 PFDA	112	53 - 151
13C7 PFUnA	117	41 - 163
d3-NMePFOSA	72	10 - 130
13C8 FOSA	105	10 - 155
13C2-PFDoDA	120	22 - 165
13C9 PFNA	115	52 - 168

Client Sample ID: Lab Control Sample Dup

Lab Sample ID: LCSD 410-477531/3-A Matrix: Water

Matrix. Water

Analysis Batch: 478276

Prep Type: Total/NA

Prep Batch: 477531

LCSD LCSD %Rec **RPD** Spike **Analyte** Added Result Qualifier Unit D %Rec Limits **RPD** Limit 11CI-PF3OUdS 0.0238 0.0171 ug/L 72 57 - 130 3 30 0.0239 66 30 4:2 Fluorotelomer sulfonic acid 0.0157 ug/L 61 - 131 15 6:2 Fluorotelomer sulfonic acid 0.0243 0.0172 71 61 - 132 4 30 ug/L 8:2 Fluorotelomer sulfonic acid 70 0.0245 0.0172 55 - 134 10 30 ug/L 9CI-PF3ONS 0.0238 0.0178 ug/L 75 60 - 130 30 **DONA** 79 30 0.0242 0.0191 ug/L 61 - 130**HFPODA** 0.0256 0.0219 ug/L 86 53 - 131 30 **NEtFOSAA** 0.0256 0.0195 ug/L 76 63 - 130 30 **NMeFOSAA** 0.0256 0.0195 ug/L 76 62 - 131 30 **NMeFOSA** 0.0256 0.0229 89 53 - 167 30 ug/L Perfluorobutanesulfonic acid 71 30 0.0227 0.0161 ug/L 64 - 132 Perfluorobutanoic acid 80 0.0256 0.0204 ug/L 58 - 130 30 76 Perfluorodecanesulfonic acid 0.0247 0.0189 ug/L 55 - 130 30 Perfluorodecanoic acid 0.0256 0.0207 ug/L 81 62 - 133 0 30 Perfluorododecanoic acid 0.0256 0.0201 ug/L 79 61 - 132 2 30

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QC Sample Results

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Method: 537 IDA - EPA 537 Isotope Dilution (Continued)

Lab Sample ID: LCSD 410-477531/3-A

Matrix: Water

Analysis Batch: 478276

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA **Prep Batch: 477531**

LCSD LCSD Spike %Rec **RPD** Analyte Added Result Qualifier Unit %Rec Limits RPD Limit Perfluoroheptanesulfonic acid 0.0244 0.0189 78 59 - 130 30 ug/L ug/L Perfluoroheptanoic acid 0.0256 0.0193 75 64 - 130 6 30 77 30 Perfluorohexanesulfonic acid 0.0233 0.0180 ug/L 62 - 130 3 Perfluorohexanoic acid 0.0256 0.0194 ug/L 76 59 - 130 8 30 Perfluorononanesulfonic acid 0.0246 76 56 - 130 30 0.0187 ug/L Perfluorononanoic acid 0.0256 0.0194 ug/L 76 63 - 133 0 30 Perfluorooctanesulfonamide 0.0256 0.0207 ug/L 81 67 - 1322 30 Perfluorooctanesulfonic acid 0.0237 0.0173 ug/L 73 62 - 1300 30 30 Perfluorooctanoic acid 0.0256 0.0186 ug/L 73 58 - 132 76 64 - 132 30 Perfluoropentanesulfonic acid 0.0240 0.0182 ug/L 0.0256 78 60 - 130 30 Perfluoropentanoic acid 0.0199 ug/L 0 76 30 Perfluorotetradecanoic acid 0.0256 0.0195 ug/L 62 - 131 2 Perfluorotridecanoic acid 0.0256 0.0215 84 59 - 136 3 30 ug/L Perfluoroundecanoic acid 0.0256 76 62 - 131 0.0195 ug/L 30

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	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
M2-4:2 FTS	139		35 - 200
M2-6:2 FTS	135		40 - 200
M2-8:2 FTS	133		37 - 200
13C2 PFTeDA	119		10 - 171
13C3 HFPO-DA	95		13 - 170
13C3 PFBS	131		34 - 200
13C4 PFBA	118		22 - 174
13C4 PFHpA	117		40 - 165
13C5 PFPeA	116		33 - 196
13C8 PFOA	122		52 - 153
13C8 PFOS	121		59 ₋ 155
d3-NMeFOSAA	122		38 - 168
d5-NEtFOSAA	117		34 - 181
13C3 PFHxS	122		48 - 169
13C5 PFHxA	109		28 - 166
13C6 PFDA	113		53 - 151
13C7 PFUnA	119		41 - 163
d3-NMePFOSA	75		10 - 130
13C8 FOSA	107		10 - 155
13C2-PFDoDA	118		22 - 165

Method: 365.4 - Phosphorus, Total

Lab Sample ID: MB 670-76992/12-A

Matrix: Water

Total Phosphorus as P

13C9 PFNA

Analysis Batch: 77171

Client Sample ID: Method Blank Prep Type: Total/NA

Prep Batch: 76992

Analyzed

MB MB R

esult	Qualifier	PQL
40	U	100

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QC Sample Results

Client: AECOM Technical Services Inc. Job ID: 670-34991-1 Project/Site: NASA KSC VAB LTM Program

Method: 365.4 - Phosphorus, Total (Continued)

Lab Sample ID: LCS 670-76992/11-A	1			Clie	nt Sai	mple ID	: Lab Cor	ntrol Sample
Matrix: Water							Prep Ty	pe: Total/NA
Analysis Batch: 77171							Prep E	Batch: 76992
_	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Phosphorus as P		1650		ua/l		110	90 - 110	

Lab Sample ID: 670-34557-B-1-D MS						C	Client Sample ID: Matrix Spike			
Matrix: Water									Prep Ty	pe: Total/NA
Analysis Batch: 77171									Prep l	Batch: 76992
Sa	ample	Sample	Spike	MS	MS				%Rec	
Analyte F	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Total Phosphorus as P	40	U	1500	1550		ug/L		103	85 - 115	

Lab Sample ID: 670-34557-B-1-E MSD					Client	Client Sample ID: Matrix Spike Duplicate					
Matrix: Water									Prep Ty	pe: Tot	al/NA
Analysis Batch: 77171									Prep E	Satch:	76992
-	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Total Phosphorus as P	40	U	1500	1570		ug/L		105	85 - 115	1	20

QC Association Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

GC/MS VOA

Analysis Batch: 77147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-34991-1	LC390GA-MW0010-010.0-20240219	Total/NA	Water	8260D	
670-34991-2	LC390GA-MW0005-010.0-20240219	Total/NA	Water	8260D	
670-34991-3	LC390GA-MW0009-024.5-20240219	Total/NA	Water	8260D	
670-34991-4	LC390GA-MW0011-010.0-20240219	Total/NA	Water	8260D	
670-34991-5	LC390GA-MW0012-024.5-20240219	Total/NA	Water	8260D	
MB 670-77147/7	Method Blank	Total/NA	Water	8260D	
LCS 670-77147/4	Lab Control Sample	Total/NA	Water	8260D	
670-35092-F-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-35092-D-1 DU	Duplicate	Total/NA	Water	8260D	

Analysis Batch: 77182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-34991-6	LC390GA-MW0004-010.0-20240219	Total/NA	Water	8260D	
670-34991-7	LC390GA-MW0008-024.5-20240219	Total/NA	Water	8260D	
670-34991-8	LC390GA-MW0002-010.0-20240219	Total/NA	Water	8260D	
670-34991-9	LC390GA-MW0007-024.5-20240219	Total/NA	Water	8260D	
670-34991-10	LC390GA-MW0001-010.0-20240219	Total/NA	Water	8260D	
670-34991-11	LC390GA-MW0006-024.5-20240219	Total/NA	Water	8260D	
670-34991-12	LC390GA-MW0003-010.0-20240219	Total/NA	Water	8260D	
670-34991-13	LC390GA-SW0002-001.0-20240219	Total/NA	Water	8260D	
670-34991-14	LC390GA-SW0004-001.0-20240219	Total/NA	Water	8260D	
670-34991-15	LC390GA-SW0005-001.0-20240219	Total/NA	Water	8260D	
670-34991-16	LC390GA-SW0006-001.0-20240219	Total/NA	Water	8260D	
670-34991-17	LC390GA-TB0001-20240219	Total/NA	Water	8260D	
670-34991-18	LC390GA-IDW0001-20240219	Total/NA	Water	8260D	
MB 670-77182/7	Method Blank	Total/NA	Water	8260D	
LCS 670-77182/4	Lab Control Sample	Total/NA	Water	8260D	
670-34991-6 MS	LC390GA-MW0004-010.0-20240219	Total/NA	Water	8260D	
670-34991-6 MSD	LC390GA-MW0004-010.0-20240219	Total/NA	Water	8260D	

HPLC/IC

Analysis Batch: 76929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-34991-18	LC390GA-IDW0001-20240219	Total/NA	Water	300.0	_
MB 670-76929/11	Method Blank	Total/NA	Water	300.0	
MB 670-76929/52	Method Blank	Total/NA	Water	300.0	
LCS 670-76929/50	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-76929/51	Lab Control Sample Dup	Total/NA	Water	300.0	
670-34977-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
670-34977-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

LCMS

Prep Batch: 477531

Lab Sample ID 670-34991-18	Client Sample ID LC390GA-IDW0001-20240219	Prep Type Total/NA	Matrix Water	Method SPE	Prep Batch
MB 410-477531/1-A	Method Blank	Total/NA	Water	SPE	
LCS 410-477531/2-A	Lab Control Sample	Total/NA	Water	SPE	
LCSD 410-477531/3-A	Lab Control Sample Dup	Total/NA	Water	SPE	

Eurofins Orlando

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QC Association Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

LCMS

Analysis Batch: 478276

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-34991-18	LC390GA-IDW0001-20240219	Total/NA	Water	537 IDA	477531
MB 410-477531/1-A	Method Blank	Total/NA	Water	537 IDA	477531
LCS 410-477531/2-A	Lab Control Sample	Total/NA	Water	537 IDA	477531
LCSD 410-477531/3-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	477531

General Chemistry

Prep Batch: 76992

Lab Sample ID 670-34991-18	Client Sample ID LC390GA-IDW0001-20240219	Prep Type Total/NA	Matrix Water	Method 365.2/365.3/365	Prep Batch
MB 670-76992/12-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-76992/11-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-34557-B-1-D MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-34557-B-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

Analysis Batch: 77171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-34991-18	LC390GA-IDW0001-20240219	Total/NA	Water	365.4	76992
MB 670-76992/12-A	Method Blank	Total/NA	Water	365.4	76992
LCS 670-76992/11-A	Lab Control Sample	Total/NA	Water	365.4	76992
670-34557-B-1-D MS	Matrix Spike	Total/NA	Water	365.4	76992
670-34557-B-1-E MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	76992

Job ID: 670-34991-1

Matrix: Water

Matrix: Water

Matrix: Water

Matrix: Water

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-MW0010-010.0-20240219 Lab Sample ID: 670-34991-1 Date Collected: 02/19/24 12:49

Matrix: Water

Date Received: 02/19/24 16:07

Batch Dilution Ratch Batch Prepared Method **Number Analyst** or Analyzed **Prep Type** Type Run **Factor** Lab 02/21/24 19:16 Total/NA 8260D P1K EET ORL Analysis 77147

Client Sample ID: LC390GA-MW0005-010.0-20240219

Lab Sample ID: 670-34991-2 Date Collected: 02/19/24 10:47 **Matrix: Water**

Date Received: 02/19/24 16:07

Batch Batch Dilution Batch **Prepared** Number Analyst **Prep Type** Type Method Run **Factor** Lab or Analyzed Total/NA Analysis 8260D 77147 P1K EET ORL 02/21/24 19:34

Client Sample ID: LC390GA-MW0009-024.5-20240219

Lab Sample ID: 670-34991-3 Date Collected: 02/19/24 11:18 **Matrix: Water**

Date Received: 02/19/24 16:07

Batch Batch Dilution Batch Prepared **Number Analyst** or Analyzed **Prep Type** Method **Factor** Type Run Lab 02/21/24 19:52 EET ORL Total/NA Analysis 8260D 77147 P1K

Lab Sample ID: 670-34991-4

Client Sample ID: LC390GA-MW0011-010.0-20240219

Date Collected: 02/19/24 12:40 Date Received: 02/19/24 16:07

Batch Batch Dilution Batch Prepared **Prep Type** Method **Number Analyst** or Analyzed Type Run **Factor** Lab Total/NA Analysis 8260D 77147 P1K EET ORL 02/21/24 20:09

Client Sample ID: LC390GA-MW0012-024.5-20240219 Lab Sample ID: 670-34991-5

Date Collected: 02/19/24 13:22 Date Received: 02/19/24 16:07

Batch Batch Dilution Batch Prepared

Method **Prep Type** Number Analyst or Analyzed Type Run **Factor** Lab 02/21/24 20:27 77147 P1K Total/NA Analysis 8260D **EET ORL**

Client Sample ID: LC390GA-MW0004-010.0-20240219 Lab Sample ID: 670-34991-6

Date Collected: 02/19/24 11:22 Date Received: 02/19/24 16:07

Dilution Batch Batch Batch Prepared **Prep Type** Type Method Run Factor **Number Analyst** or Analyzed Lab 77182 P1K EET ORL 02/21/24 14:38 Total/NA Analysis 8260D

Lab Sample ID: 670-34991-7 Client Sample ID: LC390GA-MW0008-024.5-20240219

Date Collected: 02/19/24 10:37

Date Received: 02/19/24 16:07

Batch Batch Dilution Batch **Prepared** Method or Analyzed **Prep Type** Type Run **Factor Number Analyst** Lab 77182 P1K 02/21/24 16:20 8260D EET ORL Total/NA Analysis

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-MW0002-010.0-20240219

Lab Sample ID: 670-34991-8

Matrix: Water

Date Collected: 02/19/24 12:32 Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 16:38

Client Sample ID: LC390GA-MW0007-024.5-20240219

Lab Sample ID: 670-34991-9

Date Collected: 02/19/24 12:02

Matrix: Water

Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch		Prepared
Prep Type	Type	Method	Run	Factor	Number Analys	st Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182 P1K	EET ORL	02/21/24 16:55

Client Sample ID: LC390GA-MW0001-010.0-20240219

Lab Sample ID: 670-34991-10

Matrix: Water

Date Collected: 02/19/24 13:22 Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 17:12

Client Sample ID: LC390GA-MW0006-024.5-20240219

Lab Sample ID: 670-34991-11

Matrix: Water

Date Collected: 02/19/24 10:12 Date Received: 02/19/24 16:07

Batch Batch Dilution Batch Prepared **Prep Type** Method Factor **Number Analyst** or Analyzed Type Run Lab Total/NA Analysis 8260D 77182 P1K EET ORL 02/21/24 17:29

Client Sample ID: LC390GA-MW0003-010.0-20240219

Lab Sample ID: 670-34991-12

Matrix: Water

Date Collected: 02/19/24 10:06 Date Received: 02/19/24 16:07

Batch Batch Dilution Batch Prepared Method **Prep Type** Number Analyst or Analyzed Type Run Factor Lab 02/21/24 17:46 77182 P1K Total/NA Analysis 8260D EET ORL

Client Sample ID: LC390GA-SW0002-001.0-20240219

Lab Sample ID: 670-34991-13

Date Collected: 02/19/24 10:30 Date Received: 02/19/24 16:07

Ratch Dilution Batch Batch Prepared **Prep Type** Type Method Run **Factor Number Analyst** or Analyzed Lab 77182 P1K EET ORL 02/21/24 18:03 Total/NA Analysis 8260D

Client Sample ID: LC390GA-SW0004-001.0-20240219

Lab Sample ID: 670-34991-14

Matrix: Water

Matrix: Water

Date Collected: 02/19/24 11:03 Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 18:20

Lab Chronicle

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program

Client Sample ID: LC390GA-SW0005-001.0-20240219

Lab Sample ID: 670-34991-15

Matrix: Water

Job ID: 670-34991-1

Date Collected: 02/19/24 11:34 Date Received: 02/19/24 16:07

		Batch	Batch		Dilution	Batch			Prepared
	Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
l	Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 18:38

Client Sample ID: LC390GA-SW0006-001.0-20240219 Lab Sample ID: 670-34991-16

Date Collected: 02/19/24 12:08 **Matrix: Water**

Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Type	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 18:54

Lab Sample ID: 670-34991-17 Client Sample ID: LC390GA-TB0001-20240219

Date Collected: 02/19/24 08:00 **Matrix: Water**

Date Received: 02/19/24 16:07

	Batch	Batch		Dilution	Batch			Prepared
Prep Type	Туре	Method	Run	Factor	Number	Analyst	Lab	or Analyzed
Total/NA	Analysis	8260D		1	77182	P1K	EET ORL	02/21/24 15:46

Client Sample ID: LC390GA-IDW0001-20240219 Lab Sample ID: 670-34991-18

Date Collected: 02/19/24 13:55 **Matrix: Water**

Date Received: 02/19/24 16:07

Prep Type Total/NA Total/NA	Batch Type Analysis Analysis	Batch Method 8260D 300.0	Run	Dilution Factor 1	Batch Number 77182 76929		Lab EET ORL	Prepared or Analyzed 02/21/24 19:12 02/21/24 05:44
Total/NA Total/NA	Prep Analysis	SPE 537 IDA		1	477531 478276	K3UG VK3G	ELLE ELLE	02/27/24 15:33 02/29/24 17:13
Total/NA Total/NA	Prep Analysis	365.2/365.3/365 365.4		1	76992 77171	DGS JA	EET ORL EET ORL	02/20/24 14:02 02/21/24 09:51

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. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Laboratory: Eurofins Orlando

The accreditations/certifications listed below are applicable to this report.

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

Eurofins Orlando

3/4/2024

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Method Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

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

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Sample Summary

Client: AECOM Technical Services Inc. Project/Site: NASA KSC VAB LTM Program Job ID: 670-34991-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-34991-1	LC390GA-MW0010-010.0-20240219	Water	02/19/24 12:49	02/19/24 16:07
670-34991-2	LC390GA-MW0005-010.0-20240219	Water	02/19/24 10:47	02/19/24 16:07
670-34991-3	LC390GA-MW0009-024.5-20240219	Water	02/19/24 11:18	02/19/24 16:07
670-34991-4	LC390GA-MW0011-010.0-20240219	Water	02/19/24 12:40	02/19/24 16:07
670-34991-5	LC390GA-MW0012-024.5-20240219	Water	02/19/24 13:22	02/19/24 16:07
670-34991-6	LC390GA-MW0004-010.0-20240219	Water	02/19/24 11:22	02/19/24 16:07
670-34991-7	LC390GA-MW0008-024.5-20240219	Water	02/19/24 10:37	02/19/24 16:07
670-34991-8	LC390GA-MW0002-010.0-20240219	Water	02/19/24 12:32	02/19/24 16:07
670-34991-9	LC390GA-MW0007-024.5-20240219	Water	02/19/24 12:02	02/19/24 16:07
670-34991-10	LC390GA-MW0001-010.0-20240219	Water	02/19/24 13:22	02/19/24 16:07
670-34991-11	LC390GA-MW0006-024.5-20240219	Water	02/19/24 10:12	02/19/24 16:07
670-34991-12	LC390GA-MW0003-010.0-20240219	Water	02/19/24 10:06	02/19/24 16:07
670-34991-13	LC390GA-SW0002-001.0-20240219	Water	02/19/24 10:30	02/19/24 16:07
670-34991-14	LC390GA-SW0004-001.0-20240219	Water	02/19/24 11:03	02/19/24 16:07
670-34991-15	LC390GA-SW0005-001.0-20240219	Water	02/19/24 11:34	02/19/24 16:07
670-34991-16	LC390GA-SW0006-001.0-20240219	Water	02/19/24 12:08	02/19/24 16:07
670-34991-17	LC390GA-TB0001-20240219	Water	02/19/24 08:00	02/19/24 16:07
670-34991-18	LC390GA-IDW0001-20240219	Water	02/19/24 13:55	02/19/24 16:07

Eurofins Orlando

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481 Newburyport Avenue	Chain of Cu
Altamonte Springs, FL 32701	Gridin or Gr
Phone: 407-339-5984 Fax: 407-260-6110	

Client Information	Sampler: De V	in Ke	hoe		PM: Inicki,	Kaitl	lin					C	arrier Trac	king No	(s):			COC No: 670-15994-3344	1.1	
Client Contact:	Chann	-943-3		E-M	lail:			-				St	ate of Orig	in: F	1			Page:		
Brittany Follett Company:	1-1-1	- 743	IPWSID:	lkai	tlin.dy	/Inick	i@et.e	urofir	sus.c	com					<u></u>			Page 1 of 2		-
AECOM Technical Services Inc.									Aı	nalys	is R	Requ	ested	٠						
Address: 150 North Orange Avenue Suite 200	Due Date Request	ed: 5+can	dard		П											П		Preservation Cod	les: M - Hexane	
City: Orlando	TAT Requested (da	ayaj.	1	1	11													A - HCL B - NaOH	N - None	
Orlando State, Zip:		Sta	ndar	1														C - Zn Acetate D - Nitric Acid	0 - AsNaO2 P - Na2O4S	
FL, 32801	Compliance Project	ct: A Yes	∆ No		11		0											E - NaHSO4 F - MeOH	Q - Na2SO3 R - Na2S2O3	
Phone: 919-461-1282(Tel)	PO#: 1631613						2 00				-							G - Amchlor H - Ascorbic Acid	S - H2SO4 T - TSP Dodecahydra	te
Email:	WO#:				or No		8#15	1										I - Ice	U - Acetone V - MCAA	
brittany.follett@aecom.com Project Name:	60615547.4 Project #:					ह	W 80			as P	WKS						10 FB	J - DI Water K - EDTA	W - pH 4-5 Y - Trizma	
NASA KSC VAB LTM Program	67002720				اةِ ا	8	NA K	115.8		E STU	200						containers	L - EDA	Z - other (specify)	
Site: LC3906A	SSOW#:				amp	90	NA NA	KST		Phosphorus	ASA	Nitrate					of co			
	Sample Date	Sample Time	Sample Type (C=comp,	Matrix (Wester, 8=eofid, Oweste/oil,	Field Filtered 8	Perform MS/M	826UD - VOCS WKST #15-8 PFC_IDA - (MOD) NASA KCS WS#15-2 DOD	8280D - VOCs WKST #15-8	6020B - Lead	365.4 - Total Pho		300_ORGFMS - P					Total Number	Special In	structions/Note:	
Sample Identification	Sample Date	Time		BT=Tissue, A=Ai ation Code:	"X	XA		N	-	S A	-	-	++	+			$\dot{\nabla}$	Special III	structions/Note:	\dashv
LC390GA-MW0010-0100-20240219	20240219	THE ST		W	N	VE	_				Ť									
LC3906A-MV0005-010,0-70240219	20240219	1047	6	W	NI	V3	3													
LC390GA-MW0009-024.5-20240219	20240219	1116	6	W	M	N-	3													\neg
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LC390GA-MW0007-0245-26246219	20245219	1202	6	W	M		3				\perp			670)-3499	91 Ch	ain	of Custody		
LC3906A-MW0001-010.0-20240219		1322	G	W	NI	V 3	3													
LC3906A-MW0006-024,5-70240219	20240219	1012	G	W	NI	V 3														
Possible Hazard Identification					S	amp	le Dis	posa	I(AI	fee ma	y be	asse	essed if	samp	oles a			d longer than 1		
Non-Hazard Flammable Skin Irritant Poist	on B Unkno	own F	Radiologica				Return						osal By	Lab			rchi	ive For	Months	\dashv
						_	31 11130	dotto	15/40	ricqu		icino.	10.00 - 1	. (0) :						
Empty Kit Relinquished by:		Date:		C	Time							,	Method	or Ship	ment	. / \		1 -	6	4
Relinquished by:	Date/Time: 2-14-2	4 16	07	Company AE(o	M	1	The	dl	1	(A	W	ROL		2		9	1607	Company	
Relinquished by:	Date/Time:			Company		Re	ceived t	y.						Dal	e/Time			· /	Company	
Retinquished by:	Date/Time:			Company		Red	ceived b	y:					Date/Time:						Company	7
Custody Seals Intact: Custody Seal No.: Δ Yes Δ No						Cooler Temperature(s) °C and Other Remarks:					6									

Ver: 06/08/20213/4/2024

Eurofins Orlando

481 Newburyport Avenue

Altamonte Springs, FL 32701

Chain of Custody Record



Phone: 407-339-5984 Fax: 407-260-6110 Carrier Tracking No(s): Dylnicki, Kaitlin 670-15994-3344.1 Client Information E-Mail: Client Contact: State of Origin: kaitlin.dylnicki@et.eurofinsus.com **Brittany Follett** Page 1 of 2 Company: AECOM Technical Services Inc. **Analysis Requested** Preservation Codes: Standar 150 North Orange Avenue Suite 200 M . Hevene TAT Requested (days): N - None City: B - NaOH O - AsNaO2 Orlando C - Zn Acetate P - Na204S D - Nitric Acid State, Zip: Q - Na2SO3 Compliance Project: A Yes A No E - NaHSO4 FL, 32801 R - Na2S2O3 F - MeOH S - H2SO4 Phone: G - Amchior T - TSP Dodecahydrate 8260D - (MOD) NASA KSC WKST #15-8 919-461-1282(Tel) 1631613 H - Ascorbic Acid U - Acetone I - Ice WO# V - MCAA J - DI Water brittany.follett@aecom.com 60615547.4 W - pH 4-5 365.4 - Total Phosphorus as P containers K - EDTA Project #: Y - Trizma L - EDA 8260D - VOCs WKST #15-8 Z - other (specify) NASA KSC VAB LTM Program 67002720 300_ORGFM8 - Nitrate SSOW#: Other: LC3906-A ō Total Number Matrix Sample Type (C=comp, Sample Sample Identification Sample Date Time G=grab) ST=Tlesus, A=Al Special Instructions/Note: Preservation Code: N N N S LC3906A-Mwco3-20240719010.0.2024071926240219 1006 LC3906A-SW0007-0010-20240219 LC3906A-SW0004-001.0-20240219 1030 20240219 W 26240219 1103 NN3 LC3906A-SW0006-001.0-20240219 LC3906A-SW0006-001.0-20240219 NN3 20240219 W MN 3 20240219 1208 LC3906A-TB0001-20240719 20240219 0800 NN NN3 L(3906A-IDW0001-20240219 20240219 1355 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return To Client

Disposal By Lab

Archive For _______Mont Possible Hazard Identification Archive For Non-Hazard Flammable Skin Irritant Poison B Unknown Radiological Special Instructions/QC Requirements: Deliverable Requested: I, II, III, IV, Other (specify) Empty Kit Relinquished by: Time: Method of Shipment: Relinquished by: Company ÄECOM 607 60 Relinquished by: Date/Time Company Relinquished by: Company Company Custody Seal No .: Cooler Temperature(s) °C and Other Remarks: Custody Seals Intact: Δ Yes Δ No

Eurofins Orlando

481 Newburyport Avenue

Chain of Custody Record

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eurofins

Phone: 407-339-5984 Fax: 407-260-6110																				
Sampler. Lai					ь РМ: ylnicki, Kaitlin							Carrier Tracking No(s):						COC No: 670-24101.1		
Client Contact: Shipping/Receiving	Phone: E-M kait												State of Origin: Florida					Page: Page 1 of 1		
Company:					Accreditations Required (See note): NELAP - Florida												- 1	Job #: 670-34991-1		
Eurofins Lancaster Laboratories Environm					1100	-12741	- 1 10	niua										Preservation Code:		
Address: 2425 New Holland Pike, ,	Due Date Requeste 2/29/2024		_						-	Analy	sis R	Reque	sted					A - HCI	M - Hexane	
City: Lancaster	TAT Requested (da	ıys):			П		, l				1 1							H - NaOH	N - None O - AsNaO2	
State, Zip:	-				П		S#1										1 1	D. Aliteia Apid	P - Na2O4S Q - Na2SO3	
PA, 17601					-	П	SS										1 1	F - MeOH	R - Na2S2O3 S - H2SO4	
Phone: 717-656-2300(Tel)	PO #:						A KC	≩¦										G - Amchior	T - TSP Dodecahydra	ate
Email:	WO #:				or No	Ş Q	D) NAS	PreScn									<u>e</u>	I - ICO	U - Acetone V - MCAA W - pH 4-5	
Project Name: NASA KSC VAB LTM Program	Project #: 67002720	-		-	څ	s or	OM) c	FAS									containe	I - EDA	Y - Trizma Z - other (specify)	
Site:	SSOW#:				를	اعّ	Pre	S/PI										Other:		
					Sar	NSD	» <u>'</u>	F.									r of			
Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	G=grab) 81		Field Filtered	Perform MS/MSD (Yes or No)	PFC_IDA/PFAS_W_Prep (MOD) NASA KCS WS#15-2 DOD	PRE_SCREEN_PFAS/PFAS_PreScn_W_P						100			Total Number	Special Ins	tructions/Note:	
		<u> </u>	Preservation	n Code:	<u> </u>	权	\square	\rightarrow		-	\vdash	_ _	-	_	\vdash	\perp	X			_
LC390GA-IDW0001-2024219 (670-34991-18)	2/19/24	13:55 Eastern		Water	\perp		х	×			Ш			_		\perp	2			
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Note: Since laboratory accreditations are subject to change, Eurofins Environm does not currently maintain accreditation in the State of Origin listed above for status should be brought to Eurofins Environment Testing Southeast, LLC atte	analveie/taete/matriv ha	ing analyzed I	the samples must	ha shinnad	lhack	to the	a Euro	fins En	vironm	ent Tes	ina Soul	theast. L	LC labo	ratorv	or other	instructi	ons w	ili de provided. Any ch	anges to accreditation	oratory n
Possible Hazard identification						Sa		-			may l	\neg				are re		ed longer than 1 i		
Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)	Primary Deliver	rable Rank:	2		_	Sp			To Cl		Require		oosal l :	By LE	1D		Arch	nive For	Months	
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Empty Kit Relinquished by: Relinquished by:	Date/Time:	Date.	Ico	mpany	1			ived by	y:		-				Date/Ti				Company	-
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Custody Seals Intact: Custody Seal No.: -∆ Yes △ No							Coole	er Tem	peratur	e(s) °C	and Oth	er Rema	rks:	R.	1.1		6	0.9		

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-34991-1

Login Number: 34991 List Source: Eurofins Orlando

List Number: 1

Creator: Wehr, Alexander C

Creator: Wehr, Alexander C		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	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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Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-34991-1

Login Number: 34991 List Source: Eurofins Lancaster Laboratories Environment Testing, LLC List Number: 2 List Creation: 02/21/24 09:58 AM

Creator: Santiago, Nathaniel

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).</td <td>True</td> <td></td>	True	
Cooler Temperature is recorded.	True	
WV:Container Temp acceptable, where thermal pres is required (=6C, not frozen).</td <td>N/A</td> <td></td>	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)?	True	

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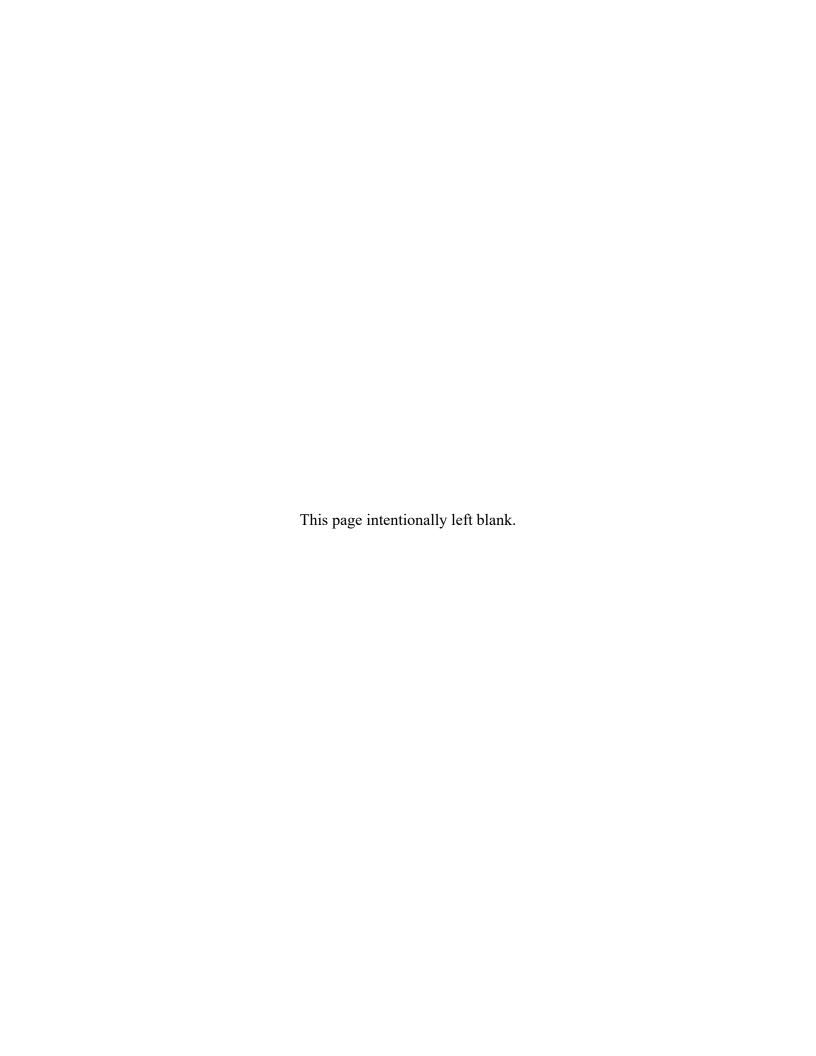
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Eurofins Orlando

APPENDIX G RIS COMPLETION TICKET



Data Checker

Completion Ticket

On 9/16/2024 at 9:11 AM the following files were submitted to Tetra Tech

COMPLETION_AECOM_VAB LTM LC39OGA_20240916.txt

LITHOLOGY_AECOM_VAB LTM LC390GA_20240916.txt

LOCATION_AECOM_VAB LTM LC390GA_20240916.txt

PROJECT_AECOM_VAB LTM LC390GA_20240916.txt

RESULT_AECOM_VAB LTM LC390GA_20240916.txt

SAMPLE_AECOM_VAB LTM LC390GA_20240916.txt

WATER_AECOM_VAB LTM LC390GA_20240916.txt

The following comment was provided with this submission: **AECOM - VAB LTM LC390GA February 2024 GW and SW Sampling**

If you need to identify this session at a later date you may use the Ticket Key:

TetraTechExternalClientsProtectedDataRepository2024916_3707616310_kedd_AECOM

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