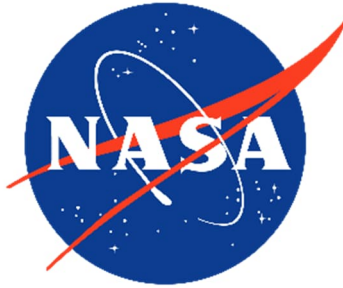


**2021-2022  
LONG-TERM GROUNDWATER MONITORING REPORT  
INDUSTRIAL AREA  
KENNEDY SPACE CENTER, FLORIDA**

**Prepared for:**



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

**A-E Contract 80KSC019D0010  
Task Order 80KSC019F0071**

**October 2023  
Revision 0**

**Prepared by:  
AECOM Technical Services, Inc.  
150 North Orange Avenue, Suite 200  
Orlando, Florida 32801  
407-843-6552**

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In accordance with the provisions of Florida Statutes, Chapter 471, this Long-Term Groundwater Monitoring Report for the Kennedy Space Center Industrial Area located in Merritt Island, Florida, has been prepared under the direct supervision of a Professional Engineer registered in the State of Florida. This work was performed in accordance with generally accepted professional engineering practices under Chapter 471 of the Florida Statutes. The data, findings, recommendations, specifications, or professional opinions were prepared solely for the use of the National Aeronautics and Space Administration and the Florida Department of Environmental Protection. AECOM makes no other warranty, either expressed or implied, and is not responsible for the interpretation by others of these data.

This item has been digitally signed and sealed by:

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Jennifer Gootee, P.E. Date  
Program Manager  
Florida License No. 57964  
Engineering Business No. 8115  
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## **APPENDICES**

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## ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ADP	Advanced Data Package
AECOM	AECOM Technical Services, Inc.
ARCADIS	Arcadis U.S., Inc.
AS	air sparge
AST	aboveground storage tank
BKG	background
bls	below land surface
CCF	Components Cleaning Facility
CCSFS	Cape Canaveral Space Force Station
CGO	Citgo Service Station
cis-1,2-DCE	cis-1,2-dichloroethene
CMS	Corrective Measures Study
COC	contaminant of concern
CVOC	chlorinated volatile organic compound
DCB	dichlorobenzene
DPT	direct push technology
EDL	Engineering Development Laboratory
EHF	Environmental Health Facility
ENCO	Environmental Conservation Laboratories, Inc.
ERD	enhanced reductive dechlorination
Eurofins	Eurofins Environment Testing Southeast, LLC
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FSA1	Fuel Storage Area #1 Underground Storage Tank (Building 1044)
ft	foot/feet
GCTL	Groundwater Cleanup Target Level
GSSP	General Services Administration Seized Property
HMF South	Hypergol Maintenance Facility Hazardous Waste South Staging Area
HSW	HSW Engineering
IA	Industrial Area
ID	Identification

IDW	investigation-derived waste
IM	interim measure
in	inches
IW	investigation well
J	estimated value
JP	jet propellant
KARS Park 1	Kennedy Athletic, Recreation, and Social Park 1
KEDD	Kennedy Space Center Electronic Data Deliverable
KSC	Kennedy Space Center
KSCRT	Kennedy Space Center Remediation Team
LETF	Launch Equipment Test Facility
LFR	Levine Fricke Recon, Inc.
LOC	Location of Concern
LTM	Long-Term Monitoring
LUC	Land Use Control
M505	Building M7-0505 Treatment Tank Area
mg/kg	milligrams per kilogram
MNA	monitored natural attenuation
MOBIL	Mobil Service Station
MTBE	methyl tert-butyl ether
MW	monitoring well
NA	Not Analyzed
NADC	Natural Attenuation Default Concentration
NASA	National Aeronautics and Space Administration
NAVD88	North American Vertical Datum of 1988
NFA	No Further Action
NWS	National Weather Service
O&C	Operations and Checkout Building
ORP	oxidation-reduction potential
ORSY	Orsino Storage Yard
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl

PCE	tetrachloroethene
PRL	potential release location
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act Facility Investigation
RIS	Remediation Information System
ROB	range of background
RP	rocket propellant
RRLF	Ransom Road Landfill
SAP	Sampling and Analysis Plan
SCTL	soil cleanup target level
SSPF	Space Station Processing Facility
SVE	soil vapor extraction
SWMU	Solid Waste Management Unit
TCB	trichlorobenzene
TCE	trichloroethene
TCFM	trichlorofluoromethane
TMB	trimethylbenzene
TOC	top of casing
trans-1,2-DCE	trans-1,2-dichloroethene
TPH	total petroleum hydrocarbons
U	analyte not detected
UCL	upper confidence limit
USEPA	United States Environmental Protection Agency
UST	underground storage tank
V	analyte found in associated method blank
VC	vinyl chloride
VOC	volatile organic compound
VPF	Vertical Processing Facility
WL	water level
µg/L	micrograms per liter

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## EXECUTIVE SUMMARY

This report presents the groundwater sampling results from the National Aeronautics and Space Administration (NASA) Industrial Area (IA) 2021-2022 Long-Term Monitoring (LTM) activities and results of the 2023 DPT activities at three of the sites. The NASA IA LTM Program includes the following 14 sites:

- Ransom Road Landfill (RRLF) – Solid Waste Management Unit (SWMU) 003
- Orsino Storage Yard (ORSY) – SWMU 004
- Building M7-0505 Treatment Tank Area (M505) – SWMU 039
- Hypergol Maintenance Facility Hazardous Waste South Staging Area (HMF South) – SWMU 070
- Operations and Checkout Building (O&C) – SWMU 076
- Vertical Processing Facility (VPF) – SWMU 077
- Environmental Health Facility (EHF) – SWMU 079
- Kennedy Athletic, Recreation, and Social Park 1 (KARS Park 1) – SWMU 084
- Engineering Development Laboratory (EDL) – SWMU 085
- Launch Equipment Test Facility (LETf) – SWMU 091
- Mobil Service Station (MOBIL) – SWMU 093
- General Services Administration Seized Property (GSSP) – SWMU 095
- Space Station Processing Facility (SSPF) – SWMU 098
- Fuel Storage Area #1 Underground Storage Tank (UST) [Building 1044] (FSA1) – Potential Release Location (PRL) 157

Groundwater levels were gauged at each site during the 2021 and 2022 LTM field activities. Sampling events for the IA LTM Program are conducted seasonally during the dry and wet seasons, which occur in May and November, respectively. The sites in the NASA IA LTM Program are sampled on annual, biennial, or 5-year sampling frequencies based on historical trends. Due to contract transitions and monitoring well installations, 2021 dry season activities were conducted during September 2021, while dry season activities for 2022 resumed in May 2022.

The sampling frequencies for the 2021 and 2022 period for NASA IA LTM sites are as follows:

- FSA1 is sampled annually, alternating between wet and dry seasons.
- GSSP is sampled annually during the wet season.
- Nine sites are sampled biennially, alternating between the wet and dry seasons (RRLF, ORSY, M505, HMF South, O&C, VPF, LETf, MOBIL, and SSPF).
- EHF and EDL are sampled biennially during the wet season.
- KARS Park 1 is sampled once every 5 years.

Based on the results of the 2021-2022 NASA IA LTM sampling activities and 2023 direct push technology (DPT) activities at RRLF, EHF, and EDL, the following recommendations are for the 2023-2024 NASA IA LTM Program:

#### **RANSOM ROAD LANDFILL**

A new downgradient stick-up monitoring well, RRLF-MW0043, is recommended at the location of RRLF-DPT0024 to serve as a horizontal point of compliance well. The screen interval for RRLF-MW0043 will be 15 feet (ft) below land surface (bls) to 25 ft bls to capture the aquifer conditions within and below the 4 ft screen interval of RRLF-DPT0024 that slightly exceeded the vinyl chloride (VC) Florida Department of Environmental Protection (FDEP) groundwater cleanup target level (GCTL).

The biennial LTM sampling frequency in alternating wet/dry seasons is recommended to continue at RRLF at monitoring wells RRLF-MW0033, RRLF-MW0038I, RRLF-MW0039I, RRLF-MW0040I, and new monitoring well RRLF-MW0043 for VC analysis by United States Environmental Protection Agency (USEPA) Method 8260 (herein referred to as Method 8260). Groundwater levels are recommended to be measured at 16 monitoring wells, assuming that RRLF-MW0015 is found and RRLF-MW0043 is installed. Monitoring well RRLF-MW0015 has not been located since 2018. A historical review is recommended to determine the location of RRLF-MW0015. The next sampling event at RRLF is scheduled for November 2024.

#### **ORSINO STORAGE YARD**

The September 2021 ORSY sampling data indicated volatile organic compound (VOC) concentrations remained below GCTLs, marking the second consecutive sampling event with results below GCTLs. Long-term groundwater monitoring at ORSY is recommended to discontinue. The land use control for soil will remain in place at the site. A letter report detailing the ORSY site history and September 2021 sampling activities was submitted to FDEP on July 10, 2023.

#### **BUILDING M7-0505 TREATMENT TANK AREA**

Biennial LTM sampling is recommended to continue at M505 in alternating wet/dry seasons. Downgradient monitoring well M505-MW0029 is recommended to be added to the sample schedule to maintain horizontal delineation along the southern boundary of the site. M505-MW0029 is downgradient of M505-MW0055 at the same screen interval (22.5 ft bls to 27.5 ft bls). Groundwater levels are recommended to be measured at 35 monitoring wells and samples collected from nine monitoring wells for select VOCs (trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], and VC). The next sampling event at M505 is scheduled for November 2024.

### **HYPERGOL MAINTENANCE FACILITY HAZARDOUS WASTE SOUTH STAGING AREA**

TCFM concentrations continue to be non-detect at the downgradient monitoring well HMF-MW0006IR, and have historically been below GCTLs at the remaining HMF South monitoring wells. Therefore, long-term groundwater monitoring at HMF South is recommended to discontinue. The LUC for groundwater is recommended to be removed, and a Site Rehabilitation Completion Report is recommended to be completed for NFA without controls.

With FDEP agreement during the April 2023 KSCRT meeting (**Appendix A**), the HMF South monitoring well network was abandoned in May 2023 (HydroGeoLogic 2023) to support construction activities at the site.

### **OPERATIONS AND CHECKOUT BUILDING**

Biennial sampling in alternating wet/dry seasons is recommended to continue at O&C with the addition of monitoring well O\_C-MW0006I for VC analysis by Method 8260 and water level collections to verify downgradient delineation. Groundwater levels are recommended to be measured at five monitoring wells and samples collected from three monitoring wells. The next sampling event at O&C is scheduled for November 2024.

### **VERTICAL PROCESSING FACILITY**

A new flush-mount shallow monitoring well, screened 3 ft bls to 13 ft bls, is recommended to be installed adjacent to VPF-MW0023 to verify horizontal delineation in the shallow zone downgradient of VPF-MW0022. Monitoring well VPF-MW0010I is recommended to be added into the sampling schedule to verify horizontal delineation in the intermediate zone downgradient of VPF-MW0018I. Monitoring well VPF-MW0008D is recommended to be added into the sampling schedule to verify vertical delineation around VPF-MW0008I.

Biennial LTM sampling is recommended to continue at VPF with 35 groundwater level measurements and nine monitoring wells sampled for select VOCs (TCE, cis-1,2-DCE, and VC). The next sampling event at VPF is scheduled for November 2024.

### **ENVIRONMENTAL HEALTH FACILITY**

A new upgradient flush-mount monitoring well, EHF-MW0009, is recommended at the location of EHF-DPT0005 to serve as a horizontal point of compliance well. The screen interval for EHF-MW0009 will be 15 ft bls to 25 ft bls to capture the aquifer conditions across both the intervals of EHF-DPT0005 that exceeded the VC GCTL.

The biennial sampling frequency is recommended to continue at monitoring wells EHF-MW0001, EHF-MW0004, EHF-MW0005, and new monitoring well EHF-MW0009 for VC analysis. Groundwater levels are recommended to be measured at seven monitoring wells. The next sampling event at EHF is scheduled for November 2024.

### **KENNEDY ATHLETIC, RECREATION, AND SOCIAL PARK 1**

Monitoring wells KP1-MW0003 and KP1-MW0035 are recommended to be removed from the sampling schedule because concentrations of total lead in these two monitoring wells have been below the GCTL for the last two consecutive sampling events. The 5-year LTM frequency is recommended to be accelerated to May 2023 at LOC 9 with 16 monitoring wells used for groundwater level measurements and a groundwater sample collected from KP1-MW0022. Pending continued analytical data below the GCTL in May 2023, long-term groundwater monitoring at KARS Park 1 LOC 9 is recommended to discontinue and the LUC is recommended to be removed.

### **ENGINEERING DEVELOPMENT LABORATORY**

The biennial LTM frequency is recommended to continue at monitoring wells EDL-MW0004 and EDL-MW0006R for VC analysis by Method 8260. Groundwater level measurements are recommended to continue at four monitoring wells. The next sampling event at EDL is scheduled for November 2024.

### **LAUNCH EQUIPMENT TEST FACILITY**

The biennial LTM sampling network is recommended to be reduced to two monitoring wells (LETF-MW0001 and downgradient LETF-PSB-MW0001) for VC analysis. Groundwater levels are recommended to continue to be measured at 14 monitoring wells. The next sampling event at LETF is scheduled for May 2023.

### **MOBIL SERVICE STATION**

Eight historically clean monitoring wells are recommended to be abandoned. During assessment and early LTM activities, these eight monitoring wells were installed before the plume was determined to be isolated in the intermediate zone at this site. The eight monitoring wells proposed for abandonment, located around the perimeter of the site, are screened above or below the monitored plume, and not used for plume delineation.

The biennial LTM sampling frequency is recommended to continue at MOBIL with monitoring wells CGO-MW0005, CGO-MW0023, and CGO-MW0024 added into the sampling program to verify downgradient VOC concentrations. Six monitoring wells are recommended to be analyzed for select VOCs (benzene, 1,2,4-trimethylbenzene, xylenes, and methyl tert-butyl ether) and monitoring well CGO-MW0006 is also recommended to be analyzed for select polynuclear aromatic hydrocarbons (PAHs) (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). Groundwater levels are recommended to continue to be measured at nine monitoring wells. The next sampling event at MOBIL is scheduled for November 2024.

### **GENERAL SERVICES ADMINISTRATION SEIZED PROPERTY**

Site contaminants of concern (COCs) are recommended to be reduced to VC only by Method 8260 for each sampled monitoring well and retain naphthalene analysis by Method 8270 at monitoring wells GSSP-MW0024R, GSSP-MW0035, and GSSP-MW0053. Select VOC concentrations other than VC have not exceeded GCTLs in the past four annual sampling events.

The annual LTM sampling frequency is recommended to continue with an expanded sampling event every five years (the next expanded event to be scheduled for November 2024). The next sampling event, scheduled for November 2023, will include water level measurements at 33 monitoring wells and groundwater samples from 14 monitoring wells.

### **SPACE STATION PROCESSING FACILITY**

Biennial sampling in alternating wet/dry seasons is recommended to continue at SSPF. Groundwater levels are recommended to be collected at 15 monitoring wells and five monitoring wells sampled for ammonia. The next sampling event at SSPF is scheduled for November 2024.

### **FUEL STORAGE AREA #1 UNDERGROUND STORAGE TANK (BUILDING 1044)**

LTM sampling is recommended to continue on an annual frequency alternating between wet and dry seasons. Naphthalene and total petroleum hydrocarbons are recommended to be removed from the site COCs following two or more consecutive events below GCTLs. Groundwater levels are recommended to be measured in 18 monitoring wells and groundwater samples collected at 10 monitoring wells for isopropylbenzene and select PAHs (1-methylnaphthalene and 2-methylnaphthalene). The next sampling event at FSA1 is scheduled for November 2023.

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## 1. INTRODUCTION

The National Aeronautics and Space Administration (NASA), through its Environmental Assurance Branch, is managing the cleanup of 14 sites in the Industrial Area (IA) of Kennedy Space Center (KSC), Florida, through a Long-Term Monitoring (LTM) Program. Groundwater sampling was conducted in 2021 and 2022 by AECOM Technical Services, Inc. (AECOM) under Contract 80KSC019D0010, Task Order 80KSC019F0071. This report presents the activities, findings, and recommendations from the 2021-2022 IA LTM Program. The 14 sites included in the 2021-2022 IA LTM Program consist of one potential release location (PRL) and 13 Solid Waste Management Units (SWMUs):

- Ransom Road Landfill (RRLF) – SWMU 003
- Orsino Storage Yard (ORSY) – SWMU 004
- Building M7-0505 Treatment Tank Area (M505) – SWMU 039
- Hypergol Maintenance Facility Hazardous Waste South Staging Area (HMF South) – SWMU 070
- Operations and Checkout Building (O&C) – SWMU 076
- Vertical Processing Facility (VPF) – SWMU 077
- Environmental Health Facility (EHF) – SWMU 079
- Kennedy, Athletic, Recreation, and Social Park 1 (KARS Park 1) – SWMU 084
- Engineering Development Laboratory (EDL) – SWMU 085
- Launch Equipment Test Facility (LETF) – SWMU 091
- Mobil Service Station (MOBIL) – SWMU 093
- General Services Administration Seized Property (GSSP) – SWMU 095
- Space Station Processing Facility (SSPF) – SWMU 098
- Fuel Storage Area #1 Underground Storage Tank (UST) [Building 1044] (FSA1) – PRL 157

The locations of the sites included in the NASA IA LTM Program are depicted on **Figure 1**. Sampling activities, findings, and recommendations for the individual IA sites sampled in 2021 and 2022 are included as **Section 2** through **Section 15**.

### 1.1 PROJECT BACKGROUND

Long-term groundwater monitoring has been approved by Florida Department of Environmental Protection (FDEP) for the sites included in the NASA IA LTM Program. The primary objective of the IA LTM Program is to provide NASA with the necessary information to monitor progress and inform decisions toward cleanup goals for each site, and provide analytical results to the FDEP as required by KSC's Corrective Action Management Plan (NASA 2006). The 2021-2022 IA LTM Program work was conducted in accordance with the 2019-2020 IA LTM Report (AECOM 2021). The 2021-2022 program also incorporated KSC Remediation Team (KSCRT) decisions from its February 2021 and March 2022 meetings (**Appendix A**).

NASA IA LTM sites generally fall under two site types:

- Mature sites, which have been under LTM for five or more years, that are approved for biennial groundwater sampling
- Sites that recently completed active remediation and are monitoring the potential for contaminant rebound through annual sampling

## 1.2 FACILITY LOCATIONS

KSC is located on the northern portion of Merritt Island, between the Indian River to the west and the Banana River to the east. The IA LTM program sites, depicted on **Figure 1**, are located on KSC, except for FSA1, which is located to the east at Cape Canaveral Space Force Station (CCSFS). At KSC, the sites are spread out with seven sites (M505, ORSY, O&C, EDL, LETF, SSPF, and MOBIL) located within the IA, one site (EHF) located north of the IA, two sites (RRLF and GSSP) located west of the IA, and two sites (HMF South and VPF) located southeast of the IA. KARS Park 1 is located approximately 5 miles south of the KSC boundary and east of State Road 3 on Merritt Island.

## 1.3 CLIMATE

The climate at KSC is typically pleasant with high temperatures in the range of 70 degrees Fahrenheit to 85 degrees Fahrenheit for 7 months out of the year. July is the hottest month with an average high temperature of 90.5 degrees Fahrenheit. The highest humidity occurs in July and August. The annual mean precipitation along the east coast of Central Florida in Brevard County is 54.65 inches (in.) based on precipitation records (2000-2022) maintained by the National Weather Service (NWS). Precipitation varies seasonally with the wet season occurring between May and October and the rest of year being relatively dry. In 2021, a lower than average total of 47.53 in. of rainfall was recorded, while in 2022, a slightly higher than average total of 62.01 in. of rainfall was recorded (National Oceanic and Atmospheric Administration, NWS Forecast Office, Melbourne, Florida).

## 1.4 PURPOSE

This report presents the 2021-2022 analytical results from the 14 IA LTM sites. Based on these analytical results, conclusions, and recommendations for future IA LTM activities are included for each monitoring site.

Recommendations for the 2023-2024 IA LTM Program were presented to the KSCRT in March 2022, April 2023, and June 2023. Minutes from the KSCRT meetings are included in **Appendix A**.



## 1.5 FIELD SAMPLING ACTIVITIES

Performance of routine prescribed LTM sampling at the IA LTM sites provides the data necessary to evaluate the status of contaminants of concern (COCs) at each site. Groundwater sampling activities conducted in 2021 and 2022 followed the KSC Sampling and Analysis Plan (SAP) (Geosyntec 2017), the 2019-2020 LTM Report, and KSCRT decisions during the March 2022 meeting. Additional field work was conducted in 2022 utilizing survey equipment at HMF South and in 2023 using direct push technology (DPT) at RRLF, EHF, and EDL. The DPT groundwater sampling activities are detailed for RRLF in **Section 2**, EHF in **Section 8**, and EDL in **Section 10**.

At the onset of each scheduled LTM sampling event and prior to collection of samples, predetermined monitoring wells were vented to allow for atmospheric equilibration. Once stabilized, depth to water levels were measured and groundwater elevations calculated in site monitoring wells to determine the groundwater gradient and flow direction of the various site aquifers. Water levels in each monitoring well were measured to the nearest 0.01 foot (ft) using an electronic water level meter. Measurements were recorded from a permanent point identified on the top of each monitoring well casing, typically the northernmost point, for consistency. Groundwater elevations are calculated by subtracting the measured depth to water from the surveyed top of casing (TOC) elevation relative to the North American Vertical Datum of 1988 (NAVD88). Additionally, observations of the condition of the monitoring wells, surrounding vegetation, and biological hazards were noted.

Site-specific laboratory kits for LTM, including coolers and sample bottleware, were provided by Environmental Conservation Laboratories, Inc. (ENCO) and Eurofins Environment Testing Southeast, LLC (Eurofins). Immediately following bottleware labeling, sample collection, and logging on the chain-of-custody, each sample was placed on ice. Samples were delivered to the ENCO and Eurofins directly by AECOM field staff or transported from KSC via a laboratory courier. Before transporting samples from KSC to ENCO or Eurofins, sample coolers were packed with fresh ice. If the samples were relinquished to a laboratory courier, the exchange was noted on the chain-of-custody and the coolers were custody-sealed in order to maintain sample integrity during transit.

During purging of monitoring wells, geochemical parameters consisting of pH, specific conductivity, turbidity, dissolved oxygen, temperature, oxidation-reduction potential (ORP), and salinity were monitored and recorded. Samples were collected once the geochemical parameters reached stabilization in accordance with FDEP Standard Operating Procedures (FDEP 2017) and the SAP. Daily field activity logs are included in **Appendix B**. Groundwater sampling logs, which include the geochemical data, are included in **Appendix C**.

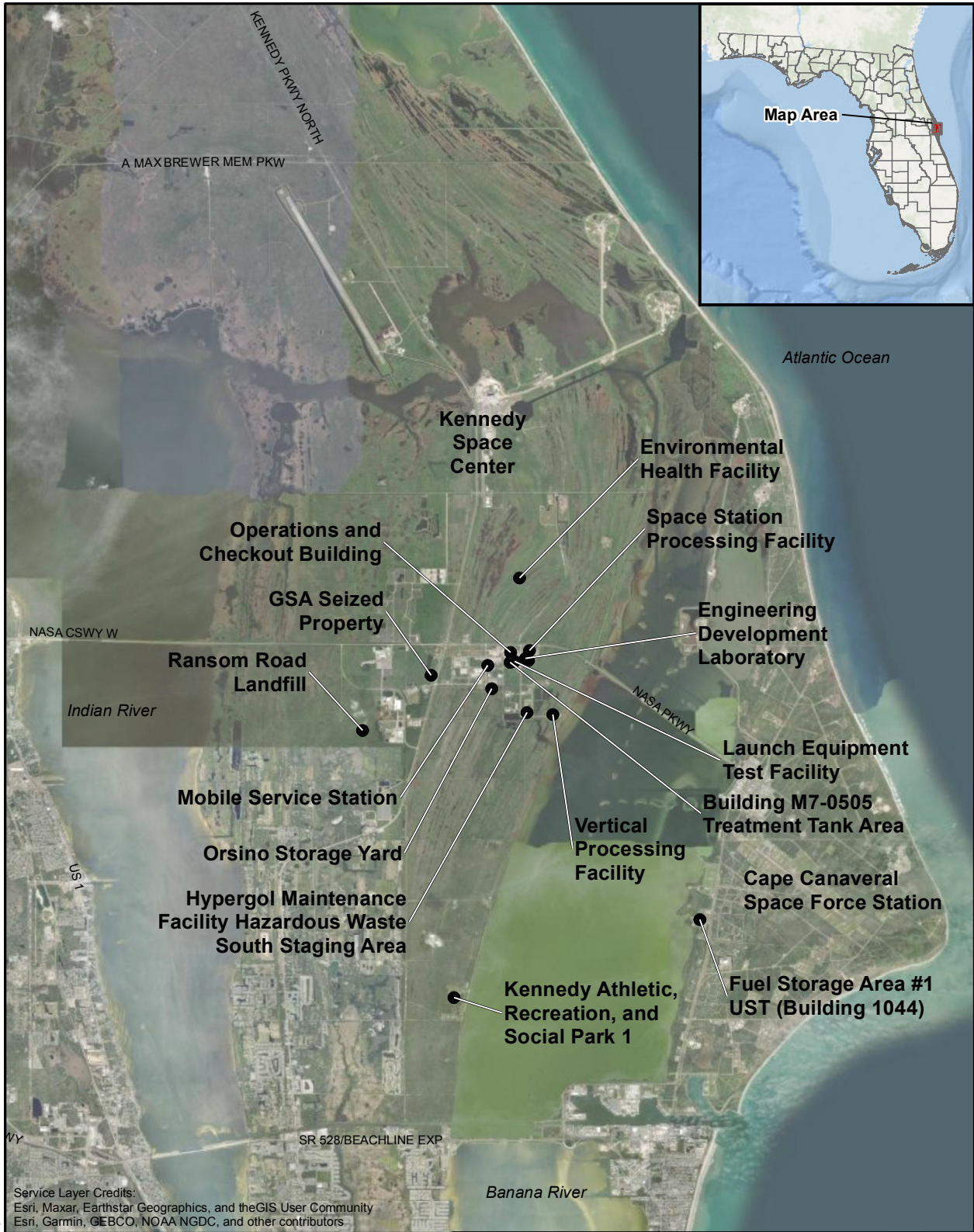
Each IA LTM site sampled in 2021 and 2022 was sampled using low-flow sampling techniques, where each monitoring well was purged and sampled with a peristaltic pump and high-density

polyethylene tubing. The sample tubing was placed within the top 1 ft of the water column at each shallow monitoring well and at the mid-point of the monitoring well screen at each intermediate and deep monitoring well to obtain a representative groundwater sample of aquifer conditions.

The KSCRT created the KSC Remediation Information System (RIS) so that contractors gathering environmental data could upload their data to the Electronic Data Exchange. Contractors are responsible for creating KSC Electronic Data Deliverables (KEDDs). A completion ticket is issued to the contractor after a successful KEDD upload. Upon receipt and validation of the 2021 and 2022 analytical data from the laboratory, data were formatted and uploaded into RIS. Once the KEDD site-specific fields were populated, these records were uploaded into the RIS database. RIS completion tickets for 2021 and 2022 groundwater sampling activities are included in **Appendix D**. Laboratory analytical data from these events can be found in **Appendix E** (electronic copies only).

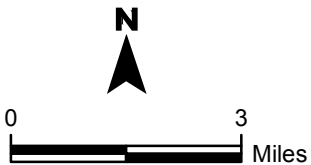
Purge water generated during sampling was containerized in 55-gallon steel drums staged on spill containment pallets at the Components Cleaning Facility (CCF). The storage drums of purge water were sampled at the end of each LTM sampling event and characterized for disposal. Upon receipt, analytical data were provided to the NASA Remediation Project Manager along with an inventory of the drums for disposal. Investigation-derived waste (IDW) inventory logs are provided as **Appendix F**.

Analytes detected in groundwater at each site were compared to the FDEP Groundwater Cleanup Target Levels (GCTLs) and Natural Attenuation Default Concentration (NADC) levels established by Chapter 62-777, Florida Administrative Code (FAC). Mann-Kendall trend analyses were completed for GSSP, and the reports are provided in **Appendix G**. Data analysis and recommendations for each site are detailed in site-specific sections of this report.



**Legend**

- IA LTM Site Location



**FIGURE 1**  
**IA LTM Site Locations**

2021-2022 Industrial Area Long Term Monitoring  
 NASA Kennedy Space Center, Florida

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## 2. RANSOM ROAD LANDFILL

This section summarizes the field activities and provides a summary of the RRLF site (SWMU 003). Refer to **Figure 2** for a site map.

### 2.1 SITE DESCRIPTION AND HISTORY

The RRLF is located south of Ransom Road and west of Space Commerce Way, adjacent to the large facilities operated by Blue Origin. The landfill was actively used between 1964 and 1970. During its operation, RRLF received general types of wastes during the initial construction of facilities at KSC. As a former trench and fill landfill, wastes were placed in unlined trenches and filled with soils excavated from the site (NASA 2004a).

In 1991, a landfill cover was constructed over the buried wastes at RRLF. In 1997, a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) and risk evaluation were completed (Geosyntec 2003a). Results from the RFI identified several volatile organic compounds (VOCs) present in groundwater at concentrations exceeding their respective GCTLs. The risk evaluation determined that these VOCs would pose an unacceptable human health risk if groundwater was to be used as a drinking water source. Between 1999 and 2000, interim groundwater monitoring was performed at RRLF. Following the interim monitoring period, it was determined additional groundwater assessment was warranted in the wooded area on the southern portion of the site. In 2003, a supplemental assessment delineated most of the VOC groundwater contamination in the wooded area south of the landfill (Geosyntec 2003a). To address contaminant concentrations that exceeded GCTLs, monitored natural attenuation (MNA) of groundwater was selected to reduce VOC concentrations (NASA 2004b). Annual LTM of groundwater commenced at RRLF in 2004. In 2012, the sampling program was reduced to what is now the current biennial groundwater sampling schedule.

### 2.2 FIELD ACTIVITIES

Monitoring well sampling was performed at RRLF in May 2022. Groundwater levels were measured at 14 monitoring wells, and samples from four monitoring wells were collected. Monitoring well RRLF-MW0015 was not located during this sampling event. Monitoring well RRLF-MW0039I was added back into the sampling schedule in 2022 based on recommendations from the 2019-2020 IA LTM report to verify downgradient delineation. The following table shows the network of monitoring wells used for groundwater level measurements and sampling at RRLF.

Well ID	Screen Interval (ft bls)	Analysis
RRLF-MW0012	4-9	WL Only
RRLF-MW0015	19.5-24.5	WL Only (not located)
RRLF-MW0029	25-30	WL Only
RRLF-MW0030	1-11	WL Only
RRLF-MW0031	25-30	WL Only

Well ID	Screen Interval (ft bls)	Analysis
RRLF-MW0033	25-30	WL + VC
RRLF-MW0034	1-11	WL Only
RRLF-MW0036	0.5-10.5	WL Only
RRLF-MW0037	0.5-10.5	WL Only
RRLF-MW0038S	1-11	WL Only
RRLF-MW0038I	22-27	WL + VC
RRLF-MW0039S	1-11	WL Only
RRLF-MW0039I	22-27	WL + VC
RRLF-MW0040I	22-27	WL + VC
RRLF-MW0042I	22-27	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

DPT groundwater sampling was performed at three locations in January 2023 and two step-out locations in March 2023. The January 2023 DPT locations were chosen to complete a horizontal delineation of the vinyl chloride (VC) plume at RRLF. The first location, RRLF-DPT0020, was placed southeast of the plume, where there has been a lack of historical groundwater data. RRLF-DPT0021 and RRLF-DPT0022 were placed near previous DPT locations RRLF-DPT0013R and RRLF-DPT0012, respectively, to determine whether the plume had attenuated in those areas. The two step-out locations were performed downgradient (west) of RRLF-DPT0022 at approximately 100-ft steps. A third side-gradient step-out location south of RRLF-DPT0022 was not able to be performed due to standing water in the seasonally flooded hammock.

Groundwater samples collected during the May 2022 LTM event and the January and March 2023 DPT events were analyzed for VC by USEPA Method 8260. Below are the respective GCTL and NADC for the COC present at RRLF.

COC	GCTL (µg/L)	NADC (µg/L)
VC	1	100

µg/L = micrograms per liter

### 2.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Prior to sampling, groundwater levels from 14 on-site monitoring wells were recorded. **Table 2-1** presents the groundwater levels collected during the May 2022 sampling event. Groundwater levels collected during this event were used to calculate groundwater elevations and determine the contours and flow direction for the shallow (0.5 feet below land surface [ft bls] to 11ft bls) and intermediate (22 ft bls to 30 ft bls) aquifer zones shown on **Figure 2-1** and **Figure 2-2**, respectively. Shallow aquifer zone groundwater flow was to the west-southwest and intermediate aquifer zone groundwater flow was to the west in May 2022. Historical shallow aquifer groundwater observations have ranged from between west to east-southeast, and intermediate aquifer groundwater observations have been predominantly southwest. Seasonal fluctuation of precipitation largely influences these variations in groundwater flow.

## 2.4 ANALYTICAL RESULTS

### 2.4.1 Groundwater Analytical Results – Monitoring Wells

VC was detected at concentrations above the GCTL in three sampled monitoring wells: RRLF-MW0033 (8.9 micrograms per liter [ $\mu\text{g/L}$ ]), RRLF-MW0038I (7.7  $\mu\text{g/L}$ ), and RRLF-MW0040I (3.4  $\mu\text{g/L}$ ). Monitoring well RRLF-MW0039I was reinstated in the LTM schedule in 2022, yet VC concentrations were not detected during analysis. Current and historical analytical results are summarized in **Table 2-2**. Analytical results are depicted on **Figure 2-3**.

### 2.4.2 Groundwater Analytical Results – DPT

Groundwater samples were collected from the center of a temporary four ft screen at the following depths: 8, 18, 28, 38, and 48 ft bls. The depth intervals were kept similar to past RRLF site assessments to analyze COC concentrations above and below the present contaminated zone.

Concentrations of VC were detected at the following locations and depths:

<b>VC Analysis (<math>\mu\text{g/L}</math>)</b>					
<b>DPT Location</b>	<b>Screen Interval (ft bls)</b>				
	<b>(6-10)</b>	<b>(16-20)</b>	<b>(26-30)</b>	<b>(36-40)</b>	<b>(46-50)</b>
RRLF-DPT0020	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U
RRLF-DPT0021	<b>0.81 I</b>	0.71 U	0.71 U	0.71 U	0.71 U
RRLF-DPT0022	<b>14</b>	<b>13</b>	<b>8.6</b>	0.71 U	0.71 U
RRLF-DPT0023	<b>8.2</b>	<b>5.8</b>	<b>6.7</b>	0.71 U	0.71 U
RRLF-DPT0024	0.71 U	<b>2.3</b>	0.71 U	0.71 U	0.71 U

I = Result is greater than or equal to the method detection limit but less than the practical quantitation limit

U = Result was below laboratory method detection limit

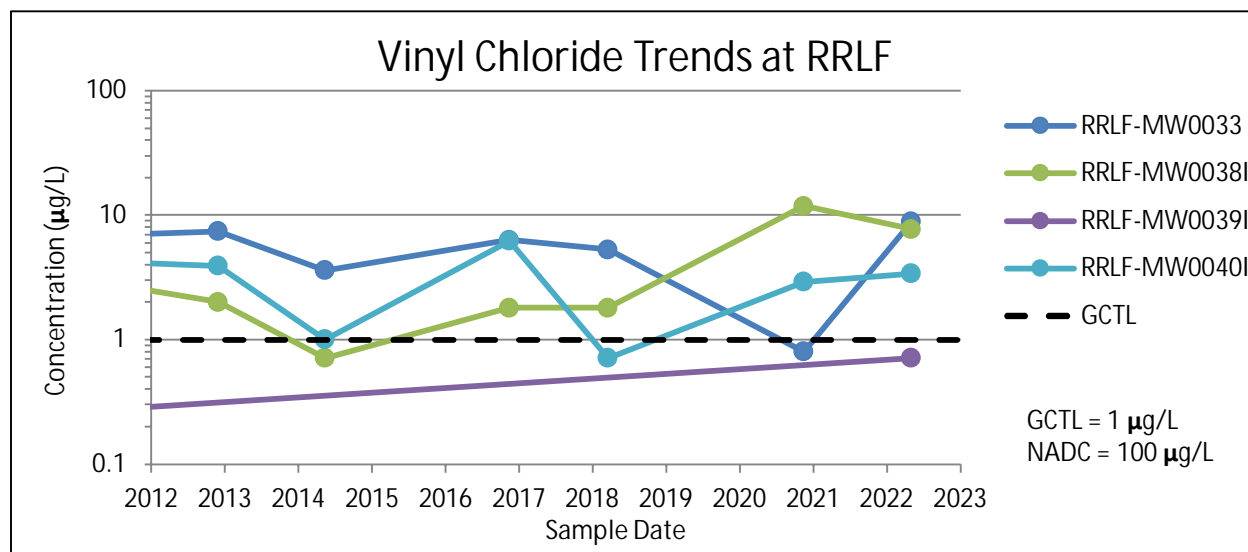
**Bold** results indicate the presence of an analyte at the specified concentration

**Red** font indicates an exceedance of FDEP GCTLs

VC concentrations were limited to the shallow and intermediate intervals. No VC concentrations were detected during the January and March 2023 DPT assessment below 30 ft bls. A summary of the analytical results is presented in **Table 2-3**. **Figure 2-4** depicts the analytical results of the groundwater samples collected from each DPT location.

## 2.5 TREND ANALYSIS

VC concentrations have shown no clear trends at RRLF-MW0033, RRLF-MW0038I, or RRLF-MW0040I in the past 10 years of sampling. Since the previous 2020 sampling event, VC concentrations in RRLF-MW0033 and RRLF-MW0040I increased, while RRLF-MW0038I decreased slightly. Overall, the VC concentration in each of the three monitoring wells has reduced since monitoring began in 2004. As shown in the following chart, RRLF-MW0033, RRLF-MW0038I, and RRLF-MW0040I had VC concentrations exceeding the GCTL of 1  $\mu\text{g/L}$  in 2022.



## 2.6 CONCLUSION AND RECOMMENDATION

VC persists at concentrations above the GCTL in monitoring wells RRLF-MW0033, RRLF-MW0038I, and RRLF-MW0040I. VC concentrations were also detected above the GCTL at DPT locations RRLF-DPT0022, RRLF-DPT0023, and RRLF-DPT0024.

A new downgradient stick-up monitoring well, RRLF-MW0043, is recommended at the location of RRLF-DPT0024 to serve as a horizontal point of compliance well. VC concentrations were found to be decreasing in each step-out location from RRLF-DPT0022, where RRLF-DPT0024 had a VC detection slightly above the GCTL (2.3 µg/L) at 18 ft bls. The recommended screen interval for RRLF-MW0043 is 15 ft bls to 25 ft bls to capture the aquifer conditions within and below the four ft screen interval that exceeded the VC GCTL at RRLF-DPT0024.

The biennial LTM sampling frequency is recommended to continue at monitoring wells RRLF-MW0033, RRLF-MW0038I, RRLF-MW0039I, RRLF-MW0040I, and new monitoring well RRLF-MW0043 for VC analysis. Groundwater levels are recommended to be measured at 16 monitoring wells, assuming that RRLF-MW0015 will be located and RRLF-MW0043 is installed. Monitoring well RRLF-MW0015 has not been located since 2018. A historical review is recommended to determine the location of RRLF-MW0015. The following table shows the recommended network of monitoring wells for groundwater level measurements and groundwater sampling for the next sampling event at RRLF scheduled for November 2024.

Well ID	Screen Interval (ft bls)	Analysis
RRLF-MW0012	4-9	WL Only
RRLF-MW0015	19.5-24.5	WL Only
RRLF-MW0029	25-30	WL Only
RRLF-MW0030	1-11	WL Only
RRLF-MW0031	25-30	WL Only



Well ID	Screen Interval (ft bls)	Analysis
RRLF-MW0033	25-30	WL + VC
RRLF-MW0034	1-11	WL Only
RRLF-MW0036	0.5-10.5	WL Only
RRLF-MW0037	0.5-10.5	WL Only
RRLF-MW0038S	1-11	WL Only
RRLF-MW0038I	22-27	WL + VC
RRLF-MW0039S	1-11	WL Only
RRLF-MW0039I	22-27	WL + VC
RRLF-MW0040I	22-27	WL + VC
RRLF-MW0042I	22-27	WL Only
RRLF-MW0043 <sup>a</sup>	15-25	WL + VC

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

<sup>a</sup> proposed monitoring well

**Table 2-1  
Ransom Road Landfill - Long Term Monitoring (LTM)  
Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>	RRLF-MW0012		RRLF-MW0030		RRLF-MW0034	
<b>Screen Interval (ft bls):</b>	4 - 9		1 - 11		1 - 11	
<b>TOC Elevation (ft NAVD88):</b>	2.31		4.42		4.31	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	3.79	-1.48	6.15	-1.73	6.10	-1.79
November 2016	Not Measured		3.73	0.69	4.01	0.30
March 2018	2.23	0.08	4.51	-0.09	4.33	-0.02
November 2020	0.99	1.32	3.46	0.96	3.15	1.16
May 2022	2.10	0.21	4.48	-0.06	4.89	-0.58

<b>SHALLOW WELL ID:</b>	RRLF-MW0036		RRLF-MW0037		RRLF-MW0038S	
<b>Screen Interval (ft bls):</b>	0.5 - 10.5		0.5 - 10.5		1 - 11	
<b>TOC Elevation (ft NAVD88):</b>	4.75		4.85		4.67	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.52	-1.77	6.54	-1.69	6.67	-2.00
November 2016	4.35	0.40	4.42	0.43	4.42	0.25
March 2018	4.66	0.09	4.79	0.06	4.84	-0.17
November 2020	3.72	1.03	3.78	1.07	3.99	0.68
May 2022	5.30	-0.55	5.12	-0.27	5.00	-0.33

<b>SHALLOW WELL ID:</b>	RRLF-MW0039S	
<b>Screen Interval (ft bls):</b>	1 - 11	
<b>TOC Elevation (ft NAVD88):</b>	4.69	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.72	-2.03
November 2016	4.17	0.52
March 2018	4.90	-0.21
November 2020	3.91	0.78
May 2022	4.92	-0.23

<b>INTERMEDIATE WELL ID:</b>	RRLF-MW0015		RRLF-MW0029		RRLF-MW0031	
<b>Screen Interval (ft bls):</b>	19.5 - 24.5		25 - 30		25 - 30	
<b>TOC Elevation (ft NAVD88):</b>	2.81		4.45		4.27	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	4.43	-1.62	6.16	-1.71	6.00	-1.73
November 2016	1.30	1.51	3.63	0.82	4.82	-0.55
March 2018	2.67	0.14	4.52	-0.07	4.33	-0.06
November 2020	Not Measured		3.46	0.99	3.18	1.09
May 2022	Not Measured		4.40	0.05	4.52	-0.25

<b>INTERMEDIATE WELL ID:</b>	RRLF-MW0033		RRLF-MW0038I		RRLF-MW0039I	
<b>Screen Interval (ft bls):</b>	25 - 30		22 - 27		22 - 27	
<b>TOC Elevation (ft NAVD88):</b>	4.30		5.07		4.61	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.10	-1.80	7.04	-1.97	6.65	-2.04
November 2016	3.96	0.34	4.79	0.28	4.32	0.29
March 2018	3.36	0.94	5.24	-0.17	4.81	-0.20
November 2020	3.20	1.10	4.33	0.74	3.87	0.74
May 2022	4.81	-0.51	5.34	-0.27	4.80	-0.19

<b>INTERMEDIATE WELL ID:</b>	RRLF-MW0040I		RRLF-MW0042I	
<b>Screen Interval (ft bls):</b>	22 - 27		22 - 27	
<b>TOC Elevation (ft NAVD88):</b>	4.61		3.99	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.65	-2.04	6.15	-2.16
November 2016	4.54	0.07	4.06	-0.07
March 2018	4.84	-0.23	4.58	-0.59
November 2020	3.86	0.75	3.07	0.92
May 2022	5.30	-0.69	5.03	-1.04

**Notes:**

- bls = below land surface
- BTOC = below top of casing
- ft = feet
- MW = monitoring well
- NAVD88 = North American Vertical Datum of 1988
- RRLF = Ransom Road Landfill
- TOC = top of casing

**Table 2-2  
Ransom Road Landfill - Long Term Monitoring (LTM)  
Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>RRLF-MW0033</b>	2/1/1995	25 - 30	<b>12</b>
	7/1/1995	25 - 30	<b>14</b>
	3/12/2001	25 - 30	<b>18.9</b>
	1/3/2002	25 - 30	<b>12</b>
	7/12/2002	25 - 30	<b>11.7</b>
	12/11/2002	25 - 30	<b>10.6</b>
	4/7/2004	25 - 30	<b>12</b>
	10/26/2004	25 - 30	<b>7.8</b>
	6/6/2005	25 - 30	<b>2.3</b>
	11/15/2005	25 - 30	0.43 U
	5/25/2006	25 - 30	<b>1.7</b>
	11/9/2006	25 - 30	<b>1.4</b>
	5/8/2007	25 - 30	<b>11</b>
	11/5/2007	25 - 30	<b>6.4</b>
	5/5/2008	25 - 30	<b>10</b>
	11/5/2008	25 - 30	<b>10</b>
	5/13/2009	25 - 30	0.25 U
	11/11/2009	25 - 30	<b>8.7</b>
	5/20/2010	25 - 30	<b>1.1</b>
	5/5/2011	25 - 30	<b>6.91</b>
	11/30/2012	25 - 30	<b>7.4</b>
	5/16/2014	25 - 30	<b>3.6</b>
11/18/2016	25 - 30	<b>6.3</b>	
3/23/2018	25 - 30	<b>5.3</b>	
11/20/2020	25 - 30	<b>0.80 I</b>	
5/10/2022	25 - 30	<b>8.9</b>	
<b>RRLF-MW0038I</b>	9/8/2003	22 - 27	<b>32</b>
	4/7/2004	22 - 27	<b>38</b>
	10/26/2004	22 - 27	<b>27</b>
	11/10/2006	22 - 27	<b>80</b>
	11/5/2007	22 - 27	<b>67</b>
	11/11/2009	22 - 27	<b>43</b>
	5/20/2010	22 - 27	<b>27</b>
	5/5/2011	22 - 27	<b>2.85</b>
	11/30/2012	22 - 27	<b>2.0</b>
	5/16/2014	22 - 27	0.71 U
	11/18/2016	22 - 27	<b>1.8</b>
	3/23/2018	22 - 27	<b>1.8</b>
	11/20/2020	22 - 27	<b>11.8</b>
5/10/2022	22 - 27	<b>7.7</b>	
<b>RRLF-MW0039I</b>	9/8/2003	22 - 27	0.14 U
	5/10/2022	22 - 27	0.71 U

**Table 2-2  
Ransom Road Landfill - Long Term Monitoring (LTM)  
Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
RRLF-MW0040I	9/8/2003	22 - 27	<b>13</b>
	4/7/2004	22 - 27	<b>15</b>
	10/26/2004	22 - 27	<b>10</b>
	11/10/2006	22 - 27	<b>1.0</b>
	11/5/2007	22 - 27	<b>7.4</b>
	11/11/2009	22 - 27	<b>5.6</b>
	5/20/2010	22 - 27	<b>6.8</b>
	5/5/2011	22 - 27	<b>4.24</b>
	11/30/2012	22 - 27	<b>3.9</b>
	5/16/2014	22 - 27	<b>1.0</b>
	11/18/2016	22 - 27	<b>6.2</b>
	3/23/2018	22 - 27	0.71 U
	11/20/2020	22 - 27	<b>2.9</b>
	5/10/2022	22 - 27	<b>3.4</b>

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

RRLF = Ransom Road Landfill

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

**Table 2-3  
Ransom Road Landfill - Long Term Monitoring (LTM)  
DPT Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
RRLF-DPT0020	1/11/2023	6 - 10	0.71 U
	1/11/2023	16 - 20	0.71 U
	1/11/2023	26 - 30	0.71 U
	1/12/2023	36 - 40	0.71 U
	1/12/2023	46 - 50	0.71 U
RRLF-DPT0021	1/11/2023	6 - 10	<b>0.81 I</b>
	1/11/2023	16 - 20	0.71 U
	1/11/2023	26 - 30	0.71 U
	1/11/2023	36 - 40	0.71 U
	1/11/2023	46 - 50	0.71 U
RRLF-DPT0022	1/12/2023	6 - 10	<b>14</b>
	1/12/2023	16 - 20	<b>13</b>
	1/12/2023	26 - 30	<b>8.6</b>
	1/12/2023	36 - 40	0.71 U
	1/12/2023	46 - 50	0.71 U
RRLF-DPT0023	3/28/2023	6 - 10	<b>8.2</b>
	3/28/2023	16 - 20	<b>5.8</b>
	3/28/2023	26 - 30	<b>6.7</b>
	3/28/2023	36 - 40	0.71 U
	3/28/2023	46 - 50	0.71 U
RRLF-DPT0024	3/28/2023	6 - 10	0.71 U
	3/28/2023	16 - 20	<b>2.3</b>
	3/28/2023	26 - 30	0.71 U
	3/28/2023	36 - 40	0.71 U
	3/28/2023	46 - 50	0.71 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

RRLF = Ransom Road Landfill

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit



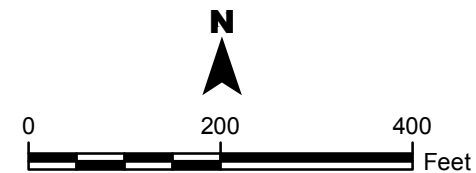
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**Legend**

- Monitoring Well (LTM)
- Monitoring Well (Water Level Only)
- Monitoring Well (Non-LTM)

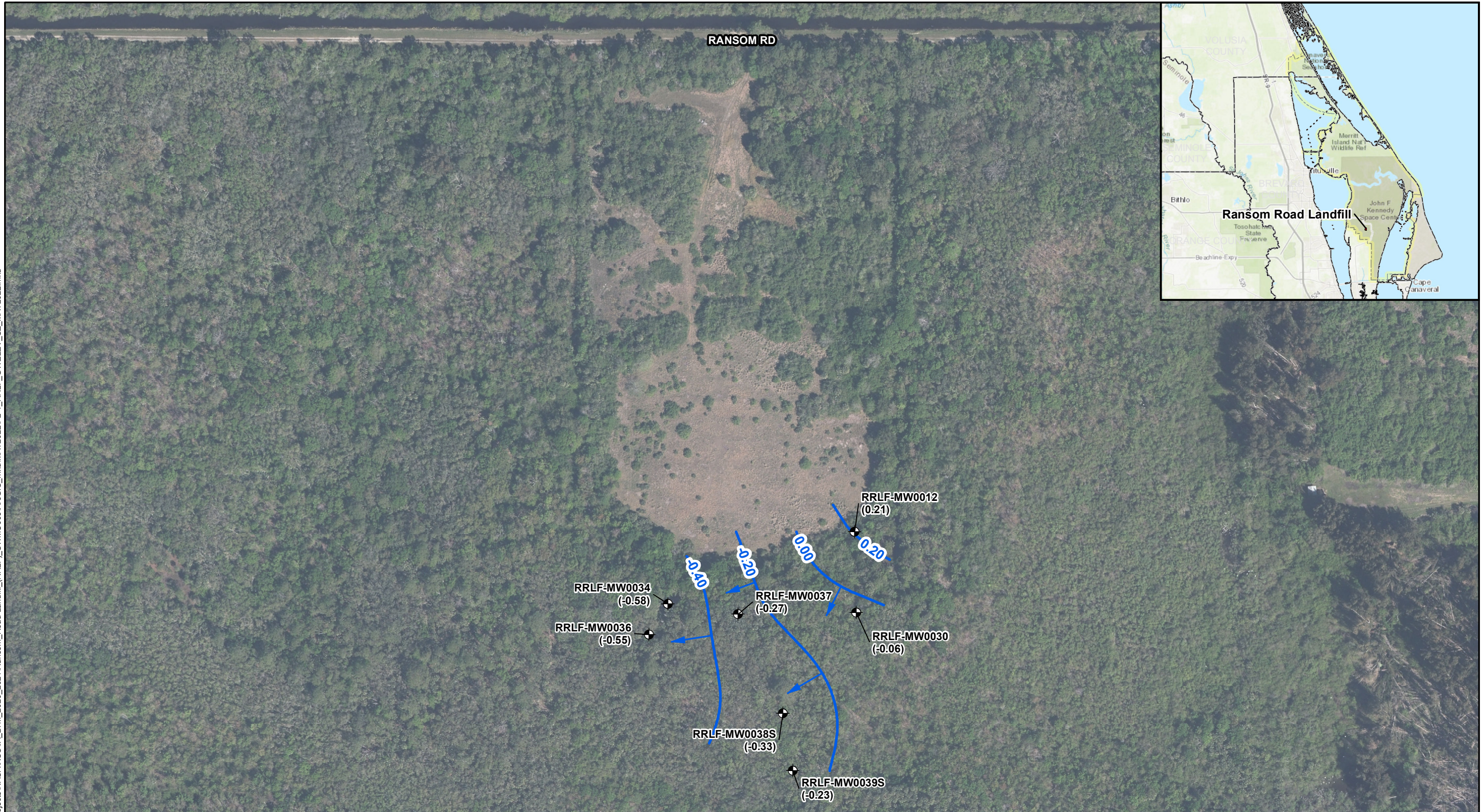
**Notes:**

- (22-27) = Monitoring well screen interval in feet below land surface
- LTM = Long Term Monitoring
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



**FIGURE 2  
 Site Map**

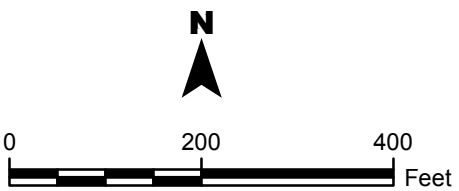
2022 - Industrial Area Long Term Monitoring  
 Ransom Road Landfill (RRLF)  
 SWMU 003  
 NASA Kennedy Space Center, Florida



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- Legend**
- Shallow Monitoring Well (0.5-11 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (0.21) Groundwater Elevation Contour (NAVD88 ft)

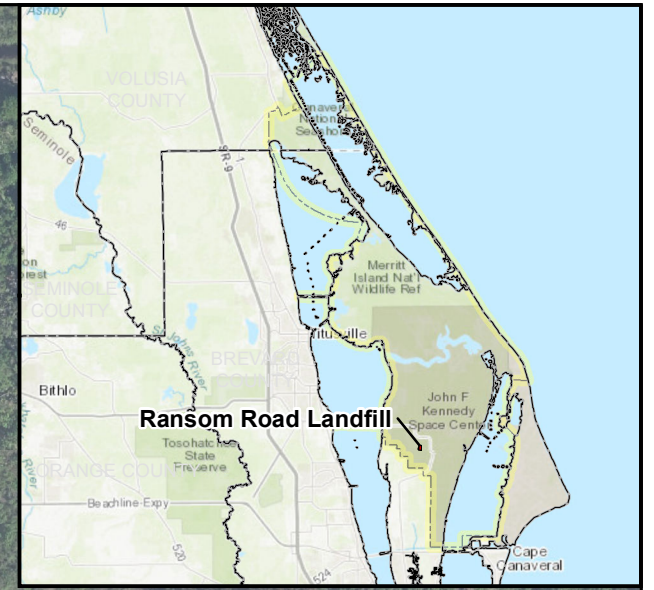
- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on May 10, 2022
  - NM = Not Measured
  - \* = Not used in contouring
  - Groundwater Contour Interval = 0.20 ft
  - ft bls = feet below land surface
  - SWMU = Solid Waste Management Unit
  - Aerial Source: FDOT 2018







**FIGURE 2-1**  
**Shallow Zone Groundwater Elevation Map – May 2022**

2022 - Industrial Area Long Term Monitoring  
 Ransom Road Landfill (RRLF)  
 SWMU 003  
 NASA Kennedy Space Center, Florida

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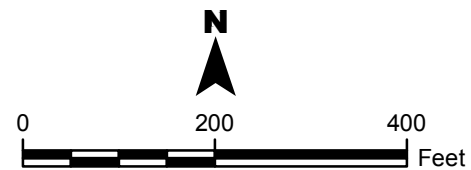


**Legend**

-  Intermediate Monitoring Well (22-30 ft bls)
-  Groundwater Contour (NAVD88 ft)
-  Approximate Direction of Groundwater Flow
-  (0.05) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

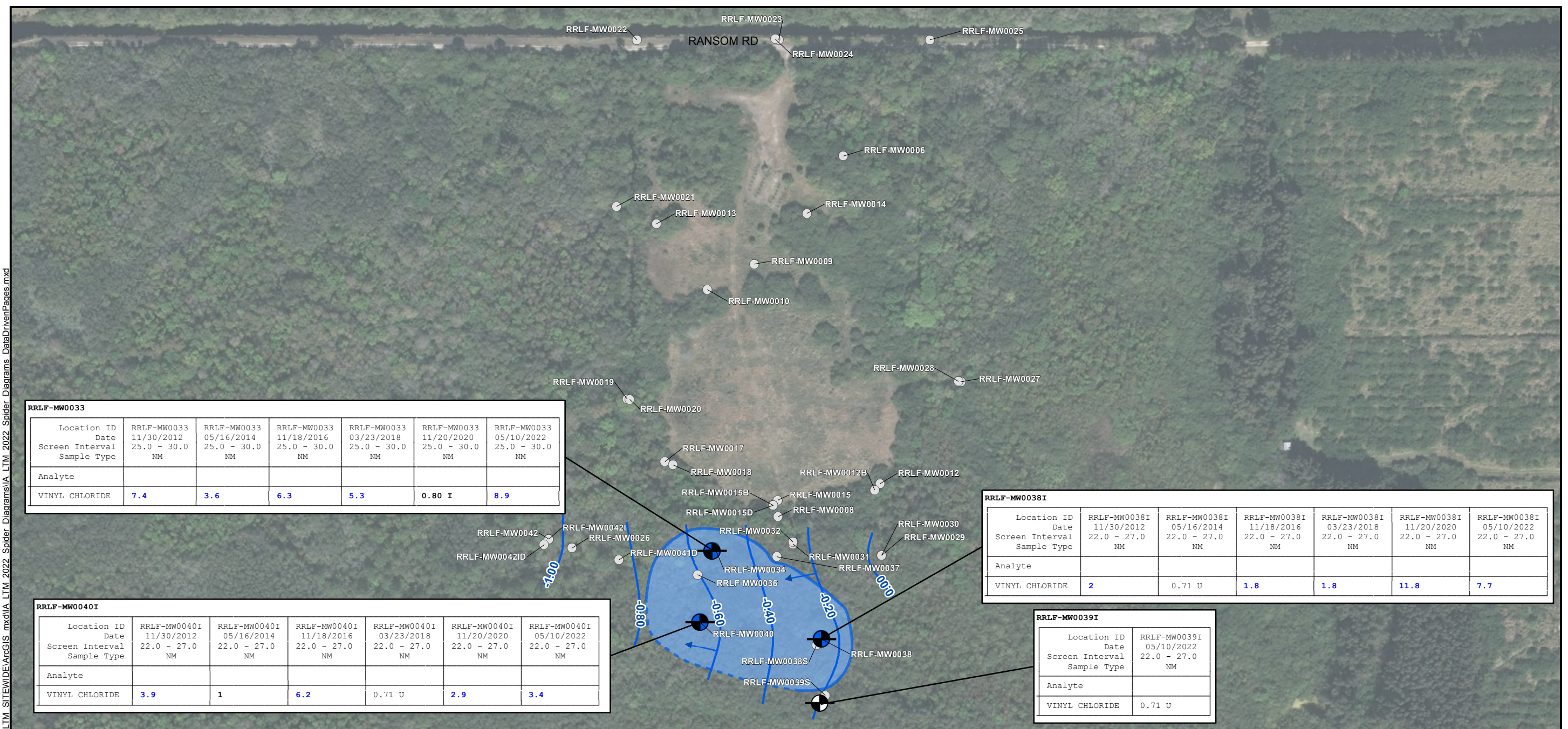
- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 10, 2022
- NM = Not Measured
- Groundwater Contour Interval = 0.20 ft
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



**FIGURE 2-2**  
**Intermediate Zone Groundwater Elevation Map**  
**May 2022**  
 2022 - Industrial Area Long Term Monitoring  
 Ransom Road Landfill (RRLF)  
 SWMU 003  
 NASA Kennedy Space Center, Florida



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RRLF-MW0033						
Location ID	RRLF-MW0033	RRLF-MW0033	RRLF-MW0033	RRLF-MW0033	RRLF-MW0033	RRLF-MW0033
Date	11/30/2012	05/16/2014	11/18/2016	03/23/2018	11/20/2020	05/10/2022
Screen Interval	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0	25.0 - 30.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	<b>7.4</b>	<b>3.6</b>	<b>6.3</b>	<b>5.3</b>	<b>0.80 I</b>	<b>8.9</b>

RRLF-MW0038I						
Location ID	RRLF-MW0038I	RRLF-MW0038I	RRLF-MW0038I	RRLF-MW0038I	RRLF-MW0038I	RRLF-MW0038I
Date	11/30/2012	05/16/2014	11/18/2016	03/23/2018	11/20/2020	05/10/2022
Screen Interval	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	<b>2</b>	0.71 U	<b>1.8</b>	<b>1.8</b>	<b>11.8</b>	<b>7.7</b>

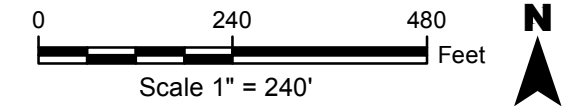
RRLF-MW0040I						
Location ID	RRLF-MW0040I	RRLF-MW0040I	RRLF-MW0040I	RRLF-MW0040I	RRLF-MW0040I	RRLF-MW0040I
Date	11/30/2012	05/16/2014	11/18/2016	03/23/2018	11/20/2020	05/10/2022
Screen Interval	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0	22.0 - 27.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	<b>3.9</b>	<b>1</b>	<b>6.2</b>	0.71 U	<b>2.9</b>	<b>3.4</b>

RRLF-MW0039I	
Location ID	RRLF-MW0039I
Date	05/10/2022
Screen Interval	22.0 - 27.0
Sample Type	NM
Analyte	
VINYL CHLORIDE	0.71 U

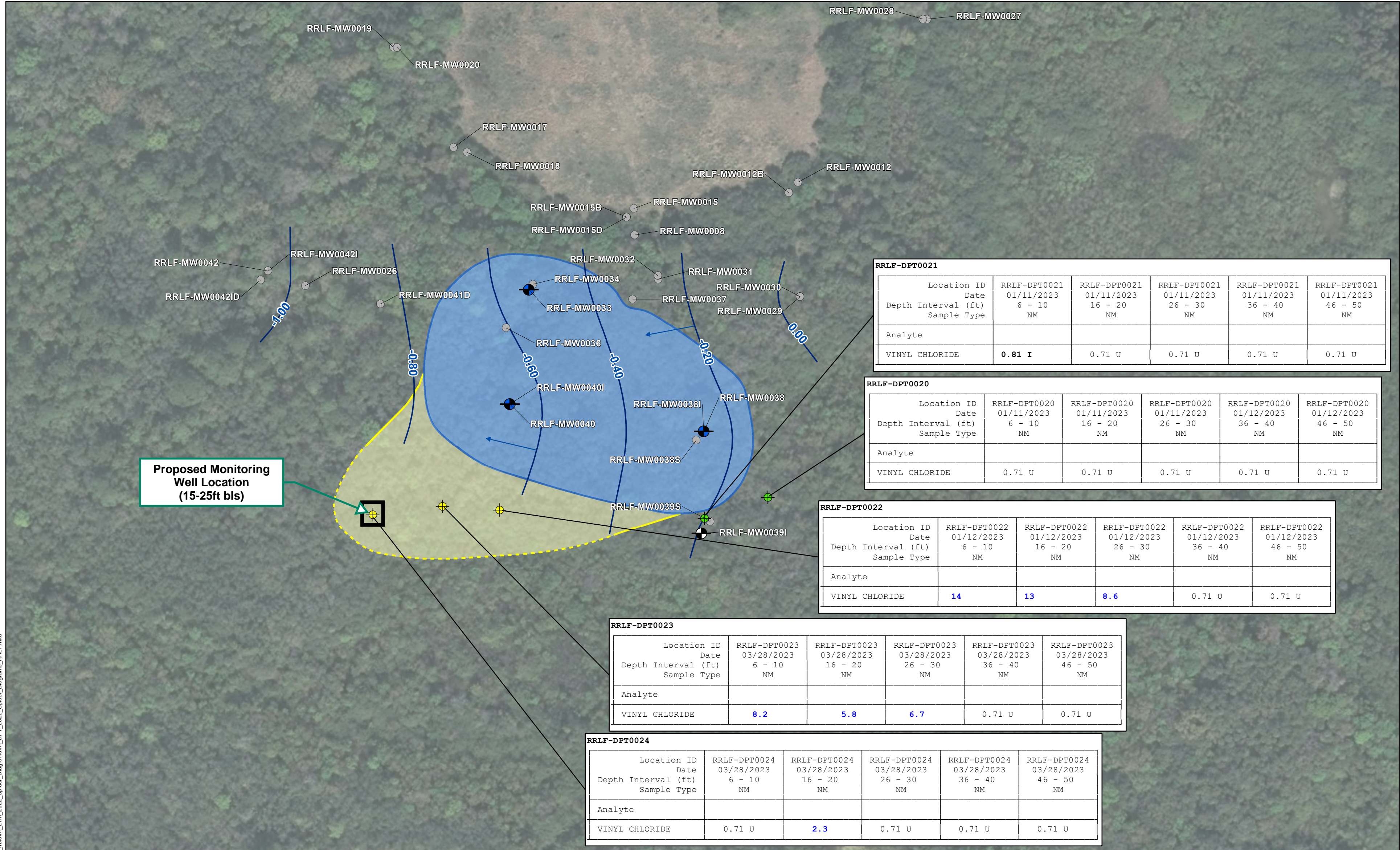
- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Intermediate LTM Well, Sample Results Below GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - May 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling (Dashed Where Inferred)

- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
  7. U = Result was below the MDL.
  8. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  9. **Bolded** results indicate the presence of an analyte at the specified concentration.
  10. **Blue** font indicates an exceedance of FDEP GCTLs.
  11. Aerial Source: ESRI 2018.
  12. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	<b>1</b>



**FIGURE 2-3**  
**Groundwater Sampling Analytical Results**  
 2022 - Industrial Area Long Term Monitoring  
 Ransom Road Landfill (RRLF)  
 SWMU 003  
 NASA Kennedy Space Center, Florida



RRLF-DPT0021					
Location ID	RRLF-DPT0021	RRLF-DPT0021	RRLF-DPT0021	RRLF-DPT0021	RRLF-DPT0021
Date	01/11/2023	01/11/2023	01/11/2023	01/11/2023	01/11/2023
Depth Interval (ft)	6 - 10	16 - 20	26 - 30	36 - 40	46 - 50
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	<b>0.81 I</b>	0.71 U	0.71 U	0.71 U	0.71 U

RRLF-DPT0020					
Location ID	RRLF-DPT0020	RRLF-DPT0020	RRLF-DPT0020	RRLF-DPT0020	RRLF-DPT0020
Date	01/11/2023	01/11/2023	01/11/2023	01/12/2023	01/12/2023
Depth Interval (ft)	6 - 10	16 - 20	26 - 30	36 - 40	46 - 50
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U

RRLF-DPT0022					
Location ID	RRLF-DPT0022	RRLF-DPT0022	RRLF-DPT0022	RRLF-DPT0022	RRLF-DPT0022
Date	01/12/2023	01/12/2023	01/12/2023	01/12/2023	01/12/2023
Depth Interval (ft)	6 - 10	16 - 20	26 - 30	36 - 40	46 - 50
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	<b>14</b>	<b>13</b>	<b>8.6</b>	0.71 U	0.71 U

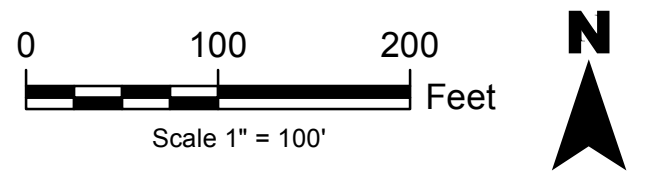
RRLF-DPT0023					
Location ID	RRLF-DPT0023	RRLF-DPT0023	RRLF-DPT0023	RRLF-DPT0023	RRLF-DPT0023
Date	03/28/2023	03/28/2023	03/28/2023	03/28/2023	03/28/2023
Depth Interval (ft)	6 - 10	16 - 20	26 - 30	36 - 40	46 - 50
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	<b>8.2</b>	<b>5.8</b>	<b>6.7</b>	0.71 U	0.71 U

RRLF-DPT0024					
Location ID	RRLF-DPT0024	RRLF-DPT0024	RRLF-DPT0024	RRLF-DPT0024	RRLF-DPT0024
Date	03/28/2023	03/28/2023	03/28/2023	03/28/2023	03/28/2023
Depth Interval (ft)	6 - 10	16 - 20	26 - 30	36 - 40	46 - 50
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	0.71 U	<b>2.3</b>	0.71 U	0.71 U	0.71 U

- Legend**
- DPT Location, Sample Results Below GCTL
  - DPT Location, Sample Results Exceed GCTL
  - Intermediate, LTM Well, Sample Result Exceeds GCTL
  - Intermediate, LTM Well, Sample Results Below GCTL
  - Non-LTM Well, No Sample Results
  - Intermediate Groundwater Elevation Contours - May 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from DPT Sampling (Dashed Where Inferred)

- Notes:**
1. DPT = Direct Push Technology
  2. LTM = Long Term Monitoring
  3. MW = Monitoring Well
  4. NM = Normal Sample
  5. SWMU = Solid Waste Management Unit
  6. All results and screening criteria presented in µg/L.
  7. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
  8. U = Result was below the MDL.
  9. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  10. **Bolded** results indicate the presence of an analyte at the specified concentration.
  11. **Blue** font indicates an exceedance of FDEP GCTLs.
  12. Aerial Source: FDOT 2018.
  13. Depth is presented in feet below land surface.
  14. Depth of screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	<b>1</b>



**FIGURE 2-4**  
**DPT Sampling Analytical Results**  
 2023 - Industrial Area Long Term Monitoring  
 Ransom Road Landfill (RRLF)  
 SWMU 003  
 NASA Kennedy Space Center, Florida

### 3. ORSINO STORAGE YARD

This section provides a summary of the ORSY site (SWMU 004). Refer to **Figure 3** for a site map.

#### 3.1 SITE DESCRIPTION AND HISTORY

ORSY is located to the southeast of the C Avenue and 5<sup>th</sup> Street Southeast intersection. A power substation borders ORSY to the west. The storage yard has been utilized since 1966 as a staging area for electrical equipment, consisting of wooden electric poles, transformers containing polychlorinated biphenyls (PCBs), electrical cables, control panels, and oil-based switches. The site is predominantly gravel-paved with several sheds situated on concrete pads along the western side of the site (NASA 2005a).

Initial site investigations focused on PCBs, which led to soil interim measure (IM) activities being conducted from 1986 through 1992 to remove soils with PCB concentrations exceeding 25 milligrams per kilogram (mg/kg), complying with the Toxic Substances Control Act. An RFI (Geosyntec 2003b) and RFI Addendum (Geosyntec 2005a) were completed between 1998 and 2005 that identified VOCs, specifically VC and chlorobenzenes, at concentrations above their respective GCTLs. A risk evaluation determined these VOCs may cause an unacceptable human health risk if groundwater was to be used as a source of drinking water, specifically cancer and non-cancer risks were attributed to VC and 1,2,4-trichlorobenzene (TCB). MNA of groundwater was selected as the remediation strategy and ORSY was incorporated into the LTM program in 2005 at an annual sampling frequency.




VC concentrations have remained below the GCTL since 2006. Chlorobenzene, 1,3-dichlorobenzene (DCB), and 1,4-DCB concentrations have remained below their respective GCTLs since 2007; however, 1,2,3-TCB and 1,2,4-TCB have persisted in site groundwater. In 2012, the ORSY LTM groundwater sampling interval was changed to a biennial frequency. In order to obtain a second consecutive event below GCTLs, the sampling frequency was accelerated in 2021 following a clean sample at ORSY-EXC-MW0001I in November 2020.

A letter report detailing the ORSY site history and September 2021 sampling activities was submitted to FDEP on July 10, 2023 and is included as **Appendix H**. Groundwater COC concentrations have remained below GCTLs for two consecutive sampling events in November 2020 and September 2021. The letter report recommended that long-term groundwater monitoring at ORSY should discontinue. The land use control (LUC) for soil will remain in place at the site.

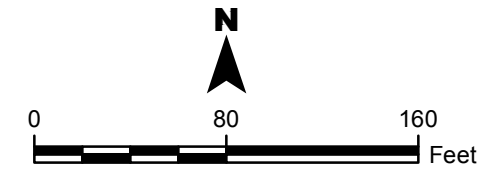
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**Legend**

-  Monitoring Well (LTM)
-  Monitoring Well (LTM - Water Level Only)
-  Monitoring Well (Non - LTM)

**Notes:**  
 • (20-25) = Monitoring well screen interval in feet below land surface  
 • LTM = Long Term Monitoring  
 • SWMU = Solid Waste Management Unit  
 • Aerial Source: FDOT 2018



**FIGURE 3**  
**Site Map**  
 2022 - Industrial Area Long Term Monitoring  
 Orsino Storage Yard (ORSY)  
 SWMU 004  
 NASA Kennedy Space Center, Florida

#### **4. BUILDING M7-0505 TREATMENT TANK AREA**

This section provides a summary of the Building M7-0505 (M505) site (SWMU 039). Refer to **Figure 4** for a site map.

##### **4.1 SITE DESCRIPTION AND HISTORY**

The M505 site is comprised of a waste treatment tank area, grease interceptor tank area, effluent drain lines, and an adjacent north-south trending swale. The Payload Support Building, M505, was constructed in 1964 and is located northeast of the intersection of Third Street and D Avenue. Historically, material fabrication, testing, and metal corrosion prevention treatment activities have been performed at the site. A waste treatment tank and grease interceptor tank, located beneath the parking lot, were operated until their removal in September 1991. The waste treatment tank was constructed of concrete and was used to buffer the pH of waste solutions generated in the metal treatment laboratory. The waste treatment tank discharged effluent to the west via underground metal piping into a north-south trending swale located southeast of the payload maintenance facility. The metal treatment laboratory floor drain and the drainage swale effluent pipe were plugged in 1986, ceasing further discharges. Concurrent with the operation of the waste treatment tank, the grease interceptor tank received M505's paint shop wastewater. Effluent from the grease interceptor tank also ultimately drained to the west and into the north-south oriented drainage swale.

Prior to the treatment tank removal in 1991, groundwater and soil investigations began in 1990. The initial site investigations identified polynuclear aromatic hydrocarbon (PAH)-contaminated soils along the north-south swale. A soil IM was completed in 1998 to remove soil with PAH exceedances.

An RFI performed in 1999 at the M505 treatment tank area identified chlorinated volatile organic compound (CVOC) impacted groundwater (HSW Engineering [HSW] 1999). A Corrective Measures Study (CMS) in 2000 selected an air sparge (AS)/soil vapor extraction (SVE) system to remediate CVOC concentrations in groundwater to less than half of the NADC for each COC (HSW 2000). NASA installed a pilot-scale AS/SVE system in May 2002, which began operation in June 2002. Additional AS and SVE wells were installed following the March 2004 Statement of Basis (HSW 2004). The pilot scale AS/SVE system continued operation through September 2008, when the SVE portion of the system ceased operation based on limited effectiveness.

Additional groundwater sampling was performed in 2010, which delineated the CVOCs laterally and vertically (Levine Fricke Recon, Inc. [LFR] 2010a). The investigation found no trichloroethene (TCE) concentrations in groundwater exceeding the NADC. Additionally, it concluded that the 2002 pilot-scale AS system had limited effectiveness, which resulted in its shut down in November 2010.

Remedial alternatives were evaluated in 2011, which resulted in the construction of an expanded, larger scale AS/SVE groundwater treatment system to address CVOCs exceeding NADCs (LFR 2011). The larger AS/SVE system was constructed from November 2011 to January 2012 and included 24 monitoring wells to monitor system performance. These monitoring wells were sampled quarterly with the initial sampling event occurring in January 2012. Following the first four quarters of groundwater sampling (between January 2012 and January 2013), the results indicated the AS/SVE system was performing effectively. The AS/SVE system was expanded from September through December 2013 to include monitoring wells in the north-south drainage swale and on the western edge of the groundwater plume (KSCRT, May 2013).

Based on the results of the second year of quarterly groundwater monitoring (performed from February 2013 through March 2014), the AS/SVE system continued operation to lower TCE concentrations below the GCTL of 3 µg/L (KSCRT, August 2014). The following year, the AS/SVE system achieved its CVOC reduction goal and the system was deactivated (KSCRT, December 2015). Semi-annual sampling of 14 monitoring wells was initiated in 2016 (Jacobs-CORE 2017a). The semi-annual sampling events were conducted in November 2016 and May 2017. Based on semi-annual monitoring results, an annual LTM sampling frequency alternating between wet and dry seasons was adopted in 2017. A biennial sampling schedule with alternating seasons was adopted in 2020.

A historical review was completed in January 2023 to provide cross-section analytical figures bisecting the site north to south and west to east. The figures provided in **Appendix I** were generated during an engineering evaluation to determine the horizontal and vertical delineation at the site (Arcadis U.S., Inc. [ARCADIS] 2010). Monitoring wells were installed at select DPT locations to continue monitoring VOC concentrations along the plume axis.

## 4.2 FIELD ACTIVITIES

Field activities were performed at M505 in May 2022. Groundwater levels were measured at 35 monitoring wells, and samples from eight monitoring wells were collected. Monitoring wells M505-MW0033 and M505-MW0049 were retained in the sampling schedule to verify horizontal and vertical delineation. The following table shows the network of monitoring wells used for groundwater level measurements and sampling at M505.

Well ID	Screen Interval (ft bls)	Analysis
M505-MW0003S	4-14	WL Only
M505-MW0007S	4-14	WL Only
M505-MW0007I	25-35	WL Only
M505-MW0008S	4-14	WL Only
M505-MW0009S	5-15	WL Only
M505-MW0009I	23-28	WL Only
M505-MW0012I	23-28	WL Only
M505-MW0013	23-28	WL + select VOCs

Well ID	Screen Interval (ft bls)	Analysis
M505-MW0014	4-14	WL Only
M505-MW0017	22.5-27.5	WL Only
M505-MW0020	33.5-38.5	WL Only
M505-MW0022	22.5-27.5	WL Only
M505-MW0024	32.5-37.5	WL Only
M505-MW0025	22.5-27.5	WL Only
M505-MW0026	32.5-37.5	WL Only
M505-MW0027	22.5-27.5	WL Only
M505-MW0028	22.5-27.5	WL Only
M505-MW0029	22.5-27.5	WL Only
M505-MW0030	22.5-27.5	WL Only
M505-MW0031	22.5-27.5	WL Only
M505-MW0032	32.5-37.5	WL + select VOCs
M505-MW0033	22.5-27.5	WL + select VOCs
M505-MW0035	22.5-27.5	WL Only
M505-MW0039	30-35	WL + select VOCs
M505-MW0042	32.5-37.5	WL Only
M505-MW0045	32-37	WL Only
M505-MW0046	5-15	WL Only
M505-MW0049	20-35	WL + select VOCs
M505-MW0050	5-15	WL Only
M505-MW0051	22.5-27.5	WL + select VOCs
M505-MW0054	5-15	WL Only
M505-MW0055	22.5-27.5	WL + select VOCs
M505-MW0057	22.5-27.5	WL Only
M505-MW0058	5-15	WL Only
M505-MW0059	22.5-27.5	WL + select VOCs

ID = identification

MW = monitoring well

Select VOCs = TCE, cis-1,2-dichloroethene (cis-1,2-DCE), and VC analysis by Method 8260

WL = water level measurement

Groundwater samples collected from M505 during the 2022 sampling event were analyzed for select VOCs by Method 8260. Below are the respective GCTLs and NADCs for the COCs present at M505.

COC	GCTL (µg/L)	NADC (µg/L)
TCE	3	300
cis-1,2-DCE	70	700
VC	1	100

#### 4.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the 2022 biennial sampling event were used to calculate groundwater elevations presented in **Table 4-1**. The 2022 shallow aquifer zone (4 ft bls to 15 ft

bls) groundwater flow directions indicate a mound around M505-MW0007S, which divided groundwater flow direction between northwest and southeast. At approximately 300 linear feet south of the former source area, the shallow groundwater flow direction was to the southwest. The 2022 intermediate aquifer zone (20 ft bls to 38.5 ft bls) groundwater flow changes from south, near M505-MW0013, to south-southwest, near M505-MW0025, with a mound around M505-MW0049. The historical shallow and intermediate groundwater flow at M505 is predominantly to the southwest. The May 2022 groundwater flows are depicted on **Figure 4-1** and **Figure 4-2**.

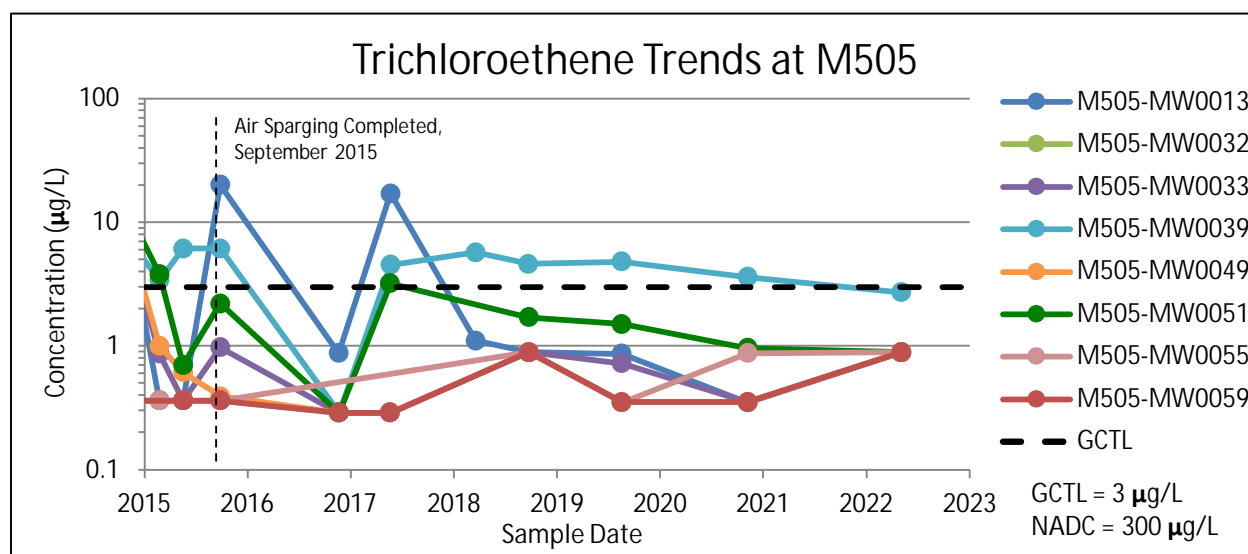
#### 4.4 ANALYTICAL RESULTS

Eight monitoring wells were sampled for select VOCs in May 2022. TCE and cis-1,2-dichloroethene (cis-1,2-DCE) concentrations did not exceed GCTLs in 2022. VC was detected at concentrations above the GCTL in monitoring wells M505-MW0013 (2.1 µg/L), M505-MW0032 (4.7 µg/L), and M505-MW0055 (9.3 µg/L). Recent and historical analytical results are summarized in **Table 4-2**. Analytical results are depicted on **Figure 4-3**.

#### 4.5 TREND ANALYSIS

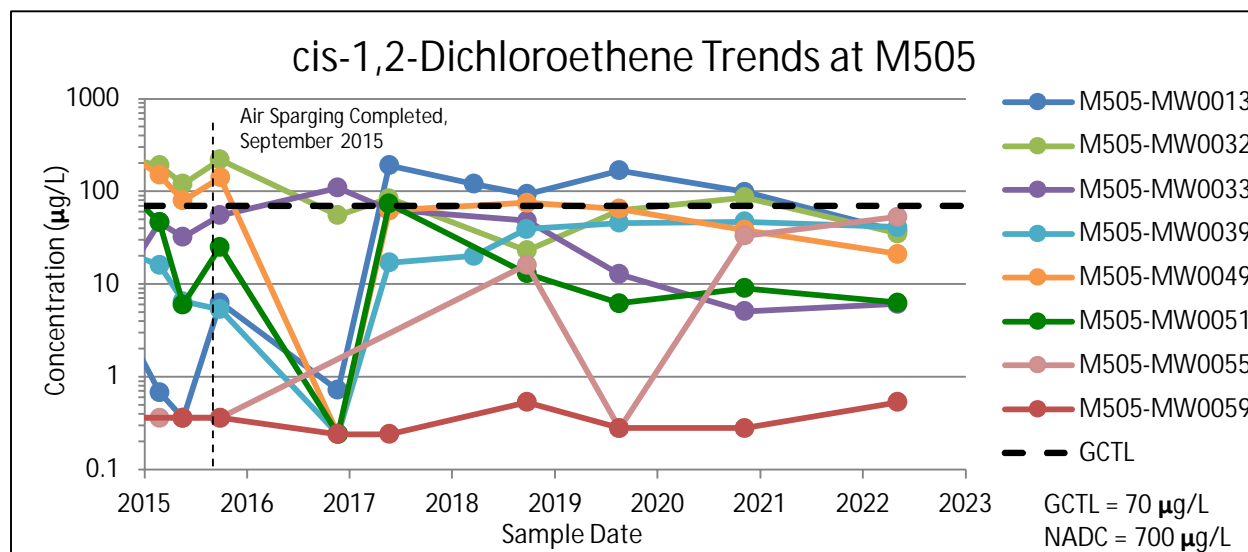
The following trend charts present the current and historical concentrations for TCE, cis-1,2-DCE, and VC since the AS system shutdown in September 2015. These COCs generally show a rebound in concentration after the AS system shutdown followed by decreasing trends.

TCE was not detected during the November 2016 sampling event following the AS shutdown. The monitoring wells have shown an overall slight decrease in TCE concentrations since 2017.

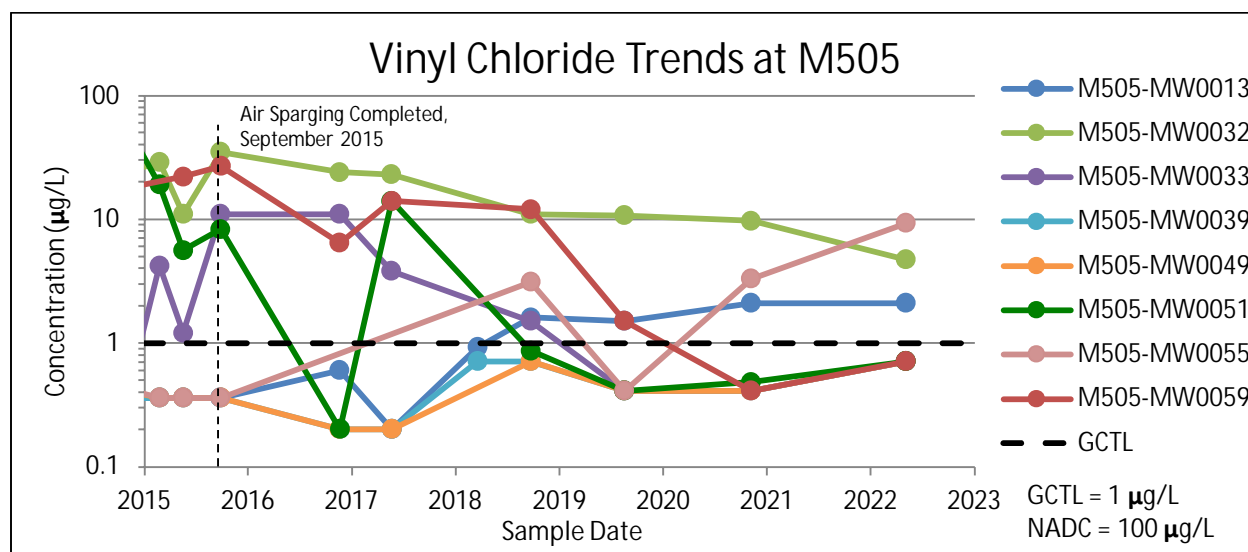


Except for the slight increase at M505-MW0055, the monitoring wells have shown an overall decrease in cis-1,2-DCE concentrations since 2017.





The monitoring wells have shown a stable or slight decrease in VC concentrations since 2018, except for M505-MW0055, which has increased since 2019.



#### 4.6 CONCLUSION AND RECOMMENDATION

COC concentrations at M505 exceeded GCTLs in three of the eight monitoring wells sampled in May 2022. There have been no analyte detections exceeding NADCs since the AS system shutdown in 2015, and the overall COC concentrations in the monitoring well network continue to show a decreasing or stable trend except for a small increase in (cis-1,2-DCE and VC at M505-MW0055).

Downgradient monitoring well M505-MW0029 is recommended to be added to the sampling network because of the recent increases in COC concentrations at monitoring well M505-MW0055. Groundwater levels are recommended to be measured at 35 monitoring wells and samples collected from nine monitoring wells on a biennial frequency. The following table shows the recommended network of monitoring wells for groundwater level measurements and groundwater sampling for the next sampling event at M505 scheduled for November 2024.

<b>Well ID</b>	<b>Screen Interval (ft bls)</b>	<b>Analysis</b>
M505-MW0003S	4-14	WL Only
M505-MW0007S	4-14	WL Only
M505-MW0007I	25-35	WL Only
M505-MW0008S	4-14	WL Only
M505-MW0009S	5-15	WL Only
M505-MW0009I	23-28	WL Only
M505-MW0012I	23-28	WL Only
M505-MW0013	23-28	WL + Select VOCs
M505-MW0014	4-14	WL Only
M505-MW0017	22.5-27.5	WL Only
M505-MW0020	33.5-38.5	WL Only
M505-MW0022	22.5-27.5	WL Only
M505-MW0024	32.5-37.5	WL Only
M505-MW0025	22.5-27.5	WL Only
M505-MW0026	32.5-37.5	WL Only
M505-MW0027	22.5-27.5	WL Only
M505-MW0028	22.5-27.5	WL Only
M505-MW0029	22.5-27.5	WL + Select VOCs
M505-MW0030	22.5-27.5	WL Only
M505-MW0031	22.5-27.5	WL Only
M505-MW0032	32.5-37.5	WL + Select VOCs
M505-MW0033	22.5-27.5	WL + Select VOCs
M505-MW0035	22.5-27.5	WL Only
M505-MW0039	30-35	WL + Select VOCs
M505-MW0042	32.5-37.5	WL Only
M505-MW0045	32-37	WL Only
M505-MW0046	5-15	WL Only
M505-MW0049	20-35	WL + Select VOCs
M505-MW0050	5-15	WL Only
M505-MW0051	22.5-27.5	WL + Select VOCs
M505-MW0054	5-15	WL Only
M505-MW0055	22.5-27.5	WL + Select VOCs
M505-MW0057	22.5-27.5	WL Only
M505-MW0058	5-15	WL Only
M505-MW0059	22.5-27.5	WL + Select VOCs

ID = identification  
MW = monitoring well  
Select VOCs = TCE, cis-1,2-DCE, and VC analysis by Method 8260  
WL = water level measurement

**Table 4-1**  
**Building M7-0505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>		M505-MW0003S		M505-MW0007S		M505-MW0008S	
<b>Screen Interval (ft bls):</b>		4 -14		4 -14		4 -14	
<b>TOC Elevation (ft NAVD88):</b>		9.64		9.15		9.11	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	
November 2016	Not Measured		5.99	3.16	Not Measured		
May 2017	7.98	1.66	7.30	1.85	7.65	1.46	
March 2018	Not Measured		5.70	3.45	6.72	2.39	
September 2018	6.66	2.98	6.04	3.11	6.58	2.53	
August 2019	5.54	4.10	4.78	4.37	5.38	3.73	
November 2020	5.75	3.89	4.28	4.87	5.38	3.73	
May 2022	6.56	3.08	5.90	3.25	6.38	2.73	

<b>SHALLOW WELL ID:</b>		M505-MW0009S		M505-MW0014		M505-MW0046	
<b>Screen Interval (ft bls):</b>		5 - 15		4 -14		5 - 15	
<b>TOC Elevation (ft NAVD88):</b>		9.37		9.21		9.03	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	
November 2016	Not Measured		6.94	2.27	6.51	2.52	
May 2017	Not Measured		8.38	0.83	7.86	1.17	
March 2018	6.96	2.41	6.84	2.37	6.72	2.31	
September 2018	7.10	2.27	7.30	1.91	6.83	2.20	
August 2019	5.78	3.59	5.85	3.36	5.49	3.54	
November 2020	5.59	3.78	5.45	3.76	5.30	3.73	
May 2022	6.80	2.57	6.97	2.24	6.48	2.55	

<b>SHALLOW WELL ID:</b>		M505-MW0050		M505-MW0054		M505-MW0058	
<b>Screen Interval (ft bls):</b>		5 - 15		5 - 15		5 - 15	
<b>TOC Elevation (ft NAVD88):</b>		10.85		10.03		7.10	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	
November 2016	8.64	2.21	8.21	1.82	3.88	3.22	
May 2017	10.04	0.81	9.71	0.32	4.86	2.24	
March 2018	8.54	2.31	8.02	2.01	3.94	3.16	
September 2018	8.99	1.86	8.53	1.50	4.00	3.10	
August 2019	7.58	3.27	5.92	4.11	2.65	4.45	
November 2020	7.31	3.54	7.18	2.85	2.26	4.84	
May 2022	8.70	2.15	8.30	1.73	3.61	3.49	

<b>INTERMEDIATE WELL ID:</b>		M505-MW0007I		M505-MW0009I		M505-MW0012I	
<b>Screen Interval (ft bls):</b>		25 - 35		23 - 28		23 - 28	
<b>TOC Elevation (ft NAVD88):</b>		9.19		9.35		8.89	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	
November 2016	Not Measured		6.87	2.48	Not Measured		
May 2017	Not Measured		8.26	1.09	Not Measured		
March 2018	6.80	2.39	6.99	2.36	6.53	2.36	
September 2018	6.85	2.34	7.15	2.20	6.52	2.37	
August 2019	5.58	3.61	5.82	3.53	5.22	3.67	
November 2020	5.42	3.77	5.62	3.73	5.13	3.76	
May 2022	6.59	2.60	6.84	2.51	6.25	2.64	

<b>INTERMEDIATE WELL ID:</b>		M505-MW0013		M505-MW0017		M505-MW0020	
<b>Screen Interval (ft bls):</b>		23 - 28		22.5 - 27.5		33.5 - 38.5	
<b>TOC Elevation (ft NAVD88):</b>		10.20		9.30		9.07	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	
November 2016	6.85	3.35	6.95	2.35	6.89	2.18	
May 2017	8.16	2.04	8.34	0.96	8.02	1.05	
March 2018	7.02	3.18	6.99	2.31	6.74	2.33	
September 2018	7.09	3.11	7.23	2.07	6.98	2.09	
August 2019	5.83	4.37	5.80	3.50	5.54	3.53	
November 2020	5.72	4.48	5.69	3.61	5.31	3.76	
May 2022	6.82	3.38	6.96	2.34	6.58	2.49	

**Table 4-1**  
**Building M7-0505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	M505-MW0022		M505-MW0024		M505-MW0025	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		32.5 - 37.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	9.45		8.72		10.70	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	7.08	2.37	5.79	2.93	8.46	2.24
May 2017	8.49	0.96	7.23	1.49	9.86	0.84
March 2018	7.11	2.34	6.35	2.37	5.41	5.29
September 2018	7.32	2.13	6.68	2.04	8.81	1.89
August 2019	5.97	3.48	5.50	3.22	7.55	3.15
November 2020	5.70	3.75	5.20	3.52	7.17	3.53
May 2022	6.98	2.47	6.41	2.31	8.52	2.18

<b>INTERMEDIATE WELL ID:</b>	M505-MW0026		M505-MW0027		M505-MW0028	
<b>Screen Interval (ft bls):</b>	32.5 - 37.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	10.71		9.70		5.66	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	8.48	2.23	7.30	2.40	3.46	2.20
May 2017	9.84	0.87	8.73	0.97	4.93	0.73
March 2018	8.42	2.29	7.39	2.31	3.39	2.27
September 2018	8.82	1.89	7.63	2.07	3.91	1.75
August 2019	7.52	3.19	6.23	3.47	2.50	3.16
November 2020	7.18	3.53	6.00	3.70	2.10	3.56
May 2022	8.51	2.20	7.27	2.43	3.49	2.17

<b>INTERMEDIATE WELL ID:</b>	M505-MW0029		M505-MW0030		M505-MW0031	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	6.88		10.13		10.37	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	5.11	1.77	Not Measured		8.41	1.96
May 2017	6.42	0.46	Not Measured		9.65	0.72
March 2018	4.95	1.93	8.90	1.23	8.33	2.04
September 2018	5.54	1.34	8.40	1.73	8.08	2.29
August 2019	4.45	2.43	7.12	3.01	7.72	2.65
November 2020	4.07	2.81	6.71	3.42	7.73	2.64
May 2022	5.26	1.62	8.10	2.03	8.60	1.77

<b>INTERMEDIATE WELL ID:</b>	M505-MW0032		M505-MW0033		M505-MW0035	
<b>Screen Interval (ft bls):</b>	32.5 - 37.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	10.82		10.67		6.85	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	8.68	2.14	8.57	2.10	4.61	2.24
May 2017	10.01	0.81	9.94	0.73	5.96	0.89
March 2018	5.57	5.25	8.43	2.24	4.58	2.27
September 2018	9.02	1.80	8.91	1.76	4.95	1.90
August 2019	8.35	2.47	7.70	2.97	3.74	3.11
November 2020	7.47	3.35	7.38	3.29	3.39	3.46
May 2022	8.78	2.04	8.70	1.97	4.69	2.16

<b>INTERMEDIATE WELL ID:</b>	M505-MW0039		M505-MW0042		M505-MW0045	
<b>Screen Interval (ft bls):</b>	30 - 35		32.5 - 37.5		32 - 37	
<b>TOC Elevation (ft NAVD88):</b>	8.49		9.14		9.03	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	5.93	2.56	6.67	2.47	6.54	2.49
May 2017	7.24	1.25	8.04	1.10	7.86	1.17
March 2018	6.02	2.47	6.75	2.39	6.75	2.28
September 2018	6.15	2.34	6.96	2.18	6.95	2.08
August 2019	4.85	3.64	5.65	3.49	5.50	3.53
November 2020	4.71	3.78	5.51	3.63	5.26	3.77
May 2022	5.88	2.61	6.67	2.47	6.50	2.53

**Table 4-1  
Building M7-0505 Treatment Tank Area - Long Term Monitoring (LTM)  
Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	M505-MW0049		M505-MW0051		M505-MW0055	
<b>Screen Interval (ft bls):</b>	20 - 35		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	11.03		9.63		9.60	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	8.85	2.18	7.59	2.04	Not Measured	
May 2017	9.56	1.47	8.96	0.67	Not Measured	
March 2018	8.06	2.97	7.46	2.17	7.45	2.15
September 2018	8.47	2.56	7.96	1.67	7.94	1.66
August 2019	7.22	3.81	6.88	2.75	7.50	2.10
November 2020	6.92	4.11	6.57	3.06	8.50	1.10
May 2022	8.20	2.83	7.77	1.86	7.72	1.88

<b>INTERMEDIATE WELL ID:</b>	M505-MW0057		M505-MW0059	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	6.93		6.78	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	4.69	2.24	4.60	2.18
May 2017	6.16	0.77	6.15	0.63
March 2018	4.66	2.27	4.57	2.21
September 2018	5.11	1.82	5.09	1.69
August 2019	3.72	3.21	3.70	3.08
November 2020	3.35	3.58	3.30	3.48
May 2022	4.73	2.20	4.74	2.04

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

M505 = Building M7-0505 Treatment Tank Area

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 4-2**  
**M7-505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
M505-MW0013	11/29/2005	23 - 28	2.3	120	0.43 U
	9/19/2006	23 - 28	14	220	0.37 U
	5/22/2007	23 - 28	2.8	290	0.84 I
	11/8/2007	23 - 28	1.0 I	130	0.12 U
	5/28/2008	23 - 28	8.2	110	0.25 U
	12/16/2008	23 - 28	3.3	76	0.25 U
	5/12/2009	23 - 28	0.45 I	68	0.25 U
	12/17/2009	23 - 28	0.15 U	79	0.25 U
	5/25/2010	23 - 28	0.63 U	79	0.52 U
	11/9/2010	23 - 28	0.16 U	58.1	0.22 U
	5/2/2011	23 - 28	26.7	126	0.36 U
	11/14/2013	23 - 28	1.1	560	7.3
	2/18/2014	23 - 28	0.36 U	13	0.36 U
	5/29/2014	23 - 28	0.36 U	0.81 I	0.36 U
	8/14/2014	23 - 28	0.36 U	0.71 I	0.36 U
	11/24/2014	23 - 28	4.5	2.3	0.36 U
	2/24/2015	23 - 28	0.36 U	0.68 I	0.36 U
	5/19/2015	23 - 28	0.36 U	0.36 U	0.36 U
	9/28/2015	23 - 28	20	6.3	0.36 U
	11/21/2016	23 - 28	0.87 U	0.72 U	0.6 U
	5/24/2017	23 - 28	17	190	0.20 U
	3/22/2018	23 - 28	1.1	120	0.92 I
9/27/2018	23 - 28	0.89 U	93	1.6	
8/22/2019	23 - 28	0.86 U	167	1.5 I	
11/11/2020	23 - 28	0.35 U	98.5	2.1	
5/11/2022	23 - 28	0.89 U	37	2.1	
M505-MW0020	5/23/2007	33.5 - 38.5	0.20 U	3.0	0.12 U
	11/8/2007	33.5 - 38.5	0.20 U	6.1	0.12 U
	5/27/2008	33.5 - 38.5	0.15 U	1.8	0.25 U
	12/17/2008	33.5 - 38.5	0.15 U	1.2	0.25 U
	5/13/2009	33.5 - 38.5	0.15 U	14	0.25 U
	12/17/2009	33.5 - 38.5	0.15 U	120	0.25 U
	5/26/2010	33.5 - 38.5	0.63 U	300	0.52 U
	11/10/2010	33.5 - 38.5	0.16 U	433	0.22 U
	5/2/2011	33.5 - 38.5	0.36 U	402	0.36 U
	11/10/2011	33.5 - 38.5	0.36 U	728	0.36 U
	4/17/2012	33.5 - 38.5	0.36 U	73.9	0.36 U
	7/24/2012	33.5 - 38.5	0.36 U	177	0.36 U
	10/9/2012	33.5 - 38.5	0.36 U	117	0.36 U
	1/9/2013	33.5 - 38.5	0.36 U	12	0.36 U
	4/23/2013	33.5 - 38.5	0.36 U	9.4	0.36 U
11/13/2013	33.5 - 38.5	0.36 U	280	0.36 U	
2/18/2014	33.5 - 38.5	0.36 U	8.5	0.36 U	
5/28/2014	33.5 - 38.5	0.36 U	1.5	0.36 U	

**Table 4-2**  
**M7-505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
<b>M505-MW0020</b> <b>(continued)</b>	8/13/2014	33.5 - 38.5	0.36 U	<b>4.8</b>	0.36 U
	5/20/2015	33.5 - 38.5	0.36 U	<b>160</b>	<b>0.42 I</b>
	9/29/2015	33.5 - 38.5	0.36 U	<b>120</b>	0.36 U
	11/21/2016	33.5 - 38.5	0.29 U	0.24 U	0.20 U
	5/23/2017	33.5 - 38.5	0.29 U	<b>130</b>	0.20 U
	9/27/2018	33.5 - 38.5	0.89 U	<b>98</b>	0.71 U
	8/22/2019	33.5 - 38.5	0.35 U	<b>34.8</b>	0.41 U
	11/11/2020	33.5 - 38.5	0.35 U	<b>21.8</b>	0.41 U
<b>M505-MW0028</b>	12/16/2009	22.5 - 27.5	0.15 U	<b>1.0</b>	<b>27</b>
	5/26/2010	22.5 - 27.5	0.63 U	<b>0.76 I</b>	<b>42</b>
	11/9/2010	22.5 - 27.5	0.16 U	<b>1.58</b>	<b>19.6</b>
	5/3/2011	22.5 - 27.5	0.36 U	<b>1.24</b>	<b>28.3</b>
	1/7/2013	22.5 - 27.5	0.36 U	<b>1.4</b>	<b>72</b>
	5/28/2014	22.5 - 27.5	0.36 U	<b>1.8</b>	<b>87</b>
	5/20/2015	22.5 - 27.5	0.36 U	<b>2.3</b>	<b>83</b>
	9/29/2015	22.5 - 27.5	0.36 U	<b>3.3</b>	<b>50</b>
	11/21/2016	22.5 - 27.5	0.29 U	<b>1.6</b>	<b>8.6</b>
	5/24/2017	22.5 - 27.5	0.29 U	<b>1.8</b>	0.20 U
	9/27/2018	22.5 - 27.5	0.89 U	<b>0.87 I</b>	<b>1.3</b>
	8/22/2019	22.5 - 27.5	0.35 U	<b>0.34 I</b>	0.41 U
	11/11/2020	22.5 - 27.5	0.35 U	0.28 U	0.41 U
<b>M505-MW0032</b>	12/16/2009	32.5 - 37.5	0.15 U	<b>57</b>	<b>2.7</b>
	5/26/2010	32.5 - 37.5	0.63 U	<b>170</b>	<b>170</b>
	11/9/2010	32.5 - 37.5	0.16 U	<b>343</b>	<b>156</b>
	5/3/2011	32.5 - 37.5	0.36 U	<b>132</b>	<b>241</b>
	11/14/2011	32.5 - 37.5	0.36 U	<b>320</b>	<b>123</b>
	4/17/2012	32.5 - 37.5	0.36 U	<b>84.4</b>	<b>25.5</b>
	7/23/2012	32.5 - 37.5	0.36 U	<b>109</b>	<b>16.4</b>
	10/9/2012	32.5 - 37.5	0.72 U	<b>184</b>	<b>30.9</b>
	1/8/2013	32.5 - 37.5	0.36 U	<b>170</b>	<b>13</b>
	4/24/2013	32.5 - 37.5	0.36 U	<b>1.8</b>	<b>0.47 I</b>
	11/12/2013	32.5 - 37.5	0.36 U	<b>260</b>	<b>32</b>
	2/17/2014	32.5 - 37.5	0.36 U	<b>190</b>	<b>25</b>
	5/28/2014	32.5 - 37.5	0.36 U	<b>170</b>	<b>8.7</b>
	8/13/2014	32.5 - 37.5	0.36 U	<b>67</b>	<b>5.5</b>
	11/24/2014	32.5 - 37.5	0.36 U	<b>220</b>	<b>25</b>
	2/24/2015	32.5 - 37.5	0.36 U	<b>190</b>	<b>29</b>
	5/19/2015	32.5 - 37.5	0.36 U	<b>120</b>	<b>11</b>
	9/28/2015	32.5 - 37.5	0.36 U	<b>220</b>	<b>35</b>
	11/21/2016	32.5 - 37.5	0.29 U	<b>55</b>	<b>24</b>
	5/23/2017	32.5 - 37.5	0.29 U	<b>84</b>	<b>23</b>
	9/26/2018	32.5 - 37.5	0.89 U	<b>23</b>	<b>11</b>
8/22/2019	32.5 - 37.5	0.35 U	<b>62.1</b>	<b>10.7</b>	
	11/11/2020	32.5 - 37.5	0.35 U	<b>85.5</b>	<b>9.7</b>
	5/11/2022	32.5 - 37.5	0.89 U	<b>35</b>	<b>4.7</b>

**Table 4-2**  
**M7-505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
M505-MW0033	12/16/2009	22.5 -27.5	0.57 I	700	130
	5/26/2010	22.5 -27.5	0.69 I	47	48
	11/9/2010	22.5 -27.5	0.16 U	76.3	67.3
	5/3/2011	22.5 -27.5	1.47	94.5	69.8
	11/14/2011	22.5 -27.5	2.23	97.4	39.9
	4/17/2012	22.5 -27.5	2.4	79.7	17.2
	7/23/2012	22.5 -27.5	3.5	116	23.2
	10/9/2012	22.5 -27.5	0.68 I	40.4	6.61
	1/8/2013	22.5 -27.5	1.6	34	7.5
	4/24/2013	22.5 -27.5	0.86 I	24	2.8
	11/12/2013	22.5 -27.5	0.56 I	8.6	1.5
	2/17/2014	22.5 -27.5	0.38 I	13	0.36 U
	5/28/2014	22.5 -27.5	1.3	42	2.8
	8/13/2014	22.5 -27.5	0.81 I	26	0.85 I
	11/24/2014	22.5 -27.5	4.7	17	0.62 I
	2/24/2015	22.5 -27.5	0.86 I	46	4.2
	5/19/2015	22.5 -27.5	0.36 I	32	1.2
	9/28/2015	22.5 -27.5	0.97 I	55	11
	11/21/2016	22.5 -27.5	0.29 U	110	11
	5/23/2017	22.5 -27.5	0.29 U	63	3.8
9/26/2018	22.5 -27.6	0.89 U	48	1.5	
8/22/2019	22.5 -27.5	0.72 I	12.7	0.41 U	
11/11/2020	22.5 -27.5	0.35 U	5.1	0.41 U	
5/11/2022	22.5 -27.5	0.89 U	6.1	0.71 U	
M505-MW0039	12/17/2009	30 - 35	21	130	0.47 I
	5/25/2010	30 - 35	16	85	0.52 U
	11/10/2010	30 - 35	37.9	119	0.22 U
	5/4/2011	30 - 35	54.6	164	0.57 I
	1/7/2013	30 - 35	64	160	0.36 U
	11/14/2013	30 - 35	45	110	0.36 U
	2/18/2014	30 - 35	6.6	38	0.36 U
	5/29/2014	30 - 35	3.2	21	0.36 U
	8/14/2014	30 - 35	4.8	30	0.36 U
	11/24/2014	30 - 35	6.5	20	0.36 U
	2/24/2015	30 - 35	3.4	16	0.36 U
	5/20/2015	30 - 35	6.1	6.5	0.36 U
	9/28/2015	30 - 35	6.1	5.3	0.36 U
	11/22/2016	30 - 35	0.29 U	0.24 U	0.20 U
	5/24/2017	30 - 35	4.5	17	0.20 U
	3/22/2018	30 - 35	5.7	20	0.71 U
	9/25/2018	30 - 35	4.6	39	0.71 U
	8/22/2019	30 - 35	4.8	45.4	0.41 U
11/11/2020	30 - 35	3.6	47.3	0.41 U	
5/11/2022	30 - 35	2.7	41	0.71 U	



**Table 4-2**  
**M7-505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
M505-MW0049	1/9/2013	20 - 35	<b>38</b>	<b>220</b>	0.36 U
	11/12/2013	20 - 35	<b>15</b>	<b>120</b>	0.36 U
	2/19/2014	20 - 35	<b>9.6</b>	<b>80</b>	0.36 U
	5/28/2014	20 - 35	<b>11</b>	<b>240</b>	<b>0.39 I</b>
	8/13/2014	20 - 35	<b>4.7</b>	<b>240</b>	<b>0.40 I</b>
	11/25/2014	20 - 35	<b>5.5</b>	<b>230</b>	<b>0.40 I</b>
	2/24/2015	20 - 35	<b>1.0</b>	<b>150</b>	0.36 U
	5/19/2015	20 - 35	<b>0.61 I</b>	<b>79</b>	0.36 U
	9/29/2015	20 - 35	<b>0.39 I</b>	<b>140</b>	0.36 U
	11/22/2016	20 - 35	0.29 U	0.24 U	0.20 U
	5/23/2017	20 - 35	0.29 U	<b>62</b>	0.20 U
	9/26/2018	20 - 35	0.89 U	<b>75</b>	0.71 U
	8/22/2019	20 - 35	0.35 U	<b>64.2</b>	0.41 U
	11/11/2020	20 - 35	0.35 U	<b>38.1</b>	0.41 U
5/11/2022	20 - 35	0.89 U	<b>21</b>	0.71 U	
M505-MW0051	11/15/2011	22.5 - 27.5	<b>13.5</b>	<b>319</b>	<b>72.5</b>
	4/17/2012	22.5 - 27.5	<b>16.3</b>	<b>129</b>	<b>34.7</b>
	7/23/2012	22.5 - 27.5	<b>7.45</b>	<b>143</b>	<b>31.6</b>
	10/9/2012	22.5 - 27.5	<b>10.2</b>	<b>110</b>	<b>30</b>
	1/8/2013	22.5 - 27.5	<b>13</b>	<b>160</b>	<b>37</b>
	4/24/2013	22.5 - 27.5	<b>11</b>	<b>170</b>	<b>45</b>
	11/12/2013	22.5 - 27.5	<b>8.1</b>	<b>150</b>	<b>50</b>
	2/19/2014	22.5 - 27.5	<b>9.2</b>	<b>64</b>	<b>29</b>
	5/28/2014	22.5 - 27.5	<b>6.1</b>	<b>46</b>	<b>20</b>
	8/13/2014	22.5 - 27.5	<b>7.1</b>	<b>47</b>	<b>24</b>
	11/24/2014	22.5 - 27.5	<b>9.9</b>	<b>88</b>	<b>45</b>
	2/24/2015	22.5 - 27.5	<b>3.8</b>	<b>46</b>	<b>19</b>
	5/19/2015	22.5 - 27.5	<b>0.70 I</b>	<b>6.0</b>	<b>5.6</b>
	9/28/2015	22.5 - 27.5	<b>2.2</b>	<b>25</b>	<b>8.3</b>
	11/22/2016	22.5 - 27.5	0.29 U	0.24 U	0.20 U
	5/23/2017	22.5 - 27.5	<b>3.2</b>	<b>73</b>	<b>14</b>
	9/26/2018	22.5 - 27.5	<b>1.7</b>	<b>13</b>	<b>0.86 I</b>
8/22/2019	22.5 - 27.5	<b>1.5</b>	<b>6.2</b>	0.41 U	
11/11/2020	22.5 - 27.5	<b>0.96 I</b>	<b>9.0</b>	<b>0.48 I</b>	
5/11/2022	22.5 - 27.5	0.89 U	<b>6.3</b>	0.71 U	
M505-MW0055	11/14/2011	22.5 - 27.5	0.36 U	<b>1,130</b>	<b>39.1</b>
	4/17/2012	22.5 - 27.5	0.36 U	<b>171</b>	<b>509</b>
	7/23/2012	22.5 - 27.5	0.36 U	<b>137</b>	<b>336</b>
	10/9/2012	22.5 - 27.5	0.36 U	<b>1.42</b>	<b>19.5</b>
	1/8/2013	22.5 - 27.5	0.36 U	<b>0.90 I</b>	<b>6.3</b>
	4/24/2013	22.5 - 27.5	0.36 U	<b>0.83 I</b>	<b>6.4</b>
	11/12/2013	22.5 - 27.5	0.36 U	0.36 U	<b>2.0</b>
	2/19/2014	22.5 - 27.5	0.36 U	<b>0.90 I</b>	<b>5.3</b>
	5/28/2014	22.5 - 27.5	0.36 U	<b>1.0</b>	<b>3.0</b>
8/13/2014	22.5 - 27.5	0.36 U	<b>0.46 I</b>	<b>0.46 I</b>	

**Table 4-2**  
**M7-505 Treatment Tank Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
<b>M505-MW0055</b> <b>(continued)</b>	11/24/2014	22.5 - 27.5	0.36 U	0.36 U	<b>0.41 I</b>
	2/24/2015	22.5 - 27.5	0.36 U	0.36 U	0.36 U
	5/19/2015	22.5 - 27.5	0.36 U	0.36 U	0.36 U
	9/28/2015	22.5 - 27.5	0.36 U	0.36 U	0.36 U
	9/26/2018	22.5 - 27.5	0.89 U	<b>16</b>	<b>3.1</b>
	8/22/2019	22.5 - 27.5	0.35 U	0.28 U	0.41 U
	11/11/2020	22.5 - 27.5	<b>0.87 I</b>	<b>33.1</b>	<b>3.3</b>
	5/11/2022	22.5 - 27.5	0.89 U	<b>53</b>	<b>9.3</b>
<b>M505-MW0057</b>	1/7/2013	22.5 - 27.5	0.36 U	<b>0.38 I</b>	<b>85</b>
	5/27/2014	22.5 - 27.5	0.36 U	0.36 U	<b>65</b>
	5/20/2015	22.5 - 27.5	0.36 U	0.36 U	<b>65</b>
	9/29/2015	22.5 - 27.5	0.36 U	0.36 U	<b>58</b>
	11/21/2016	22.5 - 27.5	0.29 U	0.24 U	<b>13</b>
	5/24/2017	22.5 - 27.5	0.29 U	0.24 U	0.20 U
	9/27/2018	22.5 - 27.5	0.89 U	0.53 U	0.71 U
	8/22/2019	22.5 - 27.5	0.35 U	0.28 U	<b>0.41 I</b>
	11/11/2020	22.5 - 27.5	0.35 U	0.28 U	0.41 U
<b>M505-MW0059</b>	1/7/2013	22.5 - 27.5	0.36 U	0.36 U	<b>2.4</b>
	5/27/2014	22.5 - 27.5	0.36 U	0.36 U	<b>15</b>
	5/19/2015	22.5 - 27.5	0.36 U	0.36 U	<b>22</b>
	9/29/2015	22.5 - 27.5	0.36 U	0.36 U	<b>27</b>
	11/21/2016	22.5 - 27.5	0.29 U	0.24 U	<b>6.4</b>
	5/24/2017	22.5 - 27.5	0.29 U	0.24 U	<b>14</b>
	9/27/2018	22.5 - 27.5	0.89 U	0.53 U	<b>12</b>
	8/22/2019	22.5 - 27.5	0.35 U	0.28 U	<b>1.5</b>
	11/11/2020	22.5 - 27.5	0.35 U	0.28 U	0.41 U
	5/11/2022	22.5 - 27.6	0.89 U	0.53 U	0.71 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,

Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

M505 = Building M7-0505 Treatment Tank Area

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

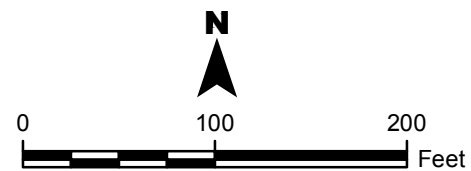


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**Legend**

- ◆ Shallow Monitoring Well (4-15 ft bls)
- ◆ Intermediate Monitoring Well (20-38.5 ft bls)
- ◆ Monitoring Well (Not included in LTM)
- Building

Notes:  
 • (22.5-27.5) = Monitoring well screen interval in feet below land surface  
 • SWMU = Solid Waste Management Unit  
 • LTM = Long Term Monitoring  
 • ft bls = feet below land surface  
 • Aerial Source: FDOT 2018



**FIGURE 4  
 Site Map**

2022 - Industrial Area Long Term Monitoring  
 Building M7-0505 Treatment Tank Area (M505)  
 SWMU 039  
 NASA Kennedy Space Center, Florida

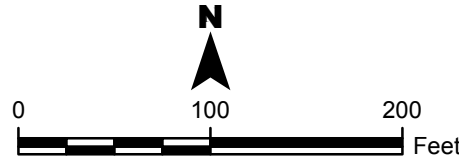
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- Legend**
- ◆ Shallow Monitoring Well (4-15 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (2.15) Groundwater Elevation Contour (NAVD88)

**Notes:**

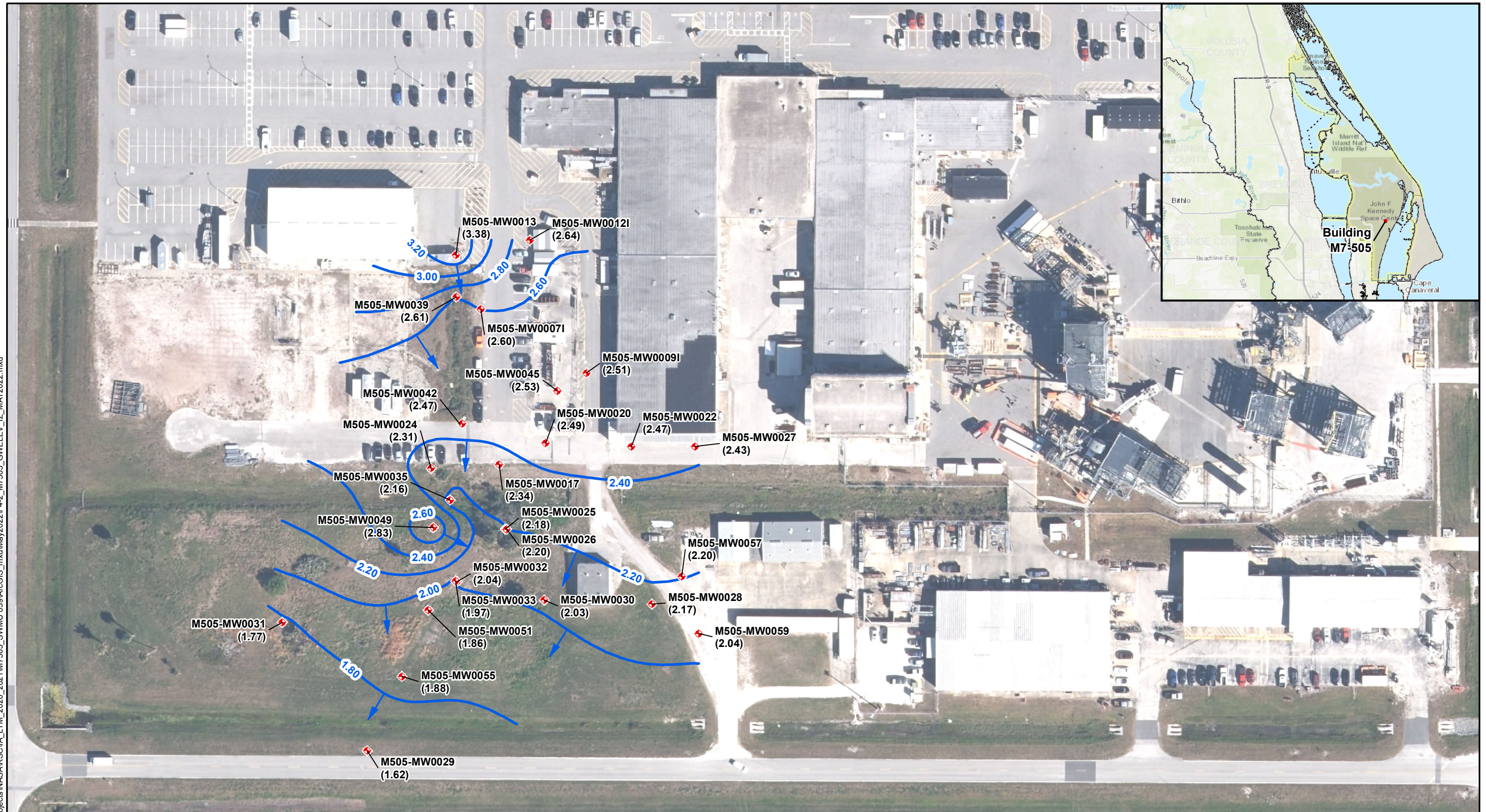
- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 11, 2022
- Groundwater Contour Interval = 0.20 ft
- ft bls = feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 4-1**  
**Shallow Zone Groundwater Elevation Map – May 2022**

2022 - Industrial Area Long Term Monitoring  
 Building M7-0505 Treatment Tank Area (M505)  
 SWMU 039  
 NASA Kennedy Space Center, Florida

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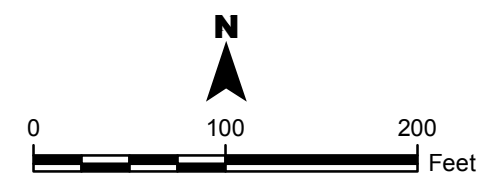


**Legend**

- ◆ Intermediate Monitoring Well (20-38.5 ft bsl)
- Groundwater Contour (NAVD88 ft)
- Approximate Direction of Groundwater Flow
- (1.62) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 11, 2022
- Groundwater Contour Interval = 0.20 ft
- ft bsl = feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 4-2**  
**Intermediate Zone Groundwater Elevation Map - May 2022**

2022 - Industrial Area Long Term Monitoring  
 Building M7-0505 Treatment Tank Area (M505)  
 SWMU 039  
 NASA Kennedy Space Center, Florida



## **5. HYPERGOL MAINTENANCE FACILITY HAZARDOUS WASTE SOUTH STAGING AREA**

This section provides a summary of the HMF South site (SWMU 070). Refer to **Figure 5** for a site map.

### **5.1 SITE DESCRIPTION AND HISTORY**

The HMF South site is located between F Avenue Southeast and G Avenue East, on the south side of 9<sup>th</sup> Street Southeast. The HMF site contained several buildings, mostly constructed in the early 1960s. Building M7-1410 and Pad M7-1460 were constructed in 1966. The Hazardous Waste Staging Shelter M7-1411 was constructed in 1985. The HMF site included both East and West hypergol storage buildings, a hazardous waste staging shelter, a hazardous waste staging area (formerly a liquid oxygen fuel pad), a former liquid hydrogen fuel pad, a pair of leaching ponds, and small equipment shelters.

The site was utilized to support the Apollo and space shuttle programs by conducting cryogenic testing for the Apollo space program and “hot-testing” of the solid rocket booster aft skirt. Spanning from 1981 to 1998, the Hazardous Waste Staging Area M7-1361 was a RCRA-permitted temporary storage and disposal facility. In accordance with RCRA requirements, the staging area closed in 1988. Accordingly, a RCRA Facility Assessment was conducted in 1999 to evaluate potential sources of contamination at the site, which included confirmation sampling. The results of these investigations identified concentrations of PCBs in surface soils exceeding the FDEP industrial soil cleanup target level (SCTL), and both trichlorofluoromethane (TCFM) and aluminum were detected at concentrations in groundwater exceeding their respective GCTLs (Geosyntec 2002a).

An RFI was conducted from 1999 through 2002, which delineated two small areas with PCB concentrations in soil exceeding the industrial SCTL (Geosyntec 2002a). Additionally, concentrations of TCFM, TCE, cis-1,2-DCE, VC, and aluminum were found in groundwater exceeding their respective GCTLs to a depth of 55 ft bls. A CMS was completed and recommended IM for site soil, which was performed in December 2003 with the removal 200 tons (4,700 cubic ft) of PCB-contaminated soil exceeding residential SCTLs. One location with arsenic concentrations exceeding the SCTL was ruled out using the 95% upper confidence limit (UCL). The study also evaluated groundwater remediation options (Geosyntec 2004a).

The HMF South site was mostly inactive during the early 2000s and was utilized for miscellaneous equipment storage. Buildings M7-1410 and M7-1460 were demolished in late 2005. The 2004 Statement of Basis recommended MNA of groundwater for aluminum and VC, and implementation of an AS treatment system to treat TCFM (NASA 2004b). The AS system was constructed and began operation in September 2005. Based on groundwater analytical

results, no further action (NFA) was approved for aluminum in September 2006 (Tetra Tech 2006).

Additional assessment activities were performed in October 2004, including the use of DPT, which resulted in a recommendation to expand the AS system. This expansion was completed in 2007 (Tetra Tech 2007a). After several years of monitoring, NFA was approved for VC in October 2010 (Tetra Tech 2010a).

In March 2013, the AS system was temporarily shut down, but after two quarterly monitoring events (September and December 2013), the AS system was restarted for another 5 months (February through July 2013). Quarterly groundwater monitoring was continued through September 2015 and the IA LTM program was added on a biennial LTM sampling frequency that started in 2016. Shortly thereafter in November 2016, the Hazardous Waste Staging Area M7-1361 and associated support structures at the site were demolished.

A historical review was completed in January 2023 to analyze past TCFM groundwater data at the site. The monitoring well network was extensively sampled between 2005 and 2015. In 2016, three monitoring wells (HMF-NLP-IW0004I, HMF-MW0005I, and HMF-MW0006I) remained in the sampling network as the site entered the LTM program, while the other monitoring wells in the network had many consecutive events below GCTLs and ceased sampling. Monitoring wells HMF-MW0005I and HMF-MW0006I were removed from the sampling network following the 2016 and 2018 sampling events, respectively, due to continued analyses below GCTLs. A historical data table, generated by Tetra Tech, for the 2016 Corrective Measures Implementation 10 year annual report is provided in **Appendix J**.

During the January 2023 historical review, two soil sample locations outside of the IM areas were found to have had PCB concentrations exceeding the FDEP Residential SCTL (1.0 mg/kg at M71361-SS2 and 0.67 mg/kg at M71410-SS2). A 95% UCL analysis was performed in March 2023. The 95% UCL calculated was 0.347 mg/kg, which is below the FDEP Residential SCTL of 0.5 mg/kg. The 95% UCL analysis results are provided in **Appendix K**.

## 5.2 FIELD ACTIVITIES

LTM field activities were conducted at HMF South in September 2021. Groundwater levels were obtained at six monitoring wells, and groundwater samples were collected from two monitoring wells. Monitoring well HMF-MW0007I was submerged during this sampling event, so the water level was not gauged. Monitoring well HMF-MW0006I was added back into the 2021 sampling schedule for site closure purposes as a downgradient well, and was replaced with HMF-MW0006IR due to excessive silt buildup in the screen interval (Jacobs-CORE 2019a). Monitoring well construction details are presented in the well installation report (HydroGeoLogic 2021). The following table shows the network of wells used for groundwater level measurements and sampling at HMF South.



Well ID	Screen Interval (ft bls)	Analysis
HMF-NLP-IW0001I	35-40	WL Only
HMF-NLP-IW0002I	37-42	WL Only
HMF-NLP-IW0003I	35.5-40.5	WL Only
HMF-NLP-IW0004I	35-40	WL + TCFM
HMF-MW0005I	35-40	WL Only
HMF-MW0006IR	35-40	WL + TCFM
HMF-MW0007I	35-40	WL Only (submerged)

ID = identification  
MW = monitoring well  
TCFM = TCFM analysis by Method 8260  
WL = water level measurement

The groundwater samples collected from HMF-NLP-IW0004I and HMF-MW0006IR were analyzed for TCFM by Method 8260. Below are the respective GCTL and NADC for the COC present at HMF.

COC	GCTL (µg/L)	NADC (µg/L)
TCFM	2,100	21,000

A field survey was completed in November 2022, in accordance with recommendations from the 2021 IA LTM Advanced Data Package (ADP), using a transit level to establish updated TOC elevations at HMF South. TOC and groundwater levels were measured at 10 intermediate monitoring wells. HMF-MW0006IR's established TOC elevation, surveyed by a professional surveyor, was used as the benchmark elevation to adjust the relative elevations captured in the field to NAVD88 elevations. The survey data is provided in **Appendix L**.

In addition to the seven monitoring wells within the LTM program listed in the table above, the following table shows three supplementary wells included in the survey. A complete list of the survey and groundwater level data collected in November 2022 is presented in **Table 5-1**.

Well ID	Screen Interval (ft bls)
HMF-M71411-IW0001D	40-45
HMF-MW0008I	35-40
HMF-MW0009I	35-40

### 5.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the September 2021 sampling event and November 2022 surveying event were used to calculate groundwater elevations presented in **Table 5-2**.

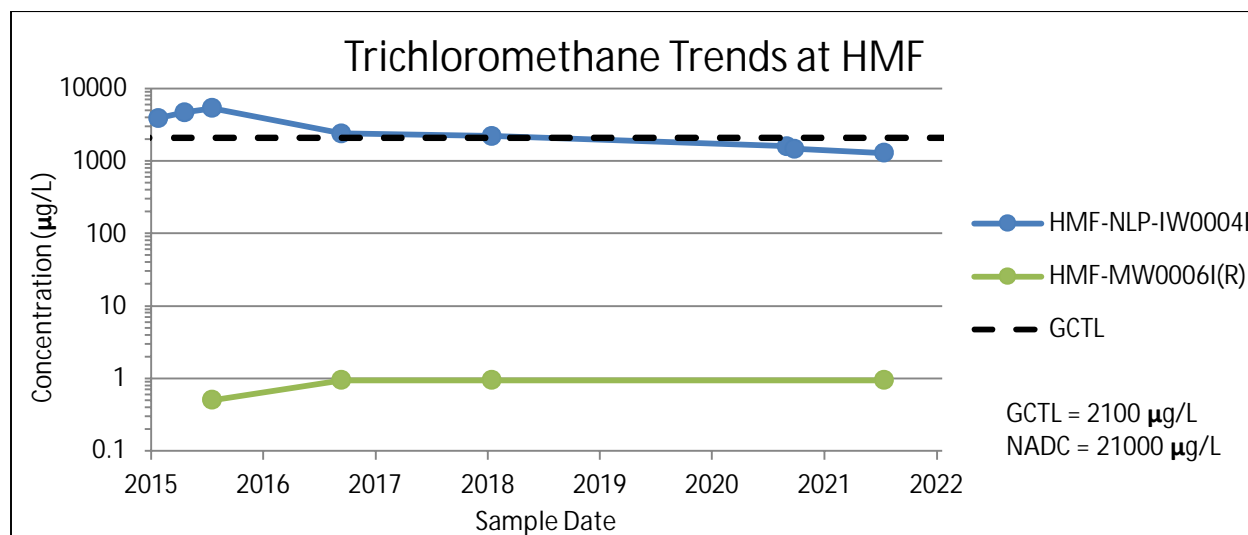
Groundwater elevations were calculated with the updated TOC data to determine the 2021 and 2022 groundwater contours and flow directions for the intermediate aquifer zone (35 ft bls to 45 ft bls) at HMF South, shown on **Figure 5-1** and **Figure 5-2**. The groundwater flow directions during the 2021 and 2022 events were both south to southeast; similar to the southeast flow direction historically reported at the site.

## 5.4 ANALYTICAL RESULTS

Groundwater samples were collected from monitoring wells HMF-NLP-IW0004I and HMF-MW0006IR in September 2021 for TCFM analysis. Concentrations of TCFM were below the GCTL at HMF-NLP-IW0004I (1,300 µg/L) and not detected at HMF-MW0006IR. A summary of recent and historical analytical results is presented in **Table 5-3**. Analytical results are depicted on **Figure 5-3**.

## 5.5 TREND ANALYSIS

Concentrations of TCFM have continued to decline at HMF-NLP-IW0004I since 2015, and have been below GCTLs since 2018. TCFM concentrations at HMF-MW0006IR continue to be non-detect since 2015.



## 5.6 CONCLUSION AND RECOMMENDATION

The updated TOC elevations confirm a south to southeast groundwater flow direction, similar to historical trends. TCFM concentrations at HMF South have shown a decreasing trend since 2015, and for the second consecutive sampling event, concentrations were below the GCTL in September 2021. TCFM concentrations continue to be non-detect at the downgradient monitoring well HMF-MW0006IR, and have historically been below GCTLs at the remaining HMF South monitoring wells. Therefore, long-term groundwater monitoring at HMF South is recommended to discontinue. The LUC for groundwater is recommended to be removed, and a Site Rehabilitation Completion Report is recommended to be completed for NFA without controls.

With FDEP agreement during the April 2023 KSCRT meeting (**Appendix A**), the HMF South monitoring well network was abandoned in May 2023 (HydroGeoLogic 2023) to support construction activities at the site.

**Table 5-1**  
**Hypergol Maintenance Facility Hazardous Waste South Staging Area - Long Term Monitoring (LTM)**  
**Top of Casing Elevation Survey - November 7, 2022**

Well ID	Screen Interval (ft bls)		Time Opened	Time Gauged	DTW (ft BTOC)	Relative Elevations (ft)	TOC Elevation (ft NAVD88)	Notes
HMF-M71411-IW0001I	16	21	11:12	12:20	5.63	3.53	6.38	Reported TOC = 7.71 no well cap or lid
HMF-M71411-IW0001D	40	45	11:13	12:18	5.62	3.44	6.47	Reported TOC = 7.83 no well cap
HMF-NLP-IW0001I	35	40	10:54	12:12	0.85	8.11	1.80	Reported TOC = 1.90
HMF-NLP-IW0002I	37	42	10:48	12:15	4.09	4.71	5.20	Reported TOC = 5.15 no manhole lid
HMF-NLP-IW0003I	35.5	40.5	10:49	12:14	2.99	5.88	4.03	Reported TOC = 4.18
HMF-NLP-IW0004I	35	40	10:30	11:45	3.64	5.19	4.72	Reported TOC = 1.87
HMF-MW0005I	35	40	10:34	11:47	2.97	5.77	4.14	Reported TOC = 4.65
HMF-MW0006IR	35	40	10:44	12:07	4.60	4.33	5.58	Benchmark well
HMF-MW0007I	35	40	10:46	12:09	0.24	8.97	0.94	Reported TOC = 0.96 no well cap
HMF-MW0008I	35	40	11:18	12:22	0.54	8.57	1.34	
HMF-MW0009I	35	40	10:43	12:05	1.78	6.97	2.94	no manhole lid

**Notes:**

bls = below land surface

BTOC = below top of casing

DTW = depth to water

ft = feet

HMF = Hypergol Maintenance Facility Hazardous Waste South Staging Area

HMF-MW0006IR used as benchmark elevation due to being professionally surveyed in January 2022 by Kugelmann Land Surveying, Inc.

HMF South monitoring wells abandoned in 2023 in preparation for construction activities at the site.

IW = investigation well

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

Reported TOC elevations obtained from KSC Remediation Information System.

TOC = top of casing

TOC elevation calculated using benchmark TOC elevation, benchmark relative elevation, and monitoring well relative elevation.

**Table 5-2  
Hypergol Maintenance Facility Hazardous Waste South Staging Area - Long Term Monitoring (LTM)  
Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	HMF-M71411-IW0001D		HMF-NLP-IW0001I		HMF-NLP-IW0002I	
<b>Screen Interval (ft bls):</b>	40 - 45		35 - 40		37 - 42	
<b>TOC Elevation (ft NAVD88):</b>	6.47		1.80		5.20	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	Not Measured		1.27	0.53	4.53	0.67
March 2018	Not Measured		1.00	0.80	4.60	0.60
November 2020	Not Measured		0.00	1.80	3.30	1.90
September 2021	Not Measured		0.73	1.07	3.55	1.65
November 2022	5.62	0.85	0.85	0.95	4.09	1.11

<b>INTERMEDIATE WELL ID:</b>	HMF-NLP-IW0003I		HMF-NLP-IW0004I		HMF-MW0005I	
<b>Screen Interval (ft bls):</b>	35.5 - 40.5		35 - 40		35 - 40	
<b>TOC Elevation (ft NAVD88):</b>	4.03		4.72		4.14	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	3.48	0.55	4.18	0.54	3.53	0.61
March 2018	3.60	0.43	4.35	0.37	3.42	0.72
November 2020	2.20	1.83	2.78	1.94	2.20	1.94
September 2021	5.10	-1.07	3.08	1.64	2.43	1.71
November 2022	2.99	1.04	3.64	1.08	2.97	1.17

<b>INTERMEDIATE WELL ID:</b>	HMF-MW0006IR		HMF-MW0007I		HMF-MW0008I	
<b>Screen Interval (ft bls):</b>	35 - 40		35 - 40		35 - 40	
<b>TOC Elevation (ft NAVD88):</b>	5.58		0.94		1.34	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2016	--		0.25	0.69	Not Measured	
March 2018	--		0.90	0.04	Not Measured	
November 2020	Not Installed		>TOC	Not Measured	Not Measured	
September 2021	4.08	1.50	>TOC	Not Measured	Not Measured	
November 2022	4.60	0.98	0.24	0.70	0.54	0.80

<b>INTERMEDIATE WELL ID:</b>	HMF-MW0009I	
<b>Screen Interval (ft bls):</b>	35 - 40	
<b>TOC Elevation (ft NAVD88):</b>	2.94	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2022	1.78	1.16

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

HMF = Hypergol Maintenance Facility Hazardous Waste South Staging Area

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 5-3**  
**Hypergol Maintenance Facility Hazardous Waste South Staging Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			TRICHLOROFLUOROMETHANE
FDEP GCTLs (µg/L)			2,100
FDEP NADCs (µg/L)			21,000
Location ID	Sample Date	Screened Interval (ft bls)	
<b>HMF-NLP-IW0004I</b>	8/25/2004	35 - 40	<b>360,000</b>
	9/8/2005	35 - 40	<b>396,000</b>
	10/26/2005	35 - 40	<b>23,500</b>
	12/1/2005	35 - 40	<b>21,200</b>
	12/28/2005	35 - 40	<b>54,700</b>
	1/25/2006	35 - 40	<b>49,700</b>
	2/28/2006	35 - 40	<b>9,230</b>
	3/28/2006	35 - 40	<b>27,200</b>
	4/25/2006	35 - 40	<b>34,800</b>
	5/25/2006	35 - 40	<b>2,380</b>
	6/21/2006	35 - 40	<b>17,000</b>
	7/26/2006	35 - 40	<b>40,600</b>
	9/1/2006	35 - 40	<b>6,370</b>
	9/28/2006	35 - 40	<b>48,900</b>
	10/25/2006	35 - 40	<b>25,700</b>
	11/29/2006	35 - 40	<b>21,400</b>
	12/28/2006	35 - 40	<b>12,500</b>
	1/31/2007	35 - 40	<b>45,800</b>
	2/27/2007	35 - 40	<b>65,300</b>
	3/29/2007	35 - 40	<b>36,200</b>
	4/30/2007	35 - 40	<b>8,180</b>
	5/31/2007	35 - 40	<b>583</b>
	6/28/2007	35 - 40	<b>19,500</b>
	7/31/2007	35 - 40	<b>67,000</b>
	8/28/2007	35 - 40	<b>13,000</b>
	9/26/2007	35 - 40	<b>24,000</b>
	11/28/2007	35 - 40	<b>4,590</b>
	1/31/2008	35 - 40	<b>2,580</b>
	3/27/2008	35 - 40	<b>5,220</b>
	5/28/2008	35 - 40	<b>9,330</b>
	7/29/2008	35 - 40	<b>953</b>
	9/25/2008	35 - 40	<b>437</b>
11/24/2008	35 - 40	<b>183</b>	
1/30/2009	35 - 40	<b>90.5</b>	
4/1/2009	35 - 40	<b>4,470</b>	
5/26/2009	35 - 40	<b>5,610</b>	
7/1/2009	35 - 40	<b>352</b>	
7/29/2009	35 - 40	<b>918</b>	
9/24/2009	35 - 40	<b>22,800</b>	
10/27/2009	35 - 40	<b>21,900</b>	
11/24/2009	35 - 40	<b>7,240</b>	
12/29/2009	35 - 40	<b>6,840</b>	
1/28/2010	35 - 40	<b>90.7</b>	

**Table 5-3**  
**Hypergol Maintenance Facility Hazardous Waste South Staging Area - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			TRICHLOROFLUOROMETHANE
FDEP GCTLs (µg/L)			2,100
FDEP NADCs (µg/L)			21,000
Location ID	Sample Date	Screened Interval (ft bls)	
<b>HMF-NLP-IW0004I</b> (continued)	2/24/2010	35 - 40	<b>529</b>
	3/31/2010	35 - 40	<b>107</b>
	5/27/2010	35 - 40	<b>507</b>
	7/27/2010	35 - 40	<b>3,350</b>
	8/31/2010	35 - 40	<b>3,100</b>
	9/23/2010	35 - 40	<b>3,670</b>
	12/29/2010	35 - 40	<b>2,750</b>
	3/24/2011	35 - 40	<b>1,190</b>
	6/22/2011	35 - 40	<b>2,940</b>
	9/15/2011	35 - 40	<b>7,210</b>
	12/16/2011	35 - 40	<b>9,660</b>
	3/29/2012	35 - 40	<b>723</b>
	6/21/2012	35 - 40	<b>9,250</b>
	11/20/2012	35 - 40	<b>166</b>
	12/27/2012	35 - 40	<b>76.4</b>
	3/27/2013	35 - 40	<b>272</b>
	6/27/2013	35 - 40	<b>1,480</b>
	9/26/2013	35 - 40	<b>6,730</b>
	12/19/2013	35 - 40	<b>10,300</b>
	2/13/2014	35 - 40	<b>14,600</b>
	3/27/2014	35 - 40	<b>26.0</b>
	7/10/2014	35 - 40	<b>123</b>
	9/23/2014	35 - 40	<b>3,370</b>
	12/23/2014	35 - 40	<b>75.1</b>
	3/31/2015	35 - 40	<b>3,910</b>
	6/25/2015	35 - 40	<b>4,670</b>
	9/23/2015	35 - 40	<b>5,410</b>
11/18/2016	35 - 40	<b>2,400</b>	
3/22/2018	35 - 40	<b>2,200</b>	
11/10/2020	35 - 40	<b>1,590</b>	
12/4/2020	35 - 40	<b>1,470</b>	
9/22/2021	35 - 40	<b>1,300</b>	
<b>HMF-MW0006I</b>	9/8/2005	35 - 40	2 U
	10/26/2005	35 - 40	<b>41.7</b>
	12/1/2005	35 - 40	<b>3.4</b>
	12/28/2005	35 - 40	<b>15.1</b>
	1/25/2006	35 - 40	<b>17.5</b>
	2/28/2006	35 - 40	<b>9.8</b>
	3/28/2006	35 - 40	<b>5.0</b>
	4/25/2006	35 - 40	<b>2.3</b>
	5/25/2006	35 - 40	<b>0.7</b>
	6/21/2006	35 - 40	0.5 U
7/26/2006	35 - 40	0.5 U	

**Table 5-3  
Hypergol Maintenance Facility Hazardous Waste South Staging Area - Long Term Monitoring (LTM)  
Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			TRICHLOROFLUOROMETHANE
FDEP GCTLs (µg/L)			2,100
FDEP NADCs (µg/L)			21,000
Location ID	Sample Date	Screened Interval (ft bls)	
<b>HMF-MW0006I</b> (Continued)	9/1/2006	35 - 40	0.5 U
	9/28/2006	35 - 40	<b>2.7</b>
	10/25/2006	35 - 40	2.7 U
	11/29/2006	35 - 40	2.7 U
	12/28/2006	35 - 40	<b>1.6 I</b>
	1/31/2007	35 - 40	0.5 U
	2/27/2007	35 - 40	0.5 U
	3/29/2007	35 - 40	0.5 U
	4/30/2007	35 - 40	<b>4.0</b>
	5/31/2007	35 - 40	<b>5.8</b>
	6/28/2007	35 - 40	0.5 U
	7/31/2007	35 - 40	<b>69.7</b>
	8/28/2007	35 - 40	<b>2.1</b>
	9/26/2007	35 - 40	<b>2.6</b>
	11/28/2007	35 - 40	<b>2.2</b>
	1/31/2008	35 - 40	<b>2.1</b>
	3/27/2008	35 - 40	<b>5.2</b>
	9/25/2008	35 - 40	<b>4.5</b>
	4/1/2009	35 - 40	<b>1.4 I</b>
	9/24/2009	35 - 40	<b>1.0 I</b>
3/31/2010	35 - 40	0.4 U	
9/23/2010	35 - 40	<b>2.6</b>	
9/15/2011	35 - 40	0.5 U	
9/26/2013	35 - 40	0.5 U	
9/23/2014	35 - 40	<b>14.1</b>	
9/23/2015	35 - 40	0.5 U	
11/18/2016	35 - 40	0.94 U	
3/22/2018	35 - 40	0.94 U	
<b>HMF-NLP-MW0006IR</b>	9/22/2021	35 - 40	0.94 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

HMF = Hypergol Maintenance Facility Hazardous Waste South Staging Area

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected





The numeric value presented for non-detects is the sample-specific reporting detection limit



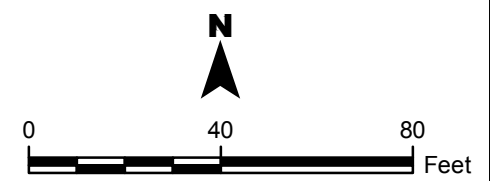
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F AVE SE

**Legend**

-  Monitoring Well (LTM)
-  Monitoring Well (LTM-Water Level Only)
-  Monitoring Well (Non-LTM)
-  Monitoring Well - Abandoned

- Notes:**
- (35-40) = Monitoring well screen interval in feet below land surface
  - SWMU = Solid Waste Management Unit
  - LTM = Long Term Monitoring
  - Aerial Source: FDOT 2018

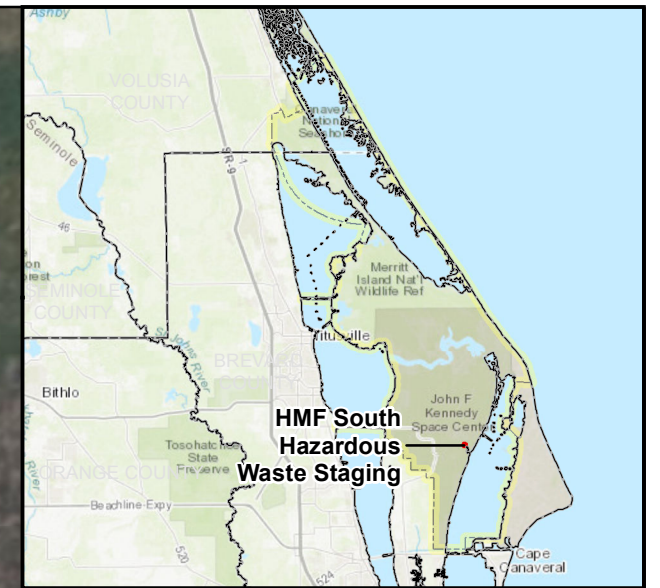


**FIGURE 5  
Site Map**







2022 - Industrial Area Long Term Monitoring  
 Hypergol Maintenance Facility South (HMF South)  
 SWMU 070  
 NASA Kennedy Space Center, Florida



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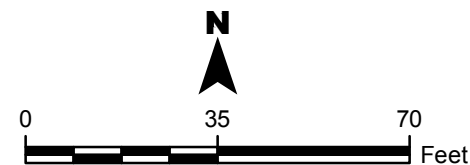


**Legend**

-  Monitoring Well (LTM)
-  Monitoring Well (LTM-Water Level Only)
-  Monitoring Well (Non-LTM)
-  Groundwater Contour (NAVD88 ft)
-  Approximate Direction of Groundwater Flow
-  (1.50) Groundwater Elevation (NAVD88 ft)

Notes:

- Vertical Datum is NAVD88 (US Foot)
- Monitoring wells were gauged in September 2021
- Groundwater Contour Interval = 0.05 ft
- \* = Not used in contouring
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- LTM = Long Term Monitoring
- Aerial Source: FDOT 2018



**FIGURE 5-1**  
**Groundwater Elevation Map - September 2021**  
 2021 - Industrial Area Long Term Monitoring  
 Hypergol Maintenance Facility South (HMF South)  
 SWMU 070  
 NASA Kennedy Space Center, Florida

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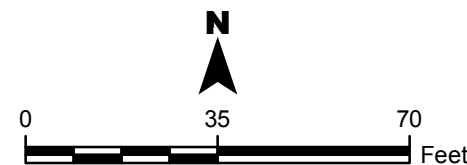
**Legend**

- Monitoring Well (LTM)
- Monitoring Well (LTM-Water Level Only)
- Monitoring Well (Non-LTM)

- Groundwater Contour (NAVD88 ft)
- Approximate Direction of Groundwater Flow
- (0.98) Groundwater Elevation (NAVD88 ft)

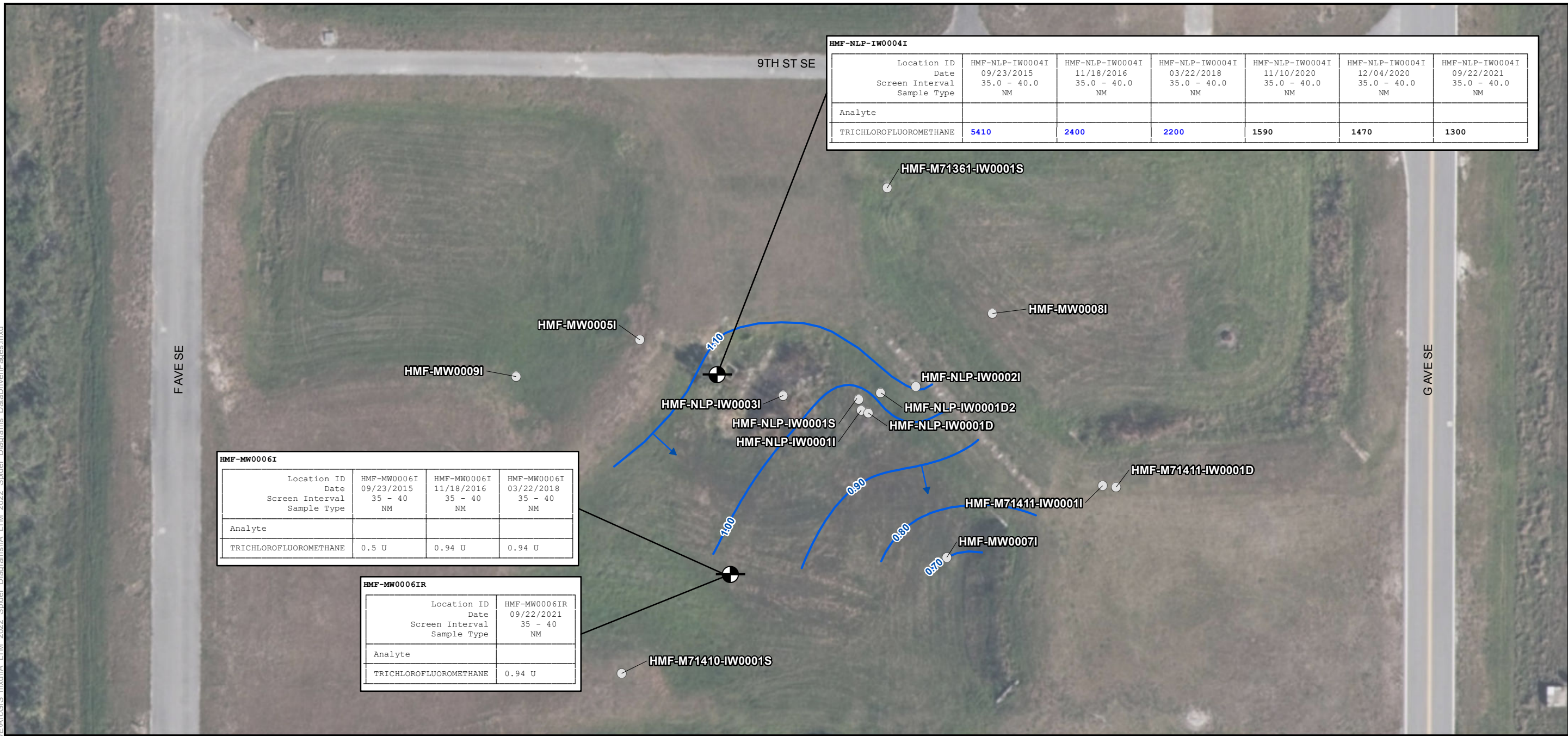
**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring wells were gauged in November 2022
- Groundwater Contour Interval = 0.10 ft
- \* = Not used in contouring
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- LTM = Long Term Monitoring
- Aerial Source: FDOT 2018



**FIGURE 5-2**  
**Groundwater Elevation Map - November 2022**

2022 - Industrial Area Long Term Monitoring  
 Hypergol Maintenance Facility South (HMF South)  
 SWMU 070  
 NASA Kennedy Space Center, Florida



HMF-NLP-IW0004I						
Location ID	HMF-NLP-IW0004I	HMF-NLP-IW0004I	HMF-NLP-IW0004I	HMF-NLP-IW0004I	HMF-NLP-IW0004I	HMF-NLP-IW0004I
Date	09/23/2015	11/18/2016	03/22/2018	11/10/2020	12/04/2020	09/22/2021
Screen Interval	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0	35.0 - 40.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TRICHLOROFLUOROMETHANE	<b>5410</b>	<b>2400</b>	<b>2200</b>	<b>1590</b>	<b>1470</b>	<b>1300</b>

HMF-MW0006I			
Location ID	HMF-MW0006I	HMF-MW0006I	HMF-MW0006I
Date	09/23/2015	11/18/2016	03/22/2018
Screen Interval	35 - 40	35 - 40	35 - 40
Sample Type	NM	NM	NM
Analyte			
TRICHLOROFLUOROMETHANE	0.5 U	0.94 U	0.94 U

HMF-MW0006IR	
Location ID	HMF-MW0006IR
Date	09/22/2021
Screen Interval	35 - 40
Sample Type	NM
Analyte	
TRICHLOROFLUOROMETHANE	0.94 U

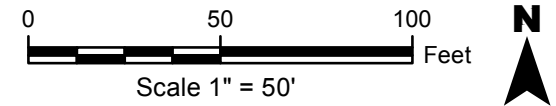
Analyte	GCTL
TRICHLOROFLUOROMETHANE	<b>2100</b>

**Legend**

- Intermediate LTM Well, Sample Results Below GCTL
- Non-LTM, No Sample Results
- Intermediate Groundwater Elevation Contours - November 2022
- Direction of Groundwater Flow

**Notes:**

1. LTM = Long Term Monitoring
2. MW = Monitoring Well
3. NM = Normal Sample
4. SWMU = Solid Waste Management Unit
5. All results and screening criteria presented in µg/L.
6. U = Result was below the laboratory Method Detection Limit (MDL).
7. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
8. **Bolded** results indicate the presence of an analyte at the specified concentration.
9. **Blue** font indicates an exceedance of FDEP GCTLs.
10. Aerial Source: ESRI 2018.
11. Depth of monitoring well screen interval is presented in feet below land surface.



**FIGURE 5-3**  
**Groundwater Sampling Analytical Results**  
  
 2022 - Industrial Area Long Term Monitoring  
 Hypergol Maintenance Facility South (HMF South)  
 SWMU 070  
 NASA Kennedy Space Center, Florida

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## 6. OPERATIONS AND CHECKOUT BUILDING

This section provides a summary of the O&C Building site (SWMU 076). Refer to **Figure 6** for a site map.

### 6.1 SITE DESCRIPTION AND HISTORY

The O&C Building located to the east of D Avenue Southeast and south of NASA Parkway East is comprised of the O&C Building, support structures, and adjacent storage areas. The O&C building, constructed in the early 1960s to support space flight operations, contains offices, laboratories, former astronaut quarters, and an assembly and test bay. The O&C assembly and test bay were used to assemble and test the Apollo Spacecraft from the 1960s through the 1970s. When the Apollo Space Program ended, the assembly and test bay were converted to process Space Shuttle payloads and for testing of the International Space Station components (NASA 2004c).

Site assessment and confirmatory sampling activities were conducted in the late 1990s and confirmed the presence of VC in groundwater located north of the O&C Building. A SWMU Assessment was performed in 2001, which confirmed the presence of VC and iron above GCTLs in the groundwater (Geosyntec 2002b). In 2003, an RFI and risk evaluation were conducted that identified VC and iron as potentially causing an unacceptable human health risk if groundwater was to be used as a source of drinking water. To address contaminant concentrations that exceeded GCTLs, MNA of groundwater was selected to reduce VC and iron concentrations (NASA 2004a). Annual LTM of groundwater commenced at O&C in 2004. In 2012, the sampling schedule transitioned to what is now the current biennial groundwater sampling schedule. Of note, in August 2004, consensus was reached that iron would not be monitored at the existing SWMUs due to there being no potential source for iron. Thus, iron was eliminated as a COC at O&C (Geosyntec 2004b).

### 6.2 FIELD ACTIVITIES

Field activities were performed at O&C in May 2022. Groundwater levels were obtained at four monitoring wells, and groundwater samples were collected from two monitoring wells. Monitoring well O\_C-MW0007I was installed in September 2021, in accordance with recommendations from the 2019-2020 IA LTM Report, to verify downgradient delineation. Monitoring well construction details are presented in the well installation report (HydroGeoLogic 2021). The following table shows the network of monitoring wells used for groundwater level measurements and sampling at O&C.

Well ID	Screen Interval (ft bls)	Analysis
O_C-MW0003I	30-35	WL Only
O_C-MW0004I	30-35	WL Only
O_C-MW0005I	40-45	WL + VC
O_C-MW0007I	40-45	WL + VC

ID = identification  
 MW = monitoring well  
 VC = vinyl chloride analysis by Method 8260  
 WL = water level measurement

The groundwater samples collected from O\_C-MW0005I and O\_C-MW0007I were analyzed for VC by Method 8260. Below are the GCTL and NADC for the COC present at O&C.

COC	GCTL (µg/L)	NADC (µg/L)
VC	1	100

### 6.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

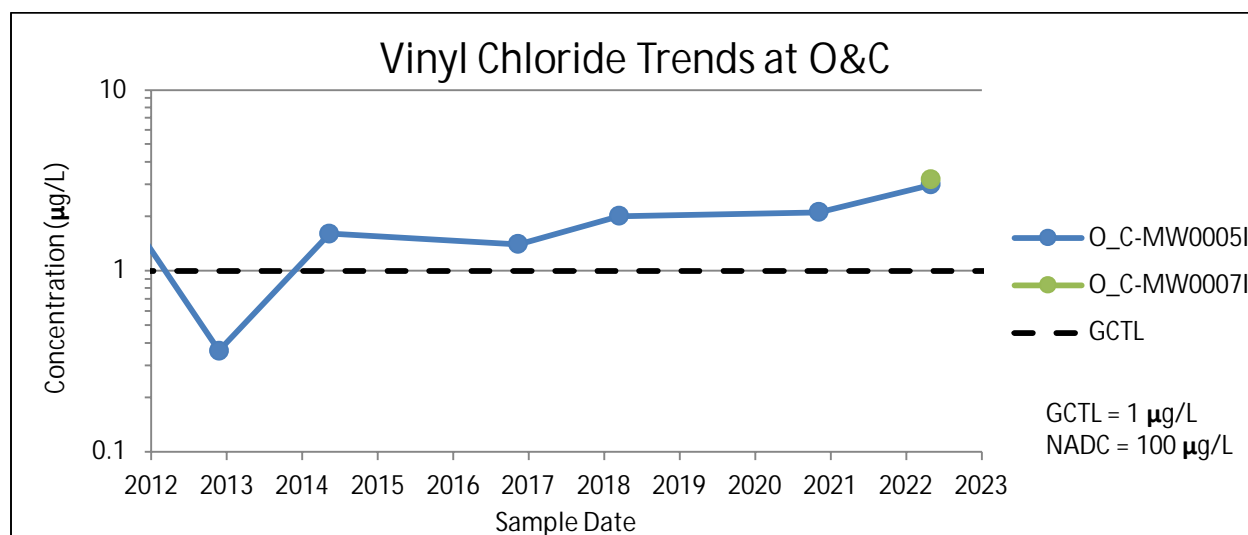
Groundwater levels collected during the May 2022 sampling event were used to calculate groundwater elevations presented in **Table 6-1**. Groundwater elevations were used to determine the contours and flow direction for the intermediate aquifer zone (30 ft bls to 45 ft bls) at O&C, shown on **Figure 6-1**. The flow direction during the May 2022 sampling event was toward the northeast, which is consistent with the observed historical groundwater flow at O&C.

### 6.4 ANALYTICAL RESULTS

In May 2022, VC was detected at concentrations exceeding the GCTL in monitoring well O\_C-MW0005I (3.0 µg/L) and O\_C-MW0007I (3.2 µg/L). A summary of the analytical results is presented in **Table 6-2**. **Figure 6-2** depicts the analytical results for monitoring wells O\_C-MW0005I and O\_C-MW0007I.

### 6.5 TREND ANALYSIS

Low-level VC concentrations at monitoring well O\_C-MW0005I have exceeded the GCTL since 2014.



**6.6 CONCLUSION AND RECOMMENDATION**

VC concentrations in monitoring wells O\_C-MW0005I and O\_C-MW0007I exceed the GCTL. Biennial sampling is recommended to continue at O&C with the addition of downgradient monitoring well O\_C-MW0006I for groundwater levels and VC analysis. The following table shows the recommended monitoring wells for groundwater level measurements and groundwater sampling for the next sampling event at O&C scheduled for November 2024.

Well ID	Screen Interval (ft bls)	Analysis
O_C-MW0003I	30-35	WL Only
O_C-MW0004I	30-35	WL Only
O_C-MW0005I	40-45	WL + VC
O_C-MW0006I	30-35	WL + VC
O_C-MW0007I	40-45	WL + VC

ID = identification  
MW = monitoring well  
VC = vinyl chloride analysis by Method 8260  
WL = water level measurement

**Table 6-1  
Operations and Checkout Building - Long Term Monitoring (LTM)  
Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	O_C-MW0003I		O_C-MW0004I		O_C-MW0005I	
<b>Screen Interval (ft bls):</b>	30 - 35		30 - 35		40 - 45	
<b>TOC Elevation (ft NAVD88):</b>	9.87		8.41		9.30	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	7.83	2.04	6.96	1.45	7.82	1.48
November 2016	7.23	2.64	6.50	1.91	7.40	1.90
March 2018	7.98	1.89	7.1	1.31	8.08	1.22
November 2020	6.81	3.06	6.18	2.23	7.07	2.23
May 2022	7.58	2.29	6.88	1.53	7.88	1.42

<b>INTERMEDIATE WELL ID:</b>	O_C-MW0007I	
<b>Screen Interval (ft bls):</b>	40 - 45	
<b>TOC Elevation (ft NAVD88):</b>	5.95	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2022	4.76	1.19

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

O\_C = Operations and Checkout Building

TOC = top of casing



**Table 6-2**  
**Operations and Checkout Building - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>O_C-MW0005I</b>	1/31/2003	40 - 45	<b>2.6</b>
	10/5/2004	40 - 45	<b>1.4</b>
	6/2/2005	40 - 45	0.43 U
	11/14/2005	40 - 45	<b>1.8</b>
	5/22/2006	40 - 45	<b>2.2</b>
	11/6/2006	40 - 45	<b>1.6</b>
	5/7/2007	40 - 45	<b>2.2</b>
	11/8/2007	40 - 45	<b>2.0</b>
	5/2/2008	40 - 45	<b>1.8</b>
	11/3/2008	40 - 45	<b>1.7</b>
	5/13/2009	40 - 45	<b>1.5</b>
	11/9/2009	40 - 45	<b>1.2</b>
	5/17/2010	40 - 45	<b>1.1</b>
	11/9/2010	40 - 45	0.22 U
	5/4/2011	40 - 45	<b>0.713 I</b>
	11/1/2011	40 - 45	<b>1.66</b>
	11/26/2012	40 - 45	0.36 U
	5/16/2014	40 - 45	<b>1.6</b>
11/15/2016	40 - 45	<b>1.4</b>	
3/19/2018	40 - 45	<b>2.0</b>	
11/11/2020	40 - 45	<b>2.1</b>	
5/9/2022	40 - 45	<b>3.0</b>	
<b>O_C-MW0007I</b>	5/9/2022	40 - 45	<b>3.2</b>

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

O\_C = Operations and Checkout Building

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

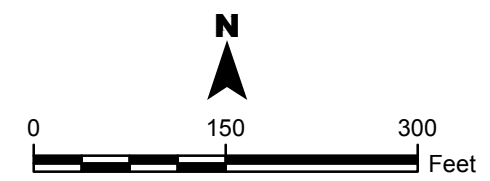
The numeric value presented for non-detects is the sample-specific reporting detection limit



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- Legend**
- Monitoring Well (LTM)
  - Monitoring Well (LTM - Water Level Only)
  - Monitoring Well (Non - LTM)
  - SSPF Site Monitoring Well





- Notes:**
- (30-35) = Monitoring well screen interval in feet below land surface
  - Long Term Monitoring (LTM)
  - SWMU = Solid Waste Management Unit
  - LTM = Long Term Monitoring
  - SSPF = Space Station Processing Facility
  - Aerial Source: FDOT 2018



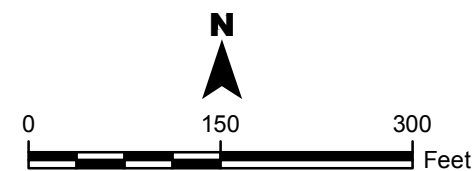
**FIGURE 6**  
**Site Map**  
 2022 - Industrial Area Long Term Monitoring  
 Operation and Checkout Building (O&C)  
 SWMU 076  
 NASA Kennedy Space Center, Florida



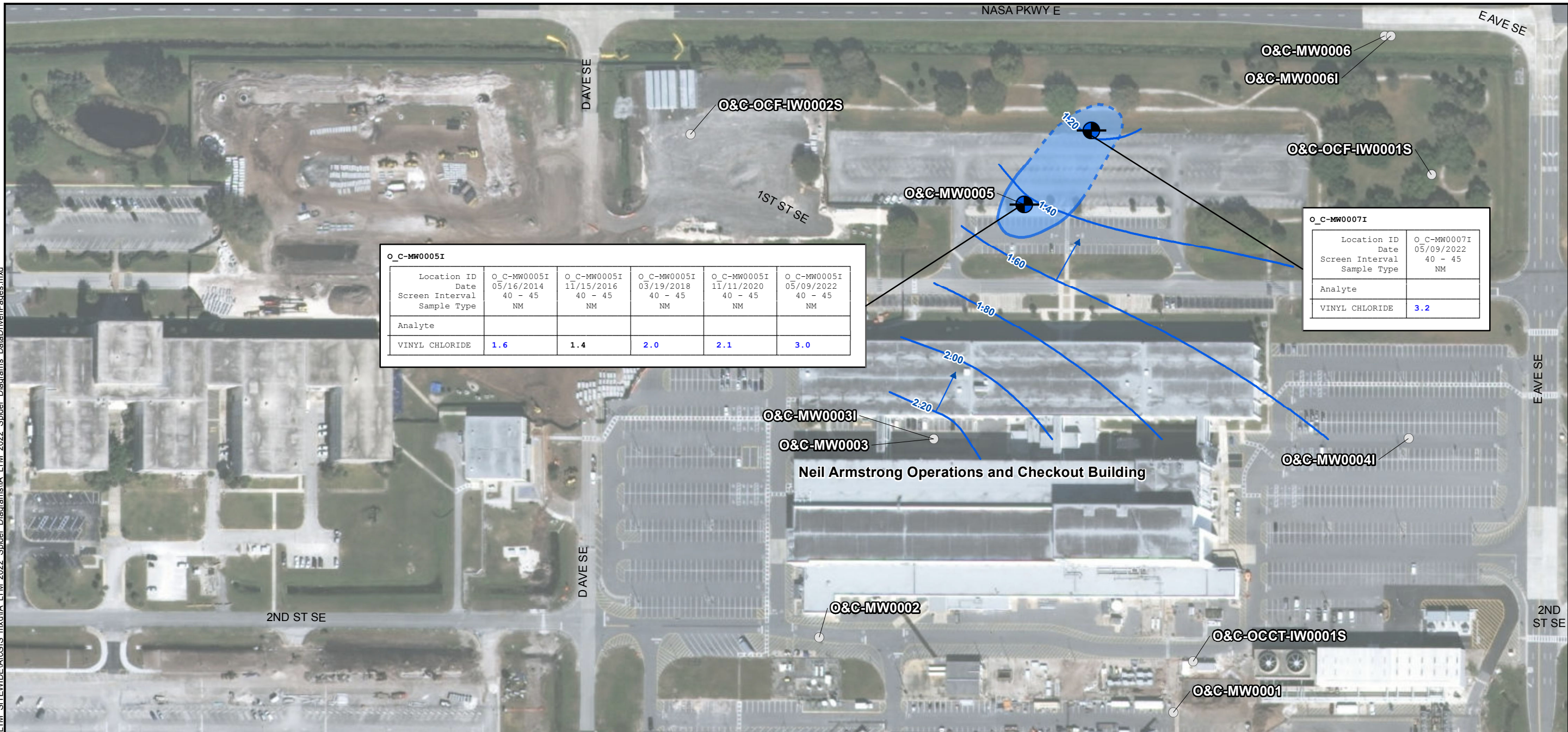
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- Legend**
-  Monitoring Well (LTM)
  -  Groundwater Contour (NAVD88 ft)
  -  Approximate Direction of Groundwater Flow
  -  (2.29) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US foot)
  - Monitoring Wells Were Gauged on May 9, 2022
  - Groundwater Contour Interval = 0.20 ft
  - LTM = Long Term Monitoring
  - SWMU = Solid Waste Management Unit
  - Aerial Source: FDOT 2018



**FIGURE 6-1**  
**Groundwater Elevation Map - May 2022**  
 2022 - Industrial Area Long Term Monitoring  
 Operation and Checkout Building (O&C)  
 SWMU 076  
 NASA Kennedy Space Center, Florida



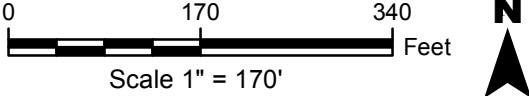
O_C-MW0005I					
Location ID	O_C-MW0005I	O_C-MW0005I	O_C-MW0005I	O_C-MW0005I	O_C-MW0005I
Date	05/16/2014	11/15/2016	03/19/2018	11/11/2020	05/09/2022
Screen Interval	40 - 45	40 - 45	40 - 45	40 - 45	40 - 45
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	<b>1.6</b>	<b>1.4</b>	<b>2.0</b>	<b>2.1</b>	<b>3.0</b>

O_C-MW0007I	
Location ID	O_C-MW0007I
Date	05/09/2022
Screen Interval	40 - 45
Sample Type	NM
Analyte	
VINYL CHLORIDE	<b>3.2</b>

Analyte	GCTL
VINYL CHLORIDE	<b>1</b>

- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - May 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling (Dashed Where Inferred)

- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  7. **Bolded** results indicate the presence of an analyte at the specified concentration.
  8. **Blue** font indicates an exceedance of FDEP GCTLs.
  9. Aerial Source: ESRI 2018.
  10. Depth of monitoring well screen interval is presented in feet below land surface.



**FIGURE 6-2**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Operation and Checkout Building (OC)  
 SWMU 076  
 NASA Kennedy Space Center, Florida

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## 7. VERTICAL PROCESSING FACILITY

This section provides a summary of the VPF site (SWMU 077). Refer to **Figure 7** for a site map.

### 7.1 SITE DESCRIPTION AND HISTORY

The VPF is located north of 10<sup>th</sup> Street Southeast and approximately 600 feet west of Banana River Drive Northeast. VPF was constructed to support the manned spaceflight programs. Once the Space Shuttle Program began, VPF was utilized for staging and processing of flight payloads. In 2010, the VPF Building (M7-1469) was demolished toward the conclusion of the Space Shuttle Program. In the fall of 2012, a mobile office building (Facility M7-1470A) and associated antenna arrays were installed as part of the Ka-Band Objects Observation and Monitoring Project, which develops techniques required to track and characterize Near Earth Objects (Geosyntec 2018b).

In 2005, based on historical operations, an RFI was performed and identified groundwater CVOCs, specifically TCE, cis-DCE, and VC, above their respective GCTLs (HSW 2005). In 2005, a bioremediation IM was conducted to address the groundwater exceedances (Geosyntec 2005b). The bioremediation IM consisted of both biostimulation, using potassium lactate, and bioaugmentation, using a microbial culture capable of complete dechlorination. These agents were injected through an injection well network. Based on the associated performance monitoring, it was concluded that there was another source of TCE beyond the initial treatment area.

The 2005 RFI also identified the presence of soils exceeding residential, industrial, and ecological SCTLs for arsenic, copper, and PAHs. RFI addendum soil sampling activities concluded PAH and B(a)P equivalents were below leachability criteria via SPLP analysis, arsenic, cadmium, and thallium were below SCTLs, and copper and chromium exceeded residential SCTLs. NFA was recommended for the constituents below SCTLs while IM activities were recommended for copper and chromium impacted areas. IM activities were performed in 2009 and resulted in NFA for soils at VPF without LUCs (Tetra Tech 2010b).

In 2009 and 2010, additional site groundwater assessment activities delineated areas of COCs that exceeded their respective GCTLs and NADCs. Based on these results, AS treatment was selected to address the groundwater CVOC impacts at the site with a goal for the system to reduce CVOC concentrations to below their respective NADCs (Geosyntec 2011).

In April 2012, the AS system was installed and began operation. The AS system achieved CVOC concentration reduction to below respective NADCs in 6 months. Due to its quick success, the AS system continued operation to treat CVOCs exceeding their respective GCTLs. After a year of operation, the AS system was shut down temporarily until funding was allotted for system expansion. The AS system was expanded and then restarted in September 2014. After a year of

operation of the expanded AS system, CVOCs were below their respective GCTLs in the sampled wells except for one monitoring well (VPF-MW0022), which contained TCE above its GCTL. A decision was made to operate the AS system for an additional 6 months; however, monitoring well VPF-MW0022 contained TCE at a concentration that remained above the GCTL. The AS system was shut down and transported off-site in March 2016 (Geosyntec 2018b).

Supplemental assessment was performed in the vicinity of monitoring well VPF-MW0022 to delineate the remaining CVOC plume. Based on the supplemental assessment results, it was concluded that air sparge well ASW22 likely had a cracked screen. The well was replaced, and the AS system was reactivated in May 2017. Though intended to be operated for a full year, the AS system's compressor failed, causing a permanent shut down in October 2017. When the shutdown occurred, TCE exceeded its GCTL at two monitoring wells (VHF-MW0022 and VHF-MW0027) and VC exceeded its GCTL at one monitoring well (VHF-IW0008I). In March 2018, based on these limited GCTLs exceedances, KSCRT transitioned VPF into the IA LTM Program on an annual sampling frequency, alternating between wet and dry seasons. VPF transitioned to a biennial sampling frequency in 2020.

## 7.2 FIELD ACTIVITIES

Field activities were performed at VPF in May 2022. Groundwater levels were measured at 34 monitoring wells. Samples were collected from six monitoring wells. The following table shows the network of wells used for groundwater level measurements and sampling at VPF.

Well ID	Screen Interval (ft bls)	Analysis
VPF-IW0001S	3-13	WL Only
VPF-IW0002I	22-27	WL Only
VPF-IW0002S	5-15	WL Only
VPF-IW0003I	22-27	WL Only
VPF-IW0003S	5-15	WL Only
VPF-IW0004I	22-27	WL Only
VPF-IW0004S	5-15	WL Only
VPF-IW0005S	3-13	WL Only
VPF-IW0006S	3-13	WL Only
VPF-IW0007I	15-25	WL Only
VPF-IW0008D	43-48	WL Only
VPF-IW0008I	15-25	WL + Select VOCs
VPF-IW0009I	15-25	WL Only
VPF-IW0010I	15-25	WL Only
VPF-IW0011I	15-25	WL Only
VPF-IW0012I	15-25	WL Only
VPF-IW0013I	15-25	WL Only
VPF-IW0014I	15-25	WL Only
VPF-IW0015I	15-25	WL Only

Well ID	Screen Interval (ft bls)	Analysis
VPF-IW0016I	15-25	WL Only
VPF-IW0017I	15-25	WL Only
VPF-IW0018I	18-28	WL + Select VOCs
VPF-MW0020	15-25	WL Only
VPF-MW0021	25-35	WL + Select VOCs
VPF-MW0022	5-15	WL + Select VOCs
VPF-MW0023	15-25	WL Only
VPF-MW0024	35-45	WL Only
VPF-MW0025	35-45	WL + Select VOCs
VPF-MW0026	35-45	WL Only
VPF-MW0027	35-45	WL + Select VOCs
VPF-MW0028	25-35	WL Only
VPF-MW0029	15-25	WL Only
VPF-MW0030	25-35	WL Only
VPF-MW0031	35-45	WL Only

ID = identification

MW = monitoring well

Select VOCs = TCE, cis-1,2-DCE, and VC analysis by Method 8260

WL = water level measurement

Groundwater samples collected during the May 2022 sampling event were analyzed for select VOCs by Method 8260. Below are the respective GCTLs and NADCs for the COCs present at VPF.

COC	GCTL (µg/L)	NADC (µg/L)
TCE	3	300
cis-1,2-DCE	70	700
VC	1	100

### 7.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the May 2022 sampling event were used to calculate groundwater elevations presented in **Table 7-1**. The shallow aquifer zone (3 ft bls to 15 ft bls) flow direction was similar to the historical radial flow pattern that is centered around the middle of the site; although, the radial flow was centered over the western side of the site in 2022. The intermediate aquifer zone (15 ft bls to 35 ft bls) flow directions were generally north with a small radial mound centered around VPF-MW0029 and VPF-MW0030. Typically, groundwater flow direction in the intermediate aquifer has been radial from the central portion of the VPF. The deep aquifer zone (35 to 48 ft bls) flow directions were generally southward toward a depression near monitoring well VFP-MW0027. Shallow, intermediate, and deep aquifer flow maps are depicted on **Figure 7-1**, **Figure 7-2**, and **Figure 7-3**, respectively.

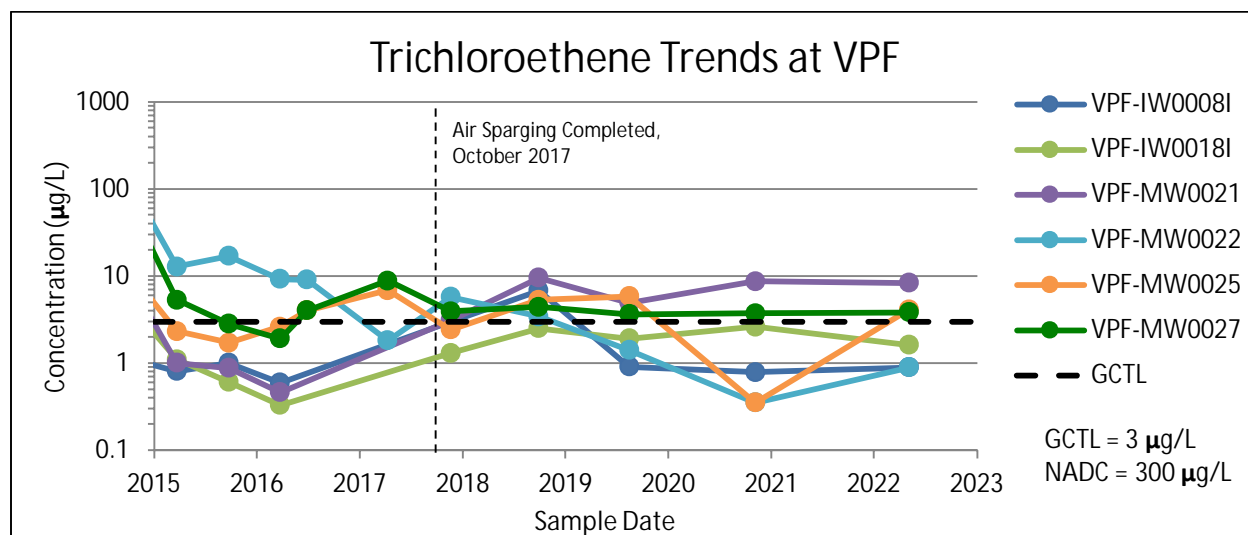
## 7.4 ANALYTICAL RESULTS

Groundwater was sampled from six monitoring wells in May 2022. TCE was detected at concentrations above the GCTL in monitoring wells VPF-MW0021 (8.3 µg/L), VPF-MW0025 (4.1 µg/L), and VPF-MW0027 (3.8 µg/L). No concentrations of cis-1,2-DCE were detected above the GCTL. VC was detected at concentrations above the GCTL in monitoring wells VPF-IW0018I (1.5 µg/L) and VPF-MW0022 (5.1 µg/L). A summary of the available analytical data at the sampled wells from 2003 to present is presented in **Table 7-2**. Analytical results are depicted on **Figure 7-7**.

## 7.5 TREND ANALYSIS

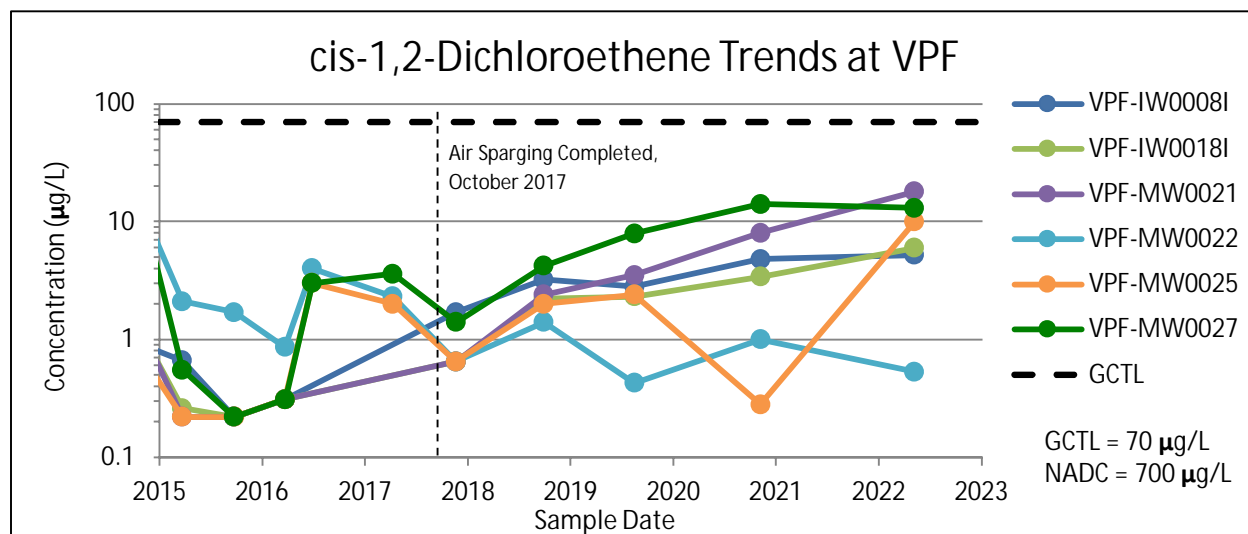
After the AS system termination in October 2017, four intermediate aquifer monitoring wells (VPF-IW0008I, VPF-IW0018I, VPF-MW0021, and VPF-MW0025) showed an initial rebound in TCE concentrations. TCE concentrations have remained stable in monitoring well VPF-MW0027, and have decreased in monitoring wells VPF-MW0008I and VPF-MW0022. Similarly, since the 2017 AS system shutdown, VC concentrations showed initial rebound in two intermediate aquifer monitoring wells (VPF-IW0008I and VPF-IW0018I) in addition to shallow aquifer monitoring well VPF-MW0022.

The following trend chart presents the concentration trends for TCE at select wells since 2015.

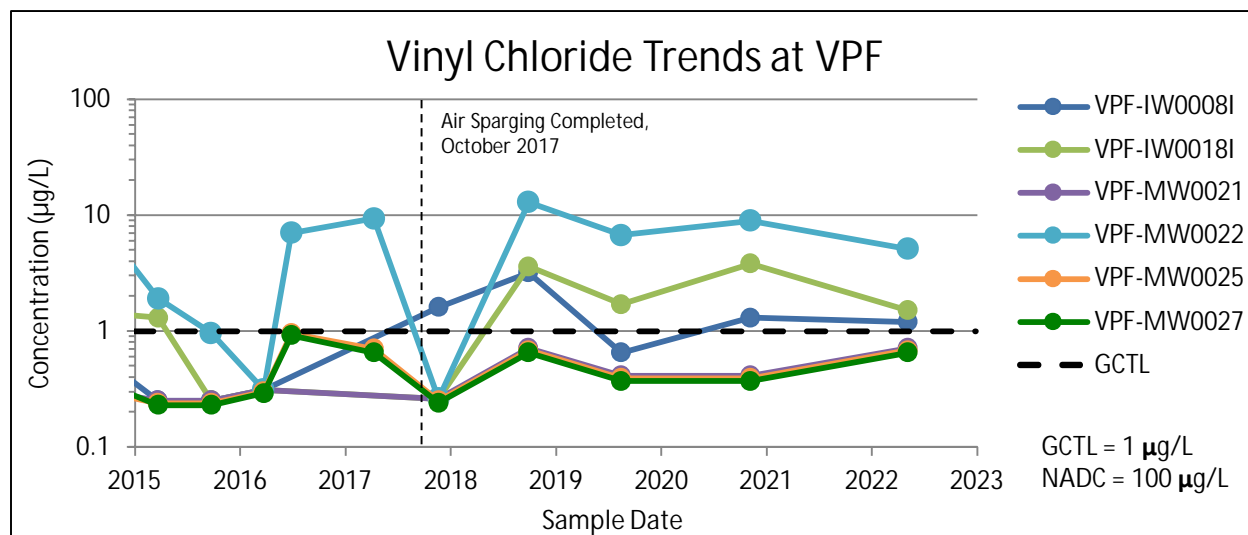


The following trend chart presents the concentration trends for cis-1,2-DCE at select wells since 2015.





The following trend chart presents the concentration trends for VC at select wells since 2015.



## 7.6 CONCLUSION AND RECOMMENDATION

TCE concentrations have persisted above the GCTL in three monitoring wells, and VC concentrations exceeded the GCTL in two monitoring wells; therefore, LTM is recommended to continue at VPF. A new flush-mount shallow monitoring well, screened 3 ft bls to 13 ft bls, is recommended to be installed adjacent to VPF-MW0023 to verify horizontal delineation in the shallow zone downgradient of VPF-MW0022. Monitoring well VPF-MW0010I is recommended to be added into the sampling schedule to verify horizontal delineation in the intermediate zone downgradient of VPF-MW0018I. Monitoring well VPF-MW0008D is recommended to be added into the sampling schedule to verify vertical delineation around VPF-MW0008I.

The biennial sampling schedule is recommended to continue with 35 groundwater level measurements and nine monitoring wells sampled for select VOCs. The following table shows the proposed monitoring wells for water level collection and groundwater sampling for the next sampling event at VPF scheduled for November 2024.

<b>Well ID</b>	<b>Screen Interval (ft bls)</b>	<b>Analysis</b>
VPF-IW0001S	3-13	WL Only
VPF-IW0002I	22-27	WL Only
VPF-IW0002S	5-15	WL Only
VPF-IW0003I	22-27	WL Only
VPF-IW0003S	5-15	WL Only
VPF-IW0004I	22-27	WL Only
VPF-IW0004S	5-15	WL Only
VPF-IW0005S	3-13	WL Only
VPF-IW0006S	3-13	WL Only
VPF-IW0007I	15-25	WL Only
VPF-IW0008D	43-48	WL + Select VOCs
VPF-IW0008I	15-25	WL + Select VOCs
VPF-IW0009I	15-25	WL Only
VPF-IW0010I	15-25	WL + Select VOCs
VPF-IW0011I	15-25	WL Only
VPF-IW0012I	15-25	WL Only
VPF-IW0013I	15-25	WL Only
VPF-IW0014I	15-25	WL Only
VPF-IW0015I	15-25	WL Only
VPF-IW0016I	15-25	WL Only
VPF-IW0017I	15-25	WL Only
VPF-IW0018I	18-28	WL + Select VOCs
VPF-MW0020	15-25	WL Only
VPF-MW0021	25-35	WL + Select VOCs
VPF-MW0022	5-15	WL + Select VOCs
VPF-MW0023	15-25	WL Only
VPF-MW0024	35-45	WL Only
VPF-MW0025	35-45	WL + Select VOCs
VPF-MW0026	35-45	WL Only
VPF-MW0027	35-45	WL + Select VOCs
VPF-MW0028	25-35	WL Only
VPF-MW0029	15-25	WL Only
VPF-MW0030	25-35	WL Only
VPF-MW0031	35-45	WL Only
VPF-MW0032 <sup>a</sup>	3-13	WL + Select VOCs

ID = identification

MW = monitoring well

Select VOCs = TCE, cis-1,2-DCE, and VC analysis by Method 8260

WL = water level measurement

<sup>a</sup> proposed monitoring well

**Table 7-1**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>	VPF-IW0001S		VPF-IW0002S		VPF-IW0003S	
<b>Screen Interval (ft bls):</b>	3 - 13		5 - 15		5 - 15	
<b>TOC Elevation (ft NAVD88):</b>	7.01		4.80		5.38	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	6.47	0.54	3.98	0.82	5.76	-0.38
August 2019	4.32	2.69	2.28	2.52	1.97	3.41
November 2020	3.32	3.69	1.98	2.82	2.94	2.44
May 2022	6.46	0.55	3.92	0.88	3.65	1.73

<b>SHALLOW WELL ID:</b>	VPF-IW0004S		VPF-IW0005S		VPF-IW0006S	
<b>Screen Interval (ft bls):</b>	5 - 15		3 - 13		3 - 13	
<b>TOC Elevation (ft NAVD88):</b>	8.28		4.99		5.41	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	6.87	1.41	4.28	0.71	4.60	0.81
August 2019	4.30	3.98	1.38	3.61	2.34	3.07
November 2020	4.35	3.93	1.10	3.89	2.18	3.23
May 2022	5.93	2.35	3.45	1.54	4.28	1.13

<b>SHALLOW WELL ID:</b>	VPF-MW0022	
<b>Screen Interval (ft bls):</b>	5 - 15	
<b>TOC Elevation (ft NAVD88):</b>	7.82	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	6.96	0.86
August 2019	5.33	2.49
November 2020	3.41	4.41
May 2022	6.61	1.21

<b>INTERMEDIATE WELL ID:</b>	VPF-IW0002I		VPF-IW0003I		VPF-IW0004I	
<b>Screen Interval (ft bls):</b>	22 - 27		22 - 27		22 - 27	
<b>TOC Elevation (ft NAVD88):</b>	5.19		5.70		8.32	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	4.47	0.72	4.77	0.93	7.66	0.66
August 2019	2.92	2.27	2.83	2.87	5.84	2.48
November 2020	2.55	2.64	2.78	2.92	5.69	2.63
May 2022	4.35	0.84	4.61	1.09	7.48	0.84

<b>INTERMEDIATE WELL ID:</b>	VPF-IW0007I		VPF-IW0008I		VPF-IW0009I	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	3.86		3.66		4.31	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	3.19	0.67	3.13	0.53	3.75	0.56
August 2019	1.28	2.58	1.24	2.42	1.86	2.45
November 2020	1.09	2.77	0.30	3.36	1.65	2.66
May 2022	2.97	0.89	2.78	0.88	3.50	0.81

<b>INTERMEDIATE WELL ID:</b>	VPF-IW0010I		VPF-IW0011I		VPF-IW0012I	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	4.02		5.70		6.97	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	3.33	0.69	Not Measured		6.95	0.02
August 2019	1.64	2.38	3.37	2.33	Not Measured	
November 2020	1.39	2.63	3.18	2.52	5.93	1.04
May 2022	2.22	1.80	5.03	0.67	6.58	0.39

<b>INTERMEDIATE WELL ID:</b>	VPF-IW0013I		VPF-IW0014I		VPF-IW0015I	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	6.77		6.11		5.73	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	6.28	0.49	Not Measured		5.09	0.64
August 2019	4.65	2.12	2.75	3.36	3.81	1.92
November 2020	5.70	1.07	3.52	2.59	3.39	2.34
May 2022	6.13	0.64	5.37	0.74	5.21	0.52

<b>INTERMEDIATE WELL ID:</b>	VPF-IW0016I		VPF-IW0017I		VPF-IW0018I	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		18 - 28	
<b>TOC Elevation (ft NAVD88):</b>	6.79		5.86		5.47	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	6.27	0.52	5.17	0.69	4.92	0.55
August 2019	4.77	2.02	3.82	2.04	3.08	2.39
November 2020	4.53	2.26	3.42	2.44	2.86	2.61
May 2022	6.18	0.61	5.25	0.61	4.65	0.82

**Table 7-1**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	VPF-MW0020		VPF-MW0021		VPF-MW0023	
<b>Screen Interval (ft bls):</b>	15 - 25		25 - 35		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	5.37		5.64		4.73	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	4.78	0.59	5.02	0.62	3.95	0.78
August 2019	2.96	2.41	3.05	2.59	2.36	2.37
November 2020	3.69	1.68	2.93	2.71	2.06	2.67
May 2022	4.59	0.78	4.70	0.94	3.85	0.88

<b>INTERMEDIATE WELL ID:</b>	VPF-MW0028		VPF-MW0029		VPF-MW0030	
<b>Screen Interval (ft bls):</b>	25 - 35		15 - 25		25 - 35	
<b>TOC Elevation (ft NAVD88):</b>	3.51		3.36		3.64	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	2.91	0.60	2.67	0.69	2.95	0.69
August 2019	0.98	2.53	1.30	2.06	1.18	2.46
November 2020	0.59	2.92	0.84	2.52	0.79	2.85
May 2022	2.63	0.88	2.31	1.05	2.61	1.03

<b>DEEP WELL ID:</b>	VPF-IW0008D		VPF-MW0024		VPF-MW0025	
<b>Screen Interval (ft bls):</b>	43 - 48		35 - 45		35 - 45	
<b>TOC Elevation (ft NAVD88):</b>	3.52		7.22		6.86	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	3.30	0.22	6.85	0.37	6.47	0.39
August 2019	0.40	3.12	4.86	2.36	4.45	2.41
November 2020	0.31	3.21	4.71	2.51	4.98	1.88
May 2022	2.10	1.42	6.50	0.72	6.06	0.80

<b>DEEP WELL ID:</b>	VPF-MW0026		VPF-MW0027		VPF-MW0031	
<b>Screen Interval (ft bls):</b>	35 - 45		35 - 45		35 - 45	
<b>TOC Elevation (ft NAVD88):</b>	6.41		6.42		4.13	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
September 2018	5.92	0.49	6.05	0.37	3.87	0.26
August 2019	3.89	2.52	4.19	2.23	Not Measured	
November 2020	3.80	2.61	4.15	2.27	1.15	2.98
May 2022	5.60	0.81	5.80	0.62	2.98	1.15

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

IW = investigation well

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

VPF = Vertical Processing Facility

**Table 7-2**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
VPF-IW0008I	9/23/2003	15 - 25	2,640	644	456
	6/17/2004	15 - 25	2,350	625	922
	4/15/2005	15 - 25	754	197	321
	9/15/2005	15 - 25	2,700	661	1,160
	11/1/2005	15 - 25	1,150	351	350
	11/18/2005	15 - 25	91.8	11.2	0.5 U
	12/19/2005	15 - 25	1,960	596	454
	1/18/2006	15 - 25	1,440	423	395
	4/18/2006	15 - 25	1,510	437	467
	8/18/2006	15 - 25	75.5	10.4	26.4
	9/22/2006	15 - 25	1,350	393	340
	10/25/2006	15 - 25	420	290	280
	1/15/2007	15 - 25	1,660	837	469
	4/5/2007	15 - 25	915	379	208
	5/17/2007	15 - 25	841	824	611
	7/3/2007	15 - 25	8.7	4.5	4.8
	7/24/2007	15 - 25	0.38 U	0.28 U	0.34 U
	10/11/2007	15 - 25	355	544	299
	1/21/2008	15 - 25	112	198	180
	3/27/2008	15 - 25	475	375	220
	9/23/2008	15 - 25	226	489	319
	12/16/2008	15 - 25	162	337	253
	2/27/2009	15 - 25	1.4	5.2	10.4
	6/16/2009	15 - 25	2.4	114	169
	9/22/2009	15 - 25	1.4	63.4	272
	12/3/2009	15 - 25	0.87 I	0.49 I	54.5
	6/23/2010	15 - 25	1.1	2.2	58.1
	9/23/2010	15 - 25	0.56 I	0.64 U	146
	12/22/2010	15 - 25	0.65 I	0.26 U	44.4
	12/6/2011	15 - 25	1 U	1 U	10.8
	7/26/2012	15 - 25	6.4	15.8	21.4
	10/18/2012	15 - 25	18.2	86.6	28.7
1/15/2013	15 - 25	2.2	3.4	1.2	
4/25/2013	15 - 25	0.80 I	0.91 I	0.44 U	
6/18/2014	15 - 25	1.4	1.2	0.84 I	
3/23/2015	15 - 25	0.80 I	0.66 I	0.25 U	
9/23/2015	15 - 25	1	0.22 U	0.25 U	
3/24/2016	15 - 25	0.59 I	0.31 U	0.31 U	
11/22/2017	15 - 25	3	1.7	1.6	
10/1/2018	15 - 25	6.8	3.2	3.2	
8/19/2019	15 - 25	0.90 I	2.8	0.65 I	
11/10/2020	15 - 25	0.78 I	4.8	1.3	
5/12/2022	15 - 25	0.89 U	5.2	1.2	

**Table 7-2**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
VPF-IW0018I	9/15/2005	18 - 28	1,420	560	527
	11/1/2005	18 - 28	2,980	946	50 U
	11/18/2005	18 - 28	1,890	623	384
	12/19/2005	18 - 28	2,250	683	560
	1/18/2006	18 - 28	2,330	784	525
	4/18/2006	18 - 28	2,000	945	524
	8/18/2006	18 - 28	1,280	636	525
	9/22/2006	18 - 28	1,720	672	674
	10/25/2006	18 - 28	1,600	680	510
	1/15/2007	18 - 28	531	258	453
	4/5/2007	18 - 28	1,000	529	550
	5/17/2007	18 - 28	731	464	553
	7/3/2007	18 - 28	700	390	480
	7/24/2007	18 - 28	746	484	503
	10/11/2007	18 - 28	761	667	475
	1/21/2008	18 - 28	545	463	315
	3/27/2008	18 - 28	234	182	274
	9/23/2008	18 - 28	51.9	29.4	797
	12/16/2008	18 - 28	45.8	25.4	796
	2/27/2009	18 - 28	16.4	5	279
	6/16/2009	18 - 28	23	6.5	261
	9/22/2009	18 - 28	23.4	5.1	916
	12/3/2009	18 - 28	29	7.6	992
	6/23/2010	18 - 28	2.8	3.6	659
	9/23/2010	18 - 28	25.5	20.6	218
	12/22/2010	18 - 28	13.8	10.8	911
	12/6/2011	18 - 28	6.5	2.8	460
	7/26/2012	18 - 28	0.55 I	0.26 U	2.9
	10/18/2012	18 - 28	4.6	4.1	9.1
	1/16/2013	18 - 28	0.89 I	0.26 I	1.7
4/26/2013	18 - 28	1.8	0.31 I	1.5	
6/18/2014	18 - 28	24.6	6.5	15.9	
10/16/2014	18 - 28	4.3	1.3	1.4	
3/24/2015	18 - 28	1.1	0.26 I	1.3	
9/24/2015	18 - 28	0.60 I	0.22 U	0.25 U	
3/24/2016	18 - 28	0.33 I	0.31 U	0.31 U	
11/22/2017	18 - 28	1.3	0.65 U	0.26 U	
10/1/2018	18 - 28	2.5	2.2	3.6	
8/19/2019	18 - 28	1.9	2.3	1.7	
11/10/2020	18 - 28	2.6	3.4	3.8	
5/12/2022	18 - 28	1.6	6.0	1.5	

**Table 7-2**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
VPF-MW0021	12/5/2011	25 - 35	<b>4,700</b>	<b>280</b>	100 U
	5/21/2012	25 - 35	<b>119</b>	<b>9.2</b>	0.22 U
	7/26/2012	25 - 35	<b>12.1</b>	<b>0.74 I</b>	0.22 U
	10/17/2012	25 - 35	<b>12.1</b>	<b>0.70 I</b>	0.44 U
	1/16/2013	25 - 35	<b>2.3</b>	0.24 U	0.44 U
	4/26/2013	25 - 35	<b>1.9</b>	0.24 U	0.44 U
	6/18/2014	25 - 35	<b>36.6</b>	<b>5.9</b>	0.33 U
	3/24/2015	25 - 35	<b>1</b>	0.22 U	0.25 U
	9/24/2015	25 - 35	<b>0.87 I</b>	0.22 U	0.25 U
	3/23/2016	25 - 35	<b>0.46 I</b>	0.31 U	0.31 U
	11/22/2017	25 - 35	<b>3.1</b>	0.65 U	0.26 U
	10/1/2018	25 - 35	<b>9.5</b>	<b>2.4</b>	0.71 U
	8/19/2019	25 - 35	<b>4.9</b>	<b>3.5</b>	0.41 U
	11/10/2020	25 - 35	<b>8.6</b>	<b>8.0</b>	0.41 U
5/12/2022	25 - 35	<b>8.3</b>	<b>18</b>	0.71 U	
VPF-MW0022	12/5/2011	5 - 15	<b>2.1</b>	<b>2.2</b>	<b>28.1</b>
	5/21/2012	5 - 15	<b>12</b>	<b>22.4</b>	<b>1.9</b>
	10/17/2012	5 - 15	<b>82.2</b>	<b>49.6</b>	<b>15.8</b>
	1/15/2013	5 - 15	<b>0.40 I</b>	<b>0.71 I</b>	0.44 U
	4/26/2013	5 - 15	<b>31</b>	<b>8.1</b>	<b>4.1</b>
	6/18/2014	5 - 15	<b>3.5</b>	<b>2.6</b>	<b>38.7</b>
	10/16/2014	5 - 15	<b>104</b>	<b>15.6</b>	<b>6.1</b>
	3/23/2015	5 - 15	<b>12.7</b>	<b>2.1</b>	<b>1.9</b>
	9/23/2015	5 - 15	<b>16.9</b>	<b>1.7</b>	<b>0.96 I</b>
	3/23/2016	5 - 15	<b>9.2</b>	<b>0.86 I</b>	0.31 U
	6/28/2016	5 - 15	<b>9</b>	<b>4</b>	<b>7</b>
	4/11/2017	5 - 15	<b>1.8</b>	<b>2.3</b>	<b>9.3</b>
	11/21/2017	5 - 15	<b>5.7</b>	0.65 U	0.26 U
	10/1/2018	5 - 15	<b>3.4</b>	<b>1.4</b>	<b>13</b>
8/19/2019	5 - 15	<b>1.4</b>	<b>0.43 I</b>	<b>6.7</b>	
11/10/2020	5 - 15	0.35 U	<b>1.0</b>	<b>8.9</b>	
5/12/2022	5 - 15	0.89 U	0.53 U	<b>5.1</b>	
VPF-MW0025	12/5/2011	35 - 45	<b>2,400</b>	<b>85</b>	50 U
	5/21/2012	35 - 45	<b>295</b>	<b>22.2</b>	1.1 U
	7/26/2012	35 - 45	<b>81.3</b>	<b>7.3</b>	0.22 U
	10/17/2012	35 - 45	<b>48.1</b>	<b>3.5</b>	0.44 U
	1/15/2013	35 - 45	<b>29.1</b>	<b>4.3</b>	0.44 U
	4/25/2013	35 - 45	<b>3.7</b>	0.24 U	0.44 U
	6/18/2014	35 - 45	<b>29.9</b>	<b>2.2</b>	0.33 U
3/24/2015	35 - 45	<b>2.3</b>	0.22 U	0.25 U	

**Table 7-2**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
<b>VPF-MW0025</b> (continued)	9/24/2015	35 - 45	<b>1.7</b>	0.22 U	0.25 U
	3/23/2016	35 - 45	<b>2.6</b>	0.31 U	0.31 U
	6/28/2016	35 - 45	<b>4</b>	3 U	1 U
	4/11/2017	35 - 45	<b>6.8</b>	<b>2</b>	0.71 U
	11/22/2017	35 - 45	<b>2.4</b>	0.65 U	0.26 U
	10/1/2018	35 - 45	<b>5.3</b>	<b>2</b>	0.71 U
	8/19/2019	35 - 45	<b>5.8</b>	<b>2.4</b>	0.41 U
	11/10/2020	35 - 45	0.35 U	0.28 U	0.41 U
	5/12/2022	35 - 45	<b>4.1</b>	<b>10</b>	0.71 U
<b>VPF-MW0026</b>	12/5/2011	35 - 45	<b>91.1</b>	<b>8.1</b>	1 U
	10/17/2012	35 - 45	<b>3.2</b>	<b>0.24 I</b>	0.44 U
	4/25/2013	35 - 45	0.31 U	0.24 U	0.44 U
	6/18/2014	35 - 45	<b>2.1</b>	0.33 U	0.33 U
	3/24/2015	35 - 45	<b>0.42 I</b>	0.22 U	0.25 U
	9/24/2015	35 - 45	0.22 U	0.22 U	0.25 U
	3/23/2016	35 - 45	<b>0.30 I</b>	0.31 U	0.31 U
	11/22/2017	35 - 45	0.61 U	0.65 U	0.26 U
	10/1/2018	35 - 45	<b>1</b>	0.53 U	0.71 U
	8/19/2019	35 - 45	0.35 U	0.28 U	0.41 U
	11/10/2020	35 - 45	<b>1.0</b>	<b>0.73 I</b>	0.41 U
<b>VPF-MW0027</b>	12/5/2011	35 - 45	<b>180</b>	<b>12.1</b>	1 U
	10/19/2012	35 - 45	<b>223</b>	<b>18.6</b>	0.44 U
	1/15/2013	35 - 45	<b>149</b>	<b>12.6</b>	0.44 U
	4/26/2013	35 - 45	<b>100</b>	<b>11.7</b>	0.44 U
	6/17/2014	35 - 45	<b>119</b>	<b>29.1</b>	0.65 U
	10/16/2014	35 - 45	<b>58.2</b>	<b>17.8</b>	0.33 U
	3/24/2015	35 - 45	<b>5.3</b>	<b>0.55 I</b>	0.25 U
	9/24/2015	35 - 45	<b>2.8</b>	0.22 U	0.25 U
	3/24/2016	35 - 45	<b>1.9</b>	0.31 U	0.31 U
	6/28/2016	35 - 45	<b>4</b>	3 U	1 U
	4/11/2017	35 - 45	<b>8.8</b>	<b>3.6</b>	0.71 U
	11/22/2017	35 - 45	<b>3.9</b>	<b>1.4</b>	0.26 U
	10/1/2018	35 - 45	<b>4.4</b>	<b>4.2</b>	0.71 U
	8/19/2019	35 - 45	<b>3.6</b>	<b>7.9</b>	0.41 U
	11/10/2020	35 - 45	<b>3.7</b>	<b>14.0</b>	0.41 U
	5/12/2022	35 - 45	<b>3.8</b>	<b>13</b>	0.71 U



**Table 7-2**  
**Vertical Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260		
Analyte			TRICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			3	70	1
FDEP NADCs (µg/L)			300	700	100
Location ID	Sample Date	Screened Interval (ft bls)			
VPF-MW0029	12/5/2011	15 - 25	91.9	69.1	32.2
	5/21/2012	15 - 25	1,940	319	69.2
	7/26/2012	15 - 25	911	211	4.4 U
	10/18/2012	15 - 25	64.9	19.1	4.6
	1/16/2013	15 - 25	13.7	14.1	3.7
	4/25/2013	15 - 25	4.4	1.2	0.44 U
	6/17/2014	15 - 25	1.3	1.6	1.2
	10/16/2014	15 - 25	2.5	7.3	0.33 U
	3/24/2015	15 - 25	0.63 I	1.2	0.25 U
	9/24/2015	15 - 25	0.51 I	0.48 I	0.25 U
	3/24/2016	15 - 25	0.38 I	0.31 U	0.31 U
	11/22/2017	15 - 25	0.67 I	0.65 U	0.26 U
	10/1/2018	15 - 25	0.89 I	1.5	0.75 I
	8/19/2019	15 - 25	0.45 I	1.3	0.41 U
11/10/2020	15 - 25	2.0	7	0.41 U	

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

VPF = Vertical Processing Facility

IW = investigation well

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit



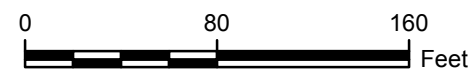
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**Legend**

- ◆ Shallow Monitoring Well (3.5-15 ft bls)
- ◆ Intermediate Monitoring Well (15-35 ft bls)
- ◆ Deep Monitoring Well (35-60 ft bls)
- Building

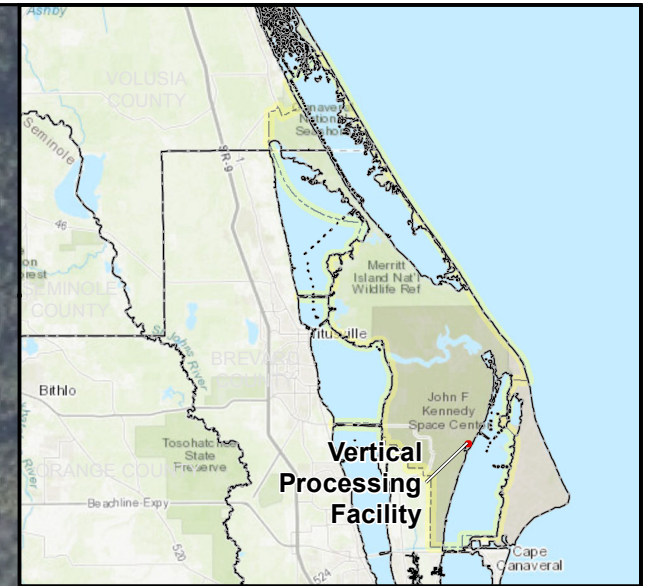
**Notes:**

- (15-25) = Monitoring well screen interval in feet below land surface
- SWMU = Solid Waste Management Unit
- ft bls = feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 7  
 Site Map**

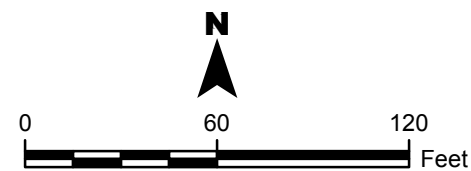
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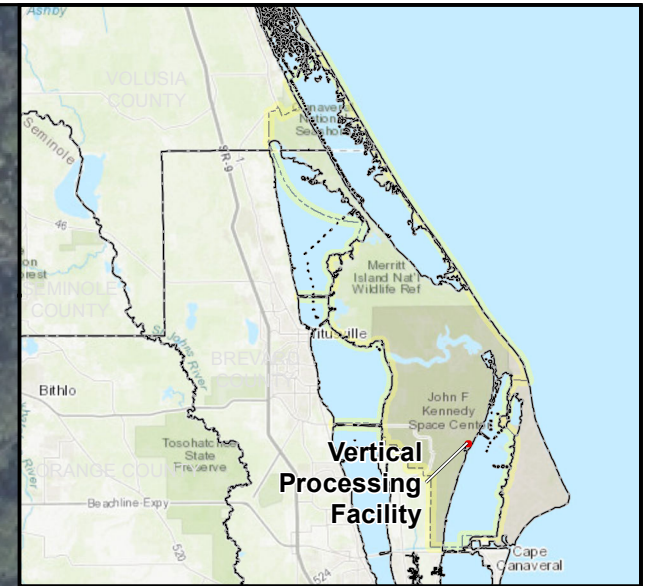
- Legend**
- Shallow Monitoring Well (3-15 ft bls)
  - Groundwater Contour (NAVD88 ft) (Dashed Where Inferred)
  - Approximate Direction of Groundwater Flow
- (1.21) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on May 12, 2022
  - Groundwater Contour Interval = 0.20 ft
  - ft bls = feet below land surface
  - SWMU = Solid Waste Management Unit
  - \* = Not Used in Contouring
  - Aerial Source: FDOT 2018



**FIGURE 7-1**  
**Shallow Zone Groundwater Elevation Map – May 2022**

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 Vertical Processing Facility (VPF)  
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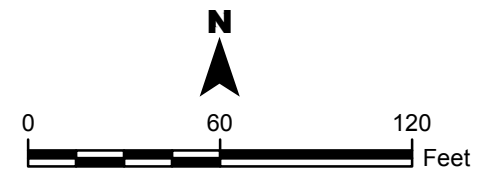


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- Legend**
- ◆ Intermediate Monitoring Well (15-35 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (1.09) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 12, 2022
- Groundwater Contour Interval = 0.10 ft
- ft bls = feet below land surface
- \* = Not Used in Contouring
- Aerial Source: FDOT 2018



**FIGURE 7-2**  
**Intermediate Zone Groundwater Elevation Map – May 2022**  
 2022 - Industrial Area Long Term Monitoring  
 Vertical Processing Facility (VPF)  
 SWMU 077  
 NASA Kennedy Space Center, Florida

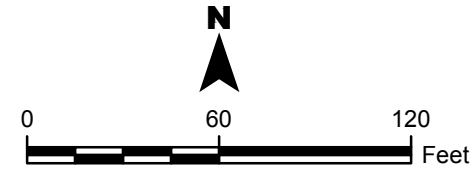


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- Legend**
- Deep Monitoring Well (35-48 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (1.15) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 12, 2022
- Groundwater Contour Interval = 0.20 ft
- ft bls = feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 7-3**  
**Deep Zone Groundwater Elevation Map – May 2022**

2022 - Industrial Area Long Term Monitoring  
 Vertical Processing Facility (VPF)  
 SWMU 077  
 NASA Kennedy Space Center, Florida

**Proposed Monitoring Well Location (3-13ft bls)**

VPF-IW0018I						
Location ID	VPF-IW0018I	VPF-IW0018I	VPF-IW0018I	VPF-IW0018I	VPF-IW0018I	VPF-IW0018I
Date	11/22/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022	
Screen Interval	18.0 - 28.0	18.0 - 28.0	18.0 - 28.0	18.0 - 28.0	18.0 - 28.0	
Sample Type	NM	NM	NM	NM	NM	
Analyte						
TRICHLOROETHENE	1.3	2.5	1.9	2.6	1.6	
CIS-1,2-DICHLOROETHENE	0.65 U	2.2	2.3	3.4	6.0	
VINYL CHLORIDE	0.26 U	3.6	1.7	3.8	1.5	

VPF-IW0008I						
Location ID	VPF-IW0008I	VPF-IW0008I	VPF-IW0008I	VPF-IW0008I	VPF-IW0008I	VPF-IW0008I
Date	11/22/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022	
Screen Interval	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	
Sample Type	NM	NM	NM	NM	NM	
Analyte						
TRICHLOROETHENE	3	6.8	0.90 I	0.78 I	0.89 U	
CIS-1,2-DICHLOROETHENE	1.7	3.2	2.8	4.8	5.2	
VINYL CHLORIDE	1.6	3.2	0.65 I	1.3	1.2	

VPF-MW0022						
Location ID	VPF-MW0022	VPF-MW0022	VPF-MW0022	VPF-MW0022	VPF-MW0022	VPF-MW0022
Date	04/11/2017	11/21/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022
Screen Interval	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0	5.0 - 15.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TRICHLOROETHENE	1.8	5.7	3.4	1.4	0.35 U	0.89 U
CIS-1,2-DICHLOROETHENE	2.3	0.65 U	1.4	0.43 I	1.0	0.53 U
VINYL CHLORIDE	9.3	0.26 U	13	6.7	8.9	5.1

VPF-MW0021						
Location ID	VPF-MW0021	VPF-MW0021	VPF-MW0021	VPF-MW0021	VPF-MW0021	VPF-MW0021
Date	11/22/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022	
Screen Interval	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	25.0 - 35.0	
Sample Type	NM	NM	NM	NM	NM	
Analyte						
TRICHLOROETHENE	3.1	9.5	4.9	8.6	8.3	
CIS-1,2-DICHLOROETHENE	0.65 U	2.4	3.5	8.0	18	
VINYL CHLORIDE	0.26 U	0.71 U	0.41 U	0.41 U	0.71 U	

VPF-MW0027						
Location ID	VPF-MW0027	VPF-MW0027	VPF-MW0027	VPF-MW0027	VPF-MW0027	VPF-MW0027
Date	04/11/2017	11/22/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022
Screen Interval	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TRICHLOROETHENE	8.8	3.9	4.4	3.6	3.7	3.8
CIS-1,2-DICHLOROETHENE	3.6	1.4	4.2	7.9	14.0	13
VINYL CHLORIDE	0.71 U	0.26 U	0.71 U	0.41 U	0.41 U	0.71 U

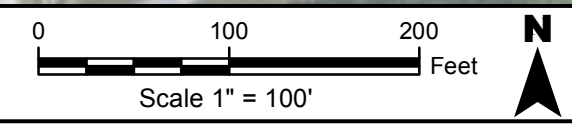
VPF-MW0025						
Location ID	VPF-MW0025	VPF-MW0025	VPF-MW0025	VPF-MW0025	VPF-MW0025	VPF-MW0025
Date	04/11/2017	11/22/2017	10/01/2018	08/19/2019	11/10/2020	05/12/2022
Screen Interval	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0	35.0 - 45.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
TRICHLOROETHENE	6.8	2.4	5.3	5.8	0.35 U	4.1
CIS-1,2-DICHLOROETHENE	2	0.65 U	2	2.4	0.28 U	10
VINYL CHLORIDE	0.71 U	0.26 U	0.71 U	0.41 U	0.41 U	0.71 U

**Legend**

- Deep LTM Well, Sample Results Exceed GCTL
- Intermediate LTM Well, Sample Results Exceed GCTL
- Intermediate LTM Well, Sample Results Below GCTL
- Shallow LTM Well, Sample Results Exceed GCTL
- Non-LTM, No Sample Results
- Intermediate Groundwater Elevation Contours - November 2022
- Direction of Groundwater Flow
- Approximate Extent of Multiple Contaminants Greater Than GCTLs from Monitoring Well Sampling (Dashed Where Inferred)

- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
  7. U = Result was below the MDL.
  8. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  9. **Bolded** results indicate the presence of an analyte at the specified concentration.
  10. **Blue** font indicates an exceedance of FDEP GCTLs.
  11. Aerial Source: ESRI 2018.
  12. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
TRICHLOROETHENE	3
CIS-1,2-DICHLOROETHENE	70
VINYL CHLORIDE	1



**FIGURE 7-4**  
**Groundwater Sampling Analytical Results**  
 2022 - Industrial Area Long Term Monitoring  
 Vertical Processing Facility (VPF)  
 SWMU 077  
 NASA Kennedy Space Center, Florida

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## 8. ENVIRONMENTAL HEALTH FACILITY

This section provides a summary of the EHF site (SWMU 079). Refer to **Figure 8** for a site map.

### 8.1 SITE DESCRIPTION AND HISTORY

The EHF is at an isolated location at the north end of C Avenue Southeast, approximately 1 mile north of the main KSC IA. The site is comprised of the former EHF Building (L7-1557), support facilities, an asbestos laboratory, and satellite antenna dishes, which remain along the northeastern edge of the site. Constructed in 1966, the EHF Building was equipped with an ionization detection system. The site was utilized as the Central Instrumentation Facility that housed computers from 1976 through 1982. Some maintenance activities were conducted on-site during that period. In 1982, Environmental Health Services occupied the site. An asbestos laboratory was constructed in 1985 (LFR 2005). In 2015, the EHF Building (L7-1557), associated support facilities, and the asbestos laboratory were demolished. The satellite antenna dishes remain along the northeastern edge of the site.

An RFI and risk evaluation were conducted in 2004 and 2005 (LFR 2005). PCB and chromium impacts were identified in soil, and VC was detected at concentrations exceeding GCTLs. The PCB and chromium impacts were removed by an IM in December 2005. The risk evaluation identified VC as causing an unacceptable human health risk in groundwater (LFR 2005). To address contaminant concentrations that exceeded GCTLs, MNA of groundwater was selected to reduce VC concentrations per a Statement of Basis in October 2005 (NASA 2005b). LTM sampling of groundwater began at EHF in November 2005. In 2014, the sampling frequency transitioned from semi-annual to the current biennial sampling schedule.

### 8.2 FIELD ACTIVITIES

Groundwater levels were measured at six monitoring wells, and groundwater samples were collected from three monitoring wells at EHF in November 2022. The following table shows the network of wells used for groundwater level measurements and sampling at EHF.

Well ID	Screen Interval (ft bls)	Analysis
EHF-MW0001	20-30	WL + VC
EHF-MW0003	25-30	WL Only
EHF-MW0004	15-20	WL + VC
EHF-MW0005	15-25	WL + VC
EHF-MW0006	30-35	WL Only
EHF-MW0007	30-35	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

DPT groundwater sampling was performed at three locations in January 2023 and three step-out locations in March 2023. The January 2023 locations were chosen to complete a horizontal delineation of the VC plume at EHF. The three step-out locations were performed northwest, west, and southwest of EHF-DPT0002 in a 40 ft square.

The groundwater samples collected during the November 2022 LTM event and the January and March 2023 DPT sampling events were analyzed for VC by Method 8260. Below are the respective GCTL and NADC for the COC present at EHF.

COC	GCTL (µg/L)	NADC (µg/L)
VC	1	100

### 8.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the November 2022 sampling event were used to calculate groundwater elevations presented in **Table 8-1**. Groundwater elevations were used to determine the contours and flow direction for the shallow-intermediate aquifer zone (15 ft bls to 35 ft bls), shown on **Figure 8-1**. The groundwater flow direction in November 2022 was mounded around monitoring well EHF-MW0005 with the flow split to the south toward EHF-MW0007 and east toward EHF-MW0003. Historical groundwater flow direction at EHF, before the removal of the EHF buildings in 2015, was toward the northeast.

### 8.4 ANALYTICAL RESULTS

#### 8.4.1 Groundwater Analytical Results – Monitoring Wells

In November 2022, VC was detected in monitoring well EHF-MW0004 (5.4 µg/L) above the GCTL, while monitoring wells EHF-MW0001 and EHF-MW0005 were below the GCTL. A summary of the current and historical analytical results is presented in **Table 8-2**. Analytical results are depicted on **Figure 8-2**.

#### 8.4.2 Groundwater Analytical Results – DPT

Groundwater samples were collected from the center of a temporary four ft screen at the following depths: 10, 15, 20, 30, 40, and 50 ft bls. The depth intervals were kept similar to past EHF site assessments to analyze COC concentrations above and below the present contaminated zone. The 50 ft sample interval was removed for the March 2023 step-out locations, because the January 2023 samples did not report any VC concentrations deeper than the 30 ft interval.



Concentrations of VC were detected at the following locations and depths:

VC Analysis (µg/L)						
DPT Location	Screen Interval (ft bls)					
	(8-12)	(13-17)	(18-22)	(28-32)	(38-42)	(48-52)
EHF-DPT0001	0.71 U	0.71 U	0.71 U	<b>1.4</b>	0.71 U	0.71 U
EHF-DPT0002	0.71 U	<b>15</b>	<b>19</b>	0.71 U	0.71 U	0.71 U
EHF-DPT0003	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U
EHF-DPT0004	0.71 U	<b>1.7</b>	<b>3.9</b>	0.71 U	0.71 U	NS
EHF-DPT0005	0.71 U	<b>8.9</b>	<b>2.9</b>	0.71 U	0.71 U	NS
EHF-DPT0006	<b>1.1</b>	<b>3.0</b>	<b>2.1</b>	0.71 U	0.71 U	NS

U = Result was below laboratory method detection limit

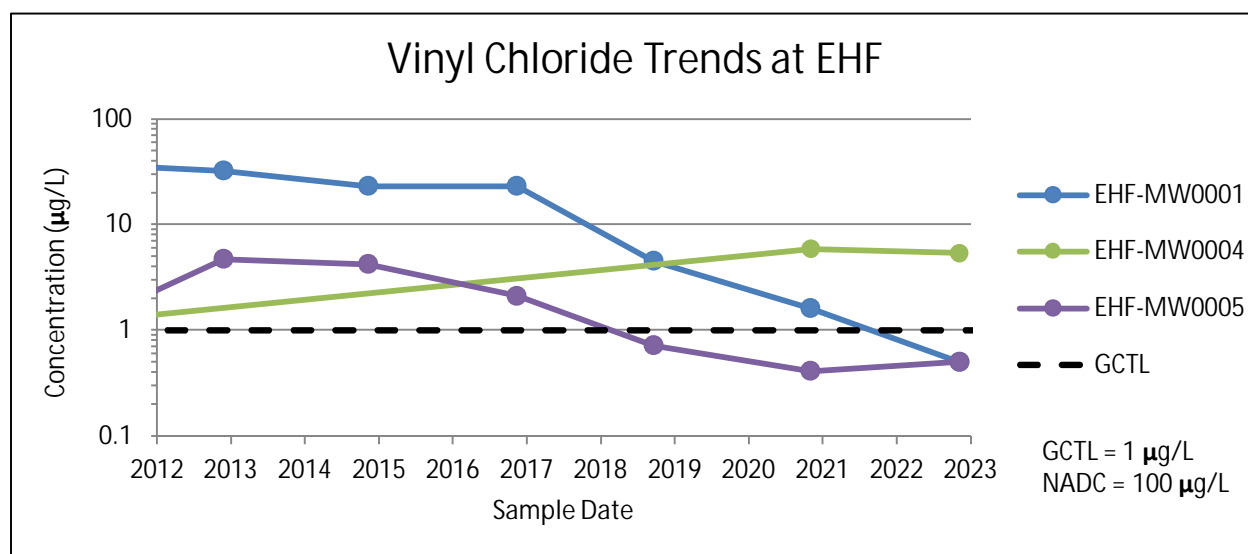
**Bold** results indicate the presence of an analyte at the specified concentration

**Red** font indicates an exceedance of FDEP GCTLs

VC concentrations were limited to the shallow and intermediate intervals. No VC concentrations were detected during the January and March 2023 DPT assessment below 32 ft bls. A summary of the analytical results is presented in **Table 8-3**. **Figure 8-3** depicts the analytical results of the groundwater samples collected from each DPT location.

### 8.5 TREND ANALYSIS

November 2022 data from the EHF monitoring wells were compared to historical sampling trends. Monitoring wells EHF-MW0001 and EHF-MW0005 show a decreasing trend and are now both below the GCTL. Monitoring well EHF-MW0004 was analyzed below the GCTL in 2004; however, VC concentrations stabilized slightly above the GCTL in 2020 and 2022.



## 8.6 CONCLUSION AND RECOMMENDATION

Although the VC concentration at monitoring well EHF-MW0001 dropped below the GCTL for the first event since assessment began in 2004, low level concentrations of VC remain above the GCTL at monitoring well EHF-MW0004. VC concentrations were also analyzed above the GCTL at DPT locations EHF-DPT0002, EHF-DPT0004, EHF-DPT0005, and EHF-DPT0006.

A new upgradient flush-mount monitoring well, EHF-MW0009, is recommended to be installed at the location of EHF-DPT0005 to serve as a horizontal point of compliance well. The screen interval for EHF-MW0009 is recommended to be 15 ft bls to 25 ft bls to capture the aquifer conditions across both the intervals of EHF-DPT0005 that exceeded the VC GCTL. VC concentrations at each step-out location were found to be less than EHF-DPT0002, suggesting that the low level contamination plume is centered around EHF-DPT0002 and EHF-MW0004.

The biennial sampling frequency is recommended to continue at monitoring wells EHF-MW0001, EHF-MW0004, EHF-MW0005, and new monitoring well EHF-MW0009 for VC analysis. Groundwater levels are recommended to be measured at seven wells. The following table shows the recommended monitoring wells for water level measurements and groundwater sampling for the next sampling event at EHF scheduled for November 2024.

Well ID	Screen Interval (ft bls)	Analysis
EHF-MW0001	20-30	WL + VC
EHF-MW0003	25-30	WL Only
EHF-MW0004	15-20	WL + VC
EHF-MW0005	15-25	WL + VC
EHF-MW0006	30-35	WL Only
EHF-MW0007	30-35	WL Only
EHF-MW0009 <sup>a</sup>	15-25	WL + VC

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

<sup>a</sup> proposed monitoring well

**Table 8-1  
Environmental Health Facility - Long Term Monitoring (LTM)  
Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	EHF-MW0001		EHF-MW0003		EHF-MW0004	
<b>Screen Interval (ft bls):</b>	20 - 30		25 - 30		15 - 20	
<b>TOC Elevation (ft NAVD88):</b>	8.70		6.62		5.52	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2014	5.84	2.86	4.00	2.62	2.66	2.86
November 2016	5.10	3.60	3.04	3.58	2.00	3.52
September 2018	5.41	3.29	3.29	3.33	2.41	3.11
November 2020	4.30	4.40	2.20	4.42	1.02	4.50
November 2022	4.21	4.49	2.15	4.47	0.99	4.53

<b>INTERMEDIATE WELL ID:</b>	EHF-MW0005		EHF-MW0006		EHF-MW0007	
<b>Screen Interval (ft bls):</b>	15 - 25		30 - 35		30 - 35	
<b>TOC Elevation (ft NAVD88):</b>	5.31		6.26		5.61	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2014	2.52	2.79	3.41	2.85	2.82	2.79
November 2016	1.67	3.64	2.82	3.44	1.96	3.65
September 2018	2.02	3.29	3.15	3.11	2.31	3.30
November 2020	0.85	4.46	1.89	4.37	1.47	4.14
November 2022	0.69	4.62	1.70	4.56	1.05	4.56

**Notes:**

bls = below land surface

BTOC = below top of casing

EHF = Environmental Health Facility

ft = feet

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 8-2**  
**Environmental Health Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>EHF-MW0001</b>	8/31/2004	20 - 30	<b>89</b>
	6/6/2005	20 - 30	<b>75</b>
	11/16/2005	20 - 30	<b>73</b>
	5/22/2006	20 - 30	<b>55</b>
	11/8/2006	20 - 30	<b>74</b>
	5/7/2007	20 - 30	<b>49</b>
	11/6/2007	20 - 30	<b>71</b>
	5/2/2008	20 - 30	<b>52</b>
	11/4/2008	20 - 30	<b>84</b>
	5/11/2009	20 - 30	<b>45</b>
	11/9/2009	20 - 30	<b>65</b>
	11/1/2010	20 - 30	<b>38.1</b>
	11/1/2011	20 - 30	<b>34.9</b>
	11/26/2012	20 - 30	<b>32</b>
	11/11/2014	20 - 30	<b>23</b>
	11/17/2016	20 - 30	<b>23</b>
	9/24/2018	20 - 30	<b>4.5</b>
11/9/2020	20 - 30	<b>1.6</b>	
11/15/2022	20 - 30	0.50 U	
<b>EHF-MW0004</b>	8/31/2004	15 - 20	0.43 U
	11/9/2020	15 - 20	<b>5.9</b>
	11/15/2022	15 - 20	<b>5.4</b>
<b>EHF-MW0005</b>	8/31/2004	15 - 25	<b>68</b>
	6/2/2005	15 - 25	<b>29</b>
	11/16/2005	15 - 25	<b>35</b>
	5/22/2006	15 - 25	<b>10</b>
	11/8/2006	15 - 25	<b>35</b>
	5/7/2007	15 - 25	<b>41</b>
	11/6/2007	15 - 25	<b>33</b>
	5/2/2008	15 - 25	<b>20</b>
	11/4/2008	15 - 25	<b>19</b>
	5/11/2009	15 - 25	<b>22</b>
	11/9/2009	15 - 25	<b>10</b>
	11/1/2010	15 - 25	<b>4.13</b>

**Table 8-2**  
**Environmental Health Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>EHF-MW0005</b> <b>(continued)</b>	11/1/2011	15 - 25	<b>2.11</b>
	11/26/2012	15 - 25	<b>4.7</b>
	11/11/2014	15 - 25	<b>4.2</b>
	11/17/2016	15 - 25	<b>2.1</b>
	9/24/2018	15 - 25	0.71 U
	11/9/2020	15 - 25	0.41 U
	11/15/2022	15 - 25	0.50 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

EHF = Environmental Health Facility

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

**Table 8-3**  
**Environmental Health Facility - Long Term Monitoring (LTM)**  
**DPT Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>EHF-DPT0001</b>	1/10/2023	8 - 12	0.71 U
	1/10/2023	13 - 17	0.71 U
	1/10/2023	18 - 22	0.71 U
	1/10/2023	28 - 32	<b>1.4</b>
	1/10/2023	38 - 42	0.71 U
	1/10/2023	48 - 52	0.71 U
<b>EHF-DPT0002</b>	1/10/2023	8 - 12	0.71 U
	1/10/2023	13 - 17	<b>15</b>
	1/10/2023	18 - 22	<b>19</b>
	1/10/2023	28 - 32	0.71 U
	1/10/2023	38 - 42	0.71 U
	1/10/2023	48 - 52	0.71 U
<b>EHF-DPT0003</b>	1/10/2023	8 - 12	0.71 U
	1/10/2023	13 - 17	0.71 U
	1/10/2023	18 - 22	0.71 U
	1/10/2023	28 - 32	0.71 U
	1/10/2023	38 - 42	0.71 U
	1/10/2023	48 - 52	0.71 U
<b>EHF-DPT0004</b>	3/27/2023	8 - 12	0.71 U
	3/27/2023	13 - 17	<b>1.7</b>
	3/27/2023	18 - 22	<b>3.9</b>
	3/27/2023	28 - 32	0.71 U
	3/27/2023	38 - 42	0.71 U
<b>EHF-DPT0005</b>	3/27/2023	8 - 12	0.71 U
	3/27/2023	13 - 17	<b>8.9</b>
	3/27/2023	18 - 22	<b>2.9</b>
	3/27/2023	28 - 32	0.71 U
	3/27/2023	38 - 42	0.71 U
<b>EHF-DPT0006</b>	3/27/2023	8 - 12	<b>1.1</b>
	3/27/2023	13 - 17	<b>3.0</b>
	3/27/2023	18 - 22	<b>2.1</b>
	3/27/2023	28 - 32	0.71 U
	3/27/2023	38 - 42	0.71 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

EHF = Environmental Health Facility

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs




U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit



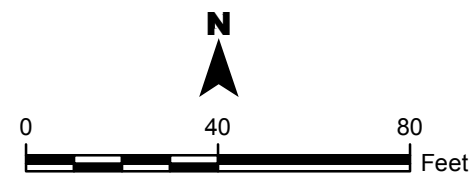
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**Legend**

-  Monitoring Well (LTM)
-  Monitoring Well (LTM - Water Level Only)
-  Building\_EHF

**Notes:**

- (15-20) = Monitoring well screen interval in feet below land surface
- LTM = Long Term Monitoring
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018







**FIGURE 8  
 Site Map**

2022 - Industrial Area Long Term Monitoring  
 Former Environmental Health Facility (EHF)  
 SWMU 079  
 NASA Kennedy Space Center, Florida

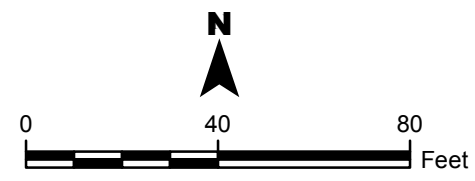
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**Legend**

-  Monitoring Well (LTM)
-  Groundwater Contour (NAVD88 ft)
-  Approximate Direction of Groundwater Flow
-  (4.56) Groundwater Elevation Contour (NAVD88 ft)

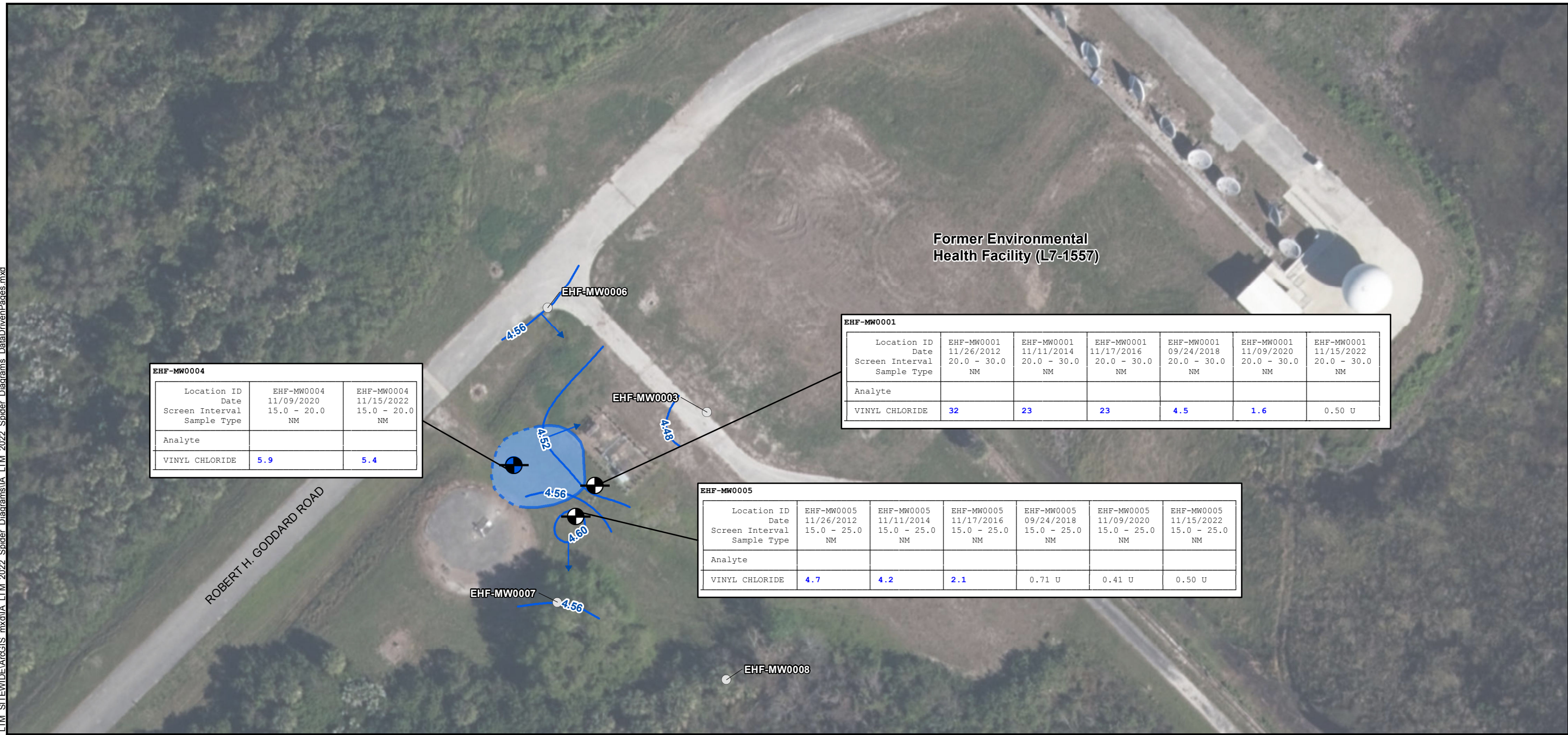
- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 15, 2022
  - Groundwater Contour Interval = 0.04 ft
  - ft bls = feet below land surface
  - LTM = Long Term Monitoring
  - SWMU = Solid Waste Management Unit
  - Aerial Source: FDOT 2018



**FIGURE 8-1**  
**Groundwater Elevation Map – November 2022**

2022 - Industrial Area Long Term Monitoring  
 Former Environmental Health Facility (EHF)  
 SWMU 079  
 NASA Kennedy Space Center, Florida





EHF-MW0004		
Location ID	EHF-MW0004	EHF-MW0004
Date	11/09/2020	11/15/2022
Screen Interval	15.0 - 20.0	15.0 - 20.0
Sample Type	NM	NM
Analyte		
VINYL CHLORIDE	5.9	5.4

EHF-MW0001						
Location ID	EHF-MW0001	EHF-MW0001	EHF-MW0001	EHF-MW0001	EHF-MW0001	EHF-MW0001
Date	11/26/2012	11/11/2014	11/17/2016	09/24/2018	11/09/2020	11/15/2022
Screen Interval	20.0 - 30.0	20.0 - 30.0	20.0 - 30.0	20.0 - 30.0	20.0 - 30.0	20.0 - 30.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	32	23	23	4.5	1.6	0.50 U

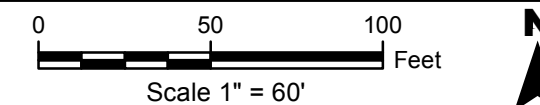
EHF-MW0005						
Location ID	EHF-MW0005	EHF-MW0005	EHF-MW0005	EHF-MW0005	EHF-MW0005	EHF-MW0005
Date	11/26/2012	11/11/2014	11/17/2016	09/24/2018	11/09/2020	11/15/2022
Screen Interval	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0	15.0 - 25.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	4.7	4.2	2.1	0.71 U	0.41 U	0.50 U

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- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Intermediate LTM Well, Sample Results Below GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - November 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling (Dashed Where Inferred)

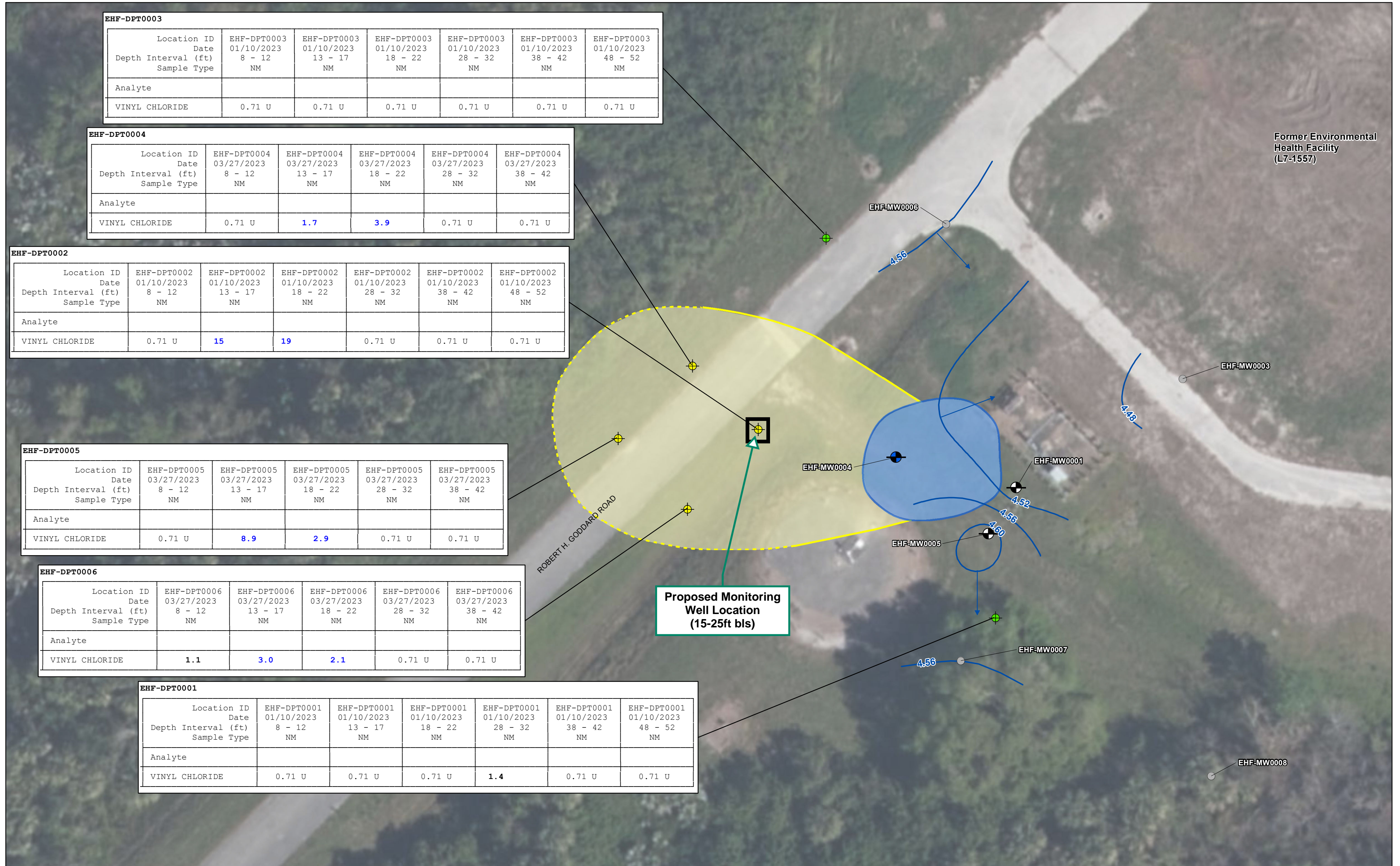
- Notes:**
- LTM = Long Term Monitoring
  - MW = Monitoring Well
  - NM = Normal Sample
  - SWMU = Solid Waste Management Unit
  - All results and screening criteria presented in µg/L.
  - U = Result was below the laboratory Method Detection Limit (MDL).
  - FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  - Blue font indicates an exceedance of FDEP GCTLs.
  - Aerial Source: ESRI 2018.
  - Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	1



**FIGURE 8-2**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Former Environmental Health Facility (EHF)  
 SWMU 079  
 NASA Kennedy Space Center, Florida



EHF-DPT0003						
Location ID	EHF-DPT0003	EHF-DPT0003	EHF-DPT0003	EHF-DPT0003	EHF-DPT0003	EHF-DPT0003
Date	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U	0.71 U

EHF-DPT0004					
Location ID	EHF-DPT0004	EHF-DPT0004	EHF-DPT0004	EHF-DPT0004	EHF-DPT0004
Date	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	0.71 U	1.7	3.9	0.71 U	0.71 U

EHF-DPT0002						
Location ID	EHF-DPT0002	EHF-DPT0002	EHF-DPT0002	EHF-DPT0002	EHF-DPT0002	EHF-DPT0002
Date	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	0.71 U	15	19	0.71 U	0.71 U	0.71 U

EHF-DPT0005					
Location ID	EHF-DPT0005	EHF-DPT0005	EHF-DPT0005	EHF-DPT0005	EHF-DPT0005
Date	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	0.71 U	8.9	2.9	0.71 U	0.71 U

EHF-DPT0006					
Location ID	EHF-DPT0006	EHF-DPT0006	EHF-DPT0006	EHF-DPT0006	EHF-DPT0006
Date	03/27/2023	03/27/2023	03/27/2023	03/27/2023	03/27/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42
Sample Type	NM	NM	NM	NM	NM
Analyte					
VINYL CHLORIDE	1.1	3.0	2.1	0.71 U	0.71 U

EHF-DPT0001						
Location ID	EHF-DPT0001	EHF-DPT0001	EHF-DPT0001	EHF-DPT0001	EHF-DPT0001	EHF-DPT0001
Date	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023	01/10/2023
Depth Interval (ft)	8 - 12	13 - 17	18 - 22	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	0.71 U	0.71 U	0.71 U	1.4	0.71 U	0.71 U

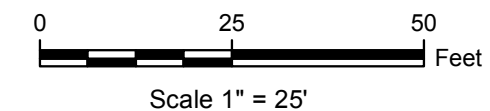
**Legend**

- DPT Does Not Exceed GCTL
- DPT Exceeds GCTL
- Intermediate LTM Well, Sample Results Exceeds GCTL
- Intermediate LTM Well, Sample Results Below GCTL
- Non-LTM Well, No Sample Results
- Intermediate Groundwater Elevation Contours - November 2022
- Direction of Groundwater Flow
- Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling
- Approximate Extent of Vinyl Chloride Greater Than GCTLs from DPT Sampling (Dashed Where Inferred)

**Notes:**

1. DPT = Direct Push Technology
2. LTM = Long Term Monitoring
3. MW = Monitoring Well
4. NM = Normal Sample
5. SWMU = Solid Waste Management Unit
6. U = Result was below the laboratory Method Detection Limit (MDL).
7. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
8. All results and screening criteria presented in µg/L.
9. **Bolded** results indicate the presence of an analyte at the specified concentration.
10. **Blue** font indicates an exceedance of FDEP GCTLs.
11. Aerial Source: FDOT 2018.
12. Depth is presented in feet below land surface.
13. Depth of screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	1



**FIGURE 8-3**  
**DPT Sampling Analytical Results**

2023 - Industrial Area Long Term Monitoring  
 Former Environmental Health Facility (EHF)  
 SWMU 079  
 NASA Kennedy Space Center, Florida

## **9. KENNEDY ATHLETIC, RECREATION, AND SOCIAL PARK 1**

This section provides a summary of the KARS Park 1 Location of Concern (LOC) 9 site (SWMU 084). Refer to **Figure 9** for a site map.

### **9.1 SITE DESCRIPTION AND HISTORY**

The KARS Park 1 site is located on East Hall Road, approximately 2.5 miles east of State Road 3, and approximately 5 miles south of KSC on Merritt Island. The 135 acre park is utilized by current and former NASA personnel as a recreational facility, which includes picnic areas; tent and recreational vehicle camp sites; tennis, volleyball, and basketball courts; softball fields; and a boat launch ramp. The LOC 9 area consists of former rifle, skeet, and pistol ranges, which have been inactive since 2003 (NASA 2008).

An RFI, completed in 2005, identified accumulated lead shot and spent skeet targets as a potential for release of contaminants. The RFI confirmed PAH and lead-impacted soils exceeding SCTLs and groundwater at concentrations exceeding the GCTL and KSC background level (Tetra Tech 2005).

Based on the RFI, the impacted soils at LOC 9 were to be removed during a series of soil IMs. PAH-impacted soils were addressed during Phase 1 of the soil IM between December 2004 and May 2005. Lead-impacted soils were addressed during Phases 2 and 3 of the Soil IM between June 2007 and February 2008. NFA for soil at LOC 9 was achieved in 2008 following the completion of successful excavation activities (NASA 2008).

As part of the 2005 RFI, a risk evaluation was conducted, which determined that groundwater posed an unacceptable human health risk if it was used as a potable water source. A CMS was performed in 2007 to determine the appropriate remedy for groundwater, which recommended NFA with controls (Tetra Tech 2007b). The remedy included LTM sampling of 12 monitoring wells, which began in 2008 on an annual schedule. In 2013, the sampling program changed to biennial groundwater sampling of three monitoring wells due to COC concentrations in the other nine monitoring wells reducing to below the GCTL (Tetra Tech 2013). LOC 9 changed to a 5-year sampling schedule after the July 2015 sampling event (Jacobs-CORE 2017b).

Lead concentrations were below the GCTL in the three remaining monitoring wells in November 2020. Monitoring well KP1-MW0018 was found destroyed during the November 2020 sampling event and was properly abandoned in July 2021 (HydroGeoLogic 2021).

### **9.2 FIELD ACTIVITIES**

A confirmation sampling event was performed in September 2021 following the November 2020 sampling event with no GCTL exceedances. Groundwater levels were measured at 16 monitoring wells, and groundwater samples were collected from three monitoring wells. In accordance with the recommendations from the 2021 IA LTM ADP, monitoring well

KP1-MW0022 was redeveloped and sampled in May 2022 due to debris obstructing the well screen. The following table shows the network of wells used for groundwater level measurements and sampling at LOC 9.

Well ID	Screen Interval (ft bls)	Analysis
KP1-MW0001	2-12	WL Only
KP1-MW0003	2-12	WL + Lead
KP1-MW0004	2-12	WL Only
KP1-MW0005	2-12	WL Only
KP1-MW0015	2-12	WL Only
KP1-MW0016	2-12	WL Only
KP1-MW0017	2-12	WL Only
KP1-MW0019	2-12	WL Only
KP1-MW0022	2-12	WL + Lead
KP1-MW0023	2-12	WL Only
KP1-MW0024	2-12	WL Only
KP1-MW0027	2-12	WL Only
KP1-MW0028	2-12	WL Only
KP1-MW0035	2-12	WL + Lead
KP1-MW0036	2-12	WL Only
KP1-MW0037	2-12	WL Only

ID = identification

Lead = total lead analysis by Method 6020

MW = monitoring well

WL = water level measurement

The groundwater samples collected during the September 2021 and May 2022 field events at KARS Park 1 LOC 9 were analyzed for lead by Method 6020. Below are the respective GCTLs and NADCs for the COC present at KARS Park 1 LOC 9.

COC	GCTL (µg/L)	NADC (µg/L)
Total lead	15	150

### 9.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the September 2021 sampling event were used to calculate groundwater elevations presented in **Table 9-1**. Groundwater elevations were used to determine the contours and flow direction for the shallow aquifer zone (2 ft bls to 12 ft bls) shown on **Figure 9-1**. The shallow groundwater flow direction at LOC 9 was toward the southeast in September 2021. The average historical groundwater flow at LOC 9 is east-southeast.

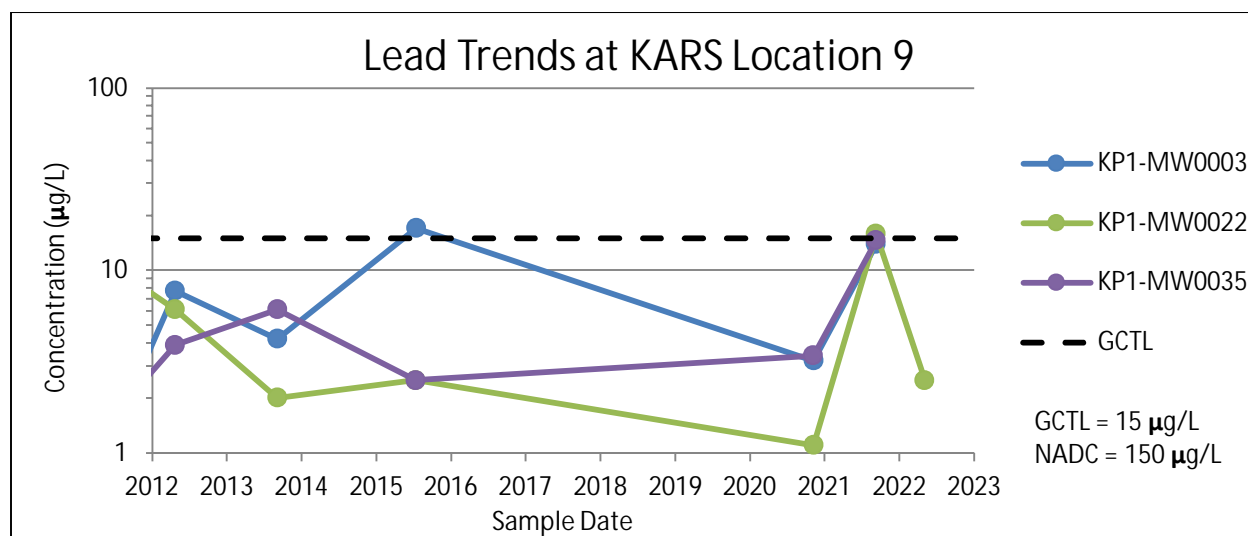
### 9.4 ANALYTICAL RESULTS

Lead concentrations were detected in groundwater at levels exceeding the GCTL at KP1-MW0022 (15.8 µg/L) in 2021; however, the detections were within the range of KSC

background concentrations (2.5 µg/L to 28 µg/L). Lead concentrations were not detected at KP1-MW0022 when resampled in May 2022. A summary of the analytical results from 2003 to present is presented in **Table 9-2**. Analytical results are depicted on **Figure 9-2**.

### 9.5 TREND ANALYSIS

Concentrations of lead at LOC 9 have decreased significantly since 2003. The three monitoring wells analyzed in 2021 have exhibited no clear trends during recent sampling events. The following chart shows the lead concentrations at LOC 9 since 2011.



### 9.6 CONCLUSION AND RECOMMENDATION

Total lead concentrations at monitoring well KP1-MW0022 were slightly elevated in September 2021, but were not detected in May 2022. Monitoring wells KP1-MW0003 and KP1-MW0035 are recommended to be removed from the sampling schedule because concentrations of total lead in these two monitoring wells have been below the GCTL for the last two consecutive sampling events. The 5-year LTM frequency is recommended to be accelerated to May 2023 at LOC 9 with 16 monitoring wells used for groundwater level measurements and a groundwater sample collected from KP1-MW0022. Pending continued analytical data below the GCTL in May 2023, long-term groundwater monitoring at KARS Park 1 LOC 9 is recommended to discontinue and the LUC is recommended to be removed.

The following table shows the recommended network of wells for groundwater level measurements and groundwater sampling for the next sampling event at KARS Park 1 LOC 9 scheduled for May 2023.

Well ID	Screen Interval (ft bls)	Analysis
KP1-MW0001	2-12	WL Only
KP1-MW0003	2-12	WL Only

Well ID	Screen Interval (ft bls)	Analysis
KP1-MW0004	2-12	WL Only
KP1-MW0005	2-12	WL Only
KP1-MW0015	2-12	WL Only
KP1-MW0016	2-12	WL Only
KP1-MW0017	2-12	WL Only
KP1-MW0019	2-12	WL Only
KP1-MW0022	2-12	WL + Lead
KP1-MW0023	2-12	WL Only
KP1-MW0024	2-12	WL Only
KP1-MW0027	2-12	WL Only
KP1-MW0028	2-12	WL Only
KP1-MW0035	2-12	WL Only
KP1-MW0036	2-12	WL Only
KP1-MW0037	2-12	WL Only

ID = identification

Lead = total lead analysis by Method 6020

MW = monitoring well

WL = water level measurement

**Table 9-1**  
**Kennedy Athletic, Recreation, and Social Park 1 - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0001		KP1-MW0003		KP1-MW0004	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	4.96		2.82		4.56	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	5.31	-0.35	2.20	0.62	5.08	-0.52
November 2020	3.15	1.81	>TOC	Not Measured	3.09	1.47
September 2021	4.58	0.38	2.01	0.81	4.25	0.31

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0005		KP1-MW0015		KP1-MW0016	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	4.79		3.01		4.21	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	5.23	-0.44	2.25	0.76	3.58	0.63
November 2020	3.25	1.54	0.00	3.01	1.15	3.06
September 2021	4.53	0.26	2.03	0.98	2.78	1.43

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0017		KP1-MW0018		KP1-MW0019	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	4.04		4.94		2.34	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	3.15	0.89	5.12	-0.18	2.79	-0.45
November 2020	0.87	3.17	Destroyed		1.00	1.34
September 2021	2.51	1.53	Abandoned		2.29	0.05

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0022		KP1-MW0023		KP1-MW0024	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	2.73		4.82		2.18	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	3.35	-0.62	4.52	0.30	2.68	-0.50
November 2020	1.60	1.13	2.55	2.27	0.95	1.23
September 2021	2.63	0.10	3.70	1.12	2.15	0.03
May 2022	3.38	-0.65	Not Measured		Not Measured	

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0027		KP1-MW0028		KP1-MW0035	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	5.57		2.64		1.99	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	5.37	0.20	3.16	-0.52	1.25	0.74
November 2020	3.32	2.25	1.00	1.64	0.62	1.37
September 2021	4.43	1.14	2.97	-0.33	1.88	0.11

<b>LOC9 SHALLOW WELL ID:</b>	KP1-MW0036		KP1-MW0037	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	2.10		4.98	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	2.10	0.00	5.41	-0.43
November 2020	0.27	1.83	3.49	1.49
September 2021	1.92	0.18	4.49	0.49

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

KP1 = Kennedy Athletic, Recreation, and Social Park 1

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 9-2**  
**KARS Park 1 - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Metals Analysis by Method SW846 6010D	
Analyte			TOTAL LEAD	DISSOLVED LEAD
FDEP GCTLs (µg/L)			15	15
FDEP NADCs (µg/L)			150	150
Location ID	Sample Date	Screened Interval (ft bls)		
<b>LOC 9: KP1-MW0001</b>	12/30/2003	2 - 12	<b>25.1</b>	<b>6.9</b>
	5/4/2006	2 - 12	<b>7.2</b>	1.7 U
<b>LOC 9: KP1-MW0003</b>	12/30/2003	2 - 12	<b>188</b>	<b>41.5</b>
	4/19/2004	2 - 12	<b>1,650</b>	<b>39.2</b>
	5/5/2006	2 - 12	<b>266</b>	<b>3.2 I</b>
	4/23/2008	2 - 12	<b>4.2 I</b>	<b>2.2 I</b>
	8/5/2008	2 - 12	<b>20.0</b>	2.0 U
	6/10/2009	2 - 12	<b>47.6</b>	<b>31.0</b>
	9/23/2009	2 - 12	<b>4.4 I</b>	<b>3.4 I</b>
	4/14/2010	2 - 12	3.4 J	2.0 U
	9/15/2010	2 - 12	6.2 J	2.0 U
	4/19/2011	2 - 12	<b>19.0</b>	<b>13.0</b>
	9/6/2011	2 - 12	2.0 U	2.0 U
	4/22/2012	2 - 12	<b>7.7 I</b>	2.0 U
	9/5/2013	2 - 12	<b>4.2 I</b>	<b>2.0 I</b>
	7/17/2015	2 - 12	<b>17.0</b>	NA
11/13/2020	2 - 12	<b>3.2 I</b>	NA	
9/16/2021	2 - 12	<b>13.9</b>	NA	
<b>LOC 9: KP1-MW0004</b>	2/20/2004	2 - 12	<b>55.7</b>	<b>8.7</b>
	2/24/2004	2 - 12	<b>82.2</b>	<b>50.3</b>
	4/23/2008	2 - 12	<b>2.8 I</b>	<b>2.9 I</b>
	8/5/2008	2 - 12	2 U	<b>2 I</b>
	6/10/2009	2 - 12	<b>2 I</b>	<b>2.1 I</b>
	9/23/2009	2 - 12	2 U	<b>2.5 I</b>
	4/14/2010	2 - 12	<b>2.1 J</b>	2 U
	9/15/2010	2 - 12	2 U	2 U
	4/19/2011	2 - 12	2 U	2 U
9/6/2011	2 - 12	2 U	2 U	
<b>LOC 9: KP1-MW0005</b>	2/20/2004	2 - 12	<b>24.4</b>	<b>12.3</b>
	2/24/2004	2 - 12	<b>28.7</b>	<b>19.4</b>
	5/4/2006	2 - 12	<b>42.1</b>	<b>32.5</b>
	4/24/2008	2 - 12	<b>2.6 I</b>	<b>2.3 I</b>
	8/6/2008	2 - 12	2 U	2 U
	6/10/2009	2 - 12	2 U	2 U
	9/23/2009	2 - 12	2 U	2 U
	4/14/2010	2 - 12	2 U	2 U
	9/15/2010	2 - 12	2 U	2 U
	4/19/2011	2 - 12	2 U	2 U
9/6/2011	2 - 12	2 U	2 U	
<b>LOC 9: KP1-MW0006</b>	2/20/2004	2 - 12	<b>8.3</b>	<b>5</b>
	2/24/2004	2 - 12	<b>13.5</b>	<b>3.4 I</b>
	5/4/2006	2 - 12	<b>20.7</b>	<b>17.6</b>
	4/24/2008	2 - 12	<b>12.5</b>	<b>5.9</b>
	8/6/2008	2 - 12	<b>9.6</b>	<b>8</b>
	6/10/2009	2 - 12	<b>3 I</b>	<b>2.2 I</b>
	9/23/2009	2 - 12	<b>10.4</b>	<b>4 I</b>
	4/14/2010	2 - 12	<b>4.3 J</b>	2 U
	9/15/2010	2 - 12	<b>2.4 J</b>	2 U
	4/19/2011	2 - 12	2 U	2 U
9/6/2011	2 - 12	<b>2.8 I</b>	2 U	



**Table 9-2**  
**KARS Park 1 - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Metals Analysis by Method SW846 6010D	
Analyte			TOTAL LEAD	DISSOLVED LEAD
FDEP GCTLs (µg/L)			15	15
FDEP NADCs (µg/L)			150	150
Location ID	Sample Date	Screened Interval (ft bls)		
LOC 9: KP1-MW0015	3/29/2005	2 - 12	7.8	3.7 I
	5/5/2006	2 - 12	5.9	3.3 I
LOC 9: KP1-MW0016	3/30/2005	2 - 12	6.4	1.2 U
	5/5/2006	2 - 12	1.8 I	1.7 U
LOC 9: KP1-MW0017	3/30/2005	2 - 12	5.5	3.9 I
	5/5/2006	2 - 12	7	3 I
LOC 9: KP1-MW0018	3/30/2005	2 - 12	85.7	16.4
	5/3/2006	2 - 12	6.7	1.7 U
	4/23/2008	2 - 12	2.2 I	2.3 I
	8/5/2008	2 - 12	2 U	2 U
LOC 9: KP1-MW0019	3/29/2005	2 - 12	40.2	35.8
	5/6/2006	2 - 12	73.4	12.4
	4/23/2008	2 - 12	2.6 I	2.8 I
	8/6/2008	2 - 12	2 U	2 U
LOC 9: KP1-MW0022	3/30/2005	2 - 12	1.2 U	1.2 U
	5/6/2006	2 - 12	2.1 I	1.7 U
	4/24/2008	2 - 12	4.6 I	3.2 I
	8/6/2008	2 - 12	3.6 I	2 U
	6/10/2009	2 - 12	22.8	16.5
	9/23/2009	2 - 12	5.3 I	6.2 I
	4/14/2010	2 - 12	2.0 U	2.0 U
	9/15/2010	2 - 12	6.7 J	6.4 J
	4/19/2011	2 - 12	2.6 I	3.0 I
	9/6/2011	2 - 12	9.1 I	7.9 I
	4/22/2012	2 - 12	6.1 I	2.0 U
	9/5/2013	2 - 12	2.0 I	2.0 I
	7/15/2015	2 - 12	2.5 U	NA
	11/13/2020	2 - 12	1.1 U	NA
	9/16/2021	2 - 12	15.8	NA
5/12/2022	2 - 12	2.50 U	NA	
LOC 9: KP1-MW0023	5/25/2005	1.5 - 11.5	2.3 I	1.2 U
	5/3/2006	1.5 - 11.5	1.7 U	1.7 U
LOC 9: KP1-MW0024	5/25/2005	2 - 12	1.2 U	1.2 U
	5/6/2006	2 - 12	3.1 I	2.4 I
	4/23/2008	2 - 12	2.5 I	2.4 I
	8/6/2008	2 - 12	3.8 I	2.7 I
LOC 9: KP1-MW0025	5/25/2005	8 - 18	1.2 U	1.2 U
	5/4/2006	8 - 18	1.7 U	1.7 U
LOC 9: KP1-MW0026	5/25/2005	8 - 18	1.2 U	1.2 U
	5/4/2006	8 - 18	1.7 I	1.7 U
LOC 9: KP1-MW0027	5/25/2005	2 - 12	1.4 I	1.2 U
	5/3/2006	2 - 12	5	3.1 I
LOC 9: KP1-MW0028	5/25/2005	2 - 12	1.2 I	1.6 I
	5/6/2006	2 - 12	3.4 I	3.2 I

**Table 9-2  
KARS Park 1 - Long Term Monitoring (LTM)  
Groundwater Sampling Analytical Results**

Category			Metals Analysis by Method SW846 6010D	
Analyte			TOTAL LEAD	DISSOLVED LEAD
FDEP GCTLs (µg/L)			15	15
FDEP NADCs (µg/L)			150	150
Location ID	Sample Date	Screened Interval (ft bls)		
<b>LOC 9: KP1-MW0035</b>	4/23/2008	2 - 12	<b>3.7 I</b>	<b>3.4 I</b>
	8/6/2008	2 - 12	<b>3.0 I</b>	2.0 U
	6/10/2009	2 - 12	<b>3.1 I</b>	2.0 U
	9/23/2009	2 - 12	<b>3.5 I</b>	<b>2.7 I</b>
	4/14/2010	2 - 12	2.0 U	2.2 J
	9/15/2010	2 - 12	2.0 U	2.0 U
	4/19/2011	2 - 12	2.0 U	2.0 U
	9/6/2011	2 - 12	2.0 U	2.0 U
	4/22/2012	2 - 12	<b>3.9 I</b>	2.0 U
	9/5/2013	2 - 12	<b>6.1 I</b>	<b>2.0 I</b>
	7/15/2015	2 - 12	2.5 U	NA
	11/13/2020	2 - 12	<b>3.4 I</b>	NA
9/16/2021	2 - 12	<b>14.6</b>	NA	
<b>LOC 9: KP1-MW0036</b>	4/23/2008	2 - 12	<b>2.1 I</b>	<b>2.8 I</b>
	8/5/2008	2 - 12	<b>2 I</b>	2 U
<b>LOC 9: KP1-MW0037</b>	4/23/2008	2 - 12	2.1 U	<b>2.3 I</b>
	8/5/2008	2 - 12	2 U	2 U
<b>LOC 9: KP1-MW0038</b>	4/23/2008	20 - 25	2.1 U	<b>3.5 I</b>
	8/5/2008	20 - 25	2 U	2 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

LOC = location of concern

KP1 = Kennedy Athletic, Recreation, and Social Park 1

MW = monitoring well

NA = Not Analyzed

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

J = Indicates an estimated value

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

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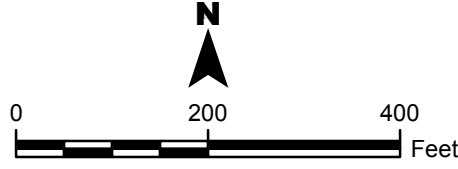


**Legend**

	Monitoring Well (LTM)		BUILDINGS
	Monitoring Well (LTM Water Level Only)		
	Monitoring Well (Non-LTM)		
	Abandoned Monitoring Well		

**Notes:**

- (2-12) = Monitoring well screen interval in feet below land surface
- KARS Park 1 = Kennedy Athletic, Recreation, and Social Park 1
- SWMU = Solid Waste Management Unit
- LTM = Long Term Monitoring
- Aerial Source: FDOT 2018



**FIGURE 9**  
**Site Map**

2021 - Industrial Area Long Term Monitoring  
 KARS Park 1 (KP1)  
 SWMU 084  
 NASA Kennedy Space Center, Florida

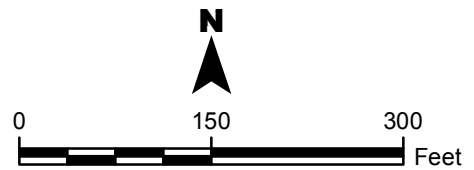
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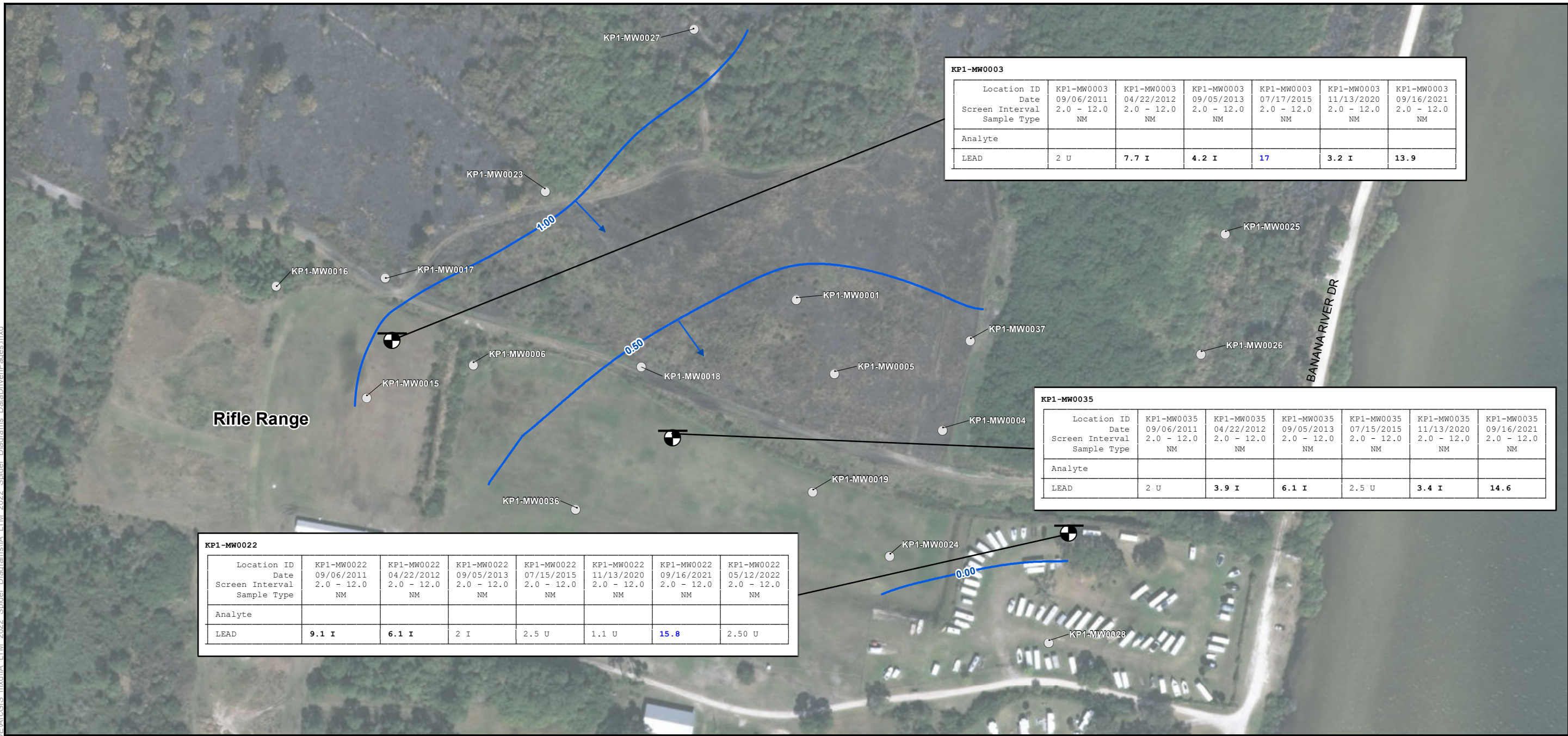
- Legend**
- ◆ Shallow Monitoring Well (2-12 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - ➔ Approximate Direction of Groundwater Flow
  - (0.03) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring wells were gauged in September 2021
- Groundwater Contour Interval = 0.50 ft
- ft bls = feet below land surface
- KARS Park 1 = Kennedy Athletic, Recreation, and Social Park 1
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



**FIGURE 9-1**  
**LOC 9 Groundwater Elevation Map—September 2021**  
 2021 - Industrial Area Long Term Monitoring  
 KARS Park 1 (KP1)  
 SWMU 084  
 NASA Kennedy Space Center, Florida



**KP1-MW0003**

Location ID	KP1-MW0003	KP1-MW0003	KP1-MW0003	KP1-MW0003	KP1-MW0003	KP1-MW0003
Date	09/06/2011	04/22/2012	09/05/2013	07/17/2015	11/13/2020	09/16/2021
Screen Interval	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
LEAD	2 U	<b>7.7 I</b>	<b>4.2 I</b>	<b>17</b>	<b>3.2 I</b>	<b>13.9</b>

**KP1-MW0035**

Location ID	KP1-MW0035	KP1-MW0035	KP1-MW0035	KP1-MW0035	KP1-MW0035	KP1-MW0035
Date	09/06/2011	04/22/2012	09/05/2013	07/15/2015	11/13/2020	09/16/2021
Screen Interval	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
LEAD	2 U	<b>3.9 I</b>	<b>6.1 I</b>	2.5 U	<b>3.4 I</b>	<b>14.6</b>

**KP1-MW0022**

Location ID	KP1-MW0022	KP1-MW0022	KP1-MW0022	KP1-MW0022	KP1-MW0022	KP1-MW0022	KP1-MW0022
Date	09/06/2011	04/22/2012	09/05/2013	07/15/2015	11/13/2020	09/16/2021	05/12/2022
Screen Interval	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0	2.0 - 12.0
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
LEAD	<b>9.1 I</b>	<b>6.1 I</b>	2 I	2.5 U	1.1 U	<b>15.8</b>	2.50 U

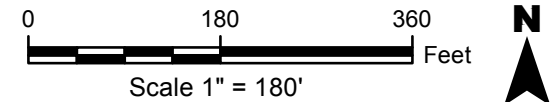
Analyte	GCTL
LEAD	<b>15</b>

**Legend**

- Shallow LTM Well, Sample Results Below GCTL
- Non-LTM, No Sample Results
- Shallow Groundwater Elevation Contours - September 2021
- Direction of Groundwater Flow

**Notes:**

1. LTM = Long Term Monitoring
2. MW = Monitoring Well
3. NM = Normal Sample
4. SWMU = Solid Waste Management Unit
5. All results and screening criteria presented in µg/L.
6. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
7. U = Result was below the laboratory MDL.
8. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
9. **Bolded** results indicate the presence of an analyte at the specified concentration.
10. **Blue** font indicates an exceedance of FDEP GCTLs.
11. Aerial Source: ESRI 2018.
12. Depth of monitoring well screen interval is presented in feet below land surface.



**FIGURE 9-2**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 KARS Park 1 (KP1)  
 SWMU 084  
 NASA Kennedy Space Center, Florida

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## 10. ENGINEERING DEVELOPMENT LABORATORY

This section provides a summary of the EDL site (SWMU 085). Refer to **Figure 10** for a site map.

### 10.1 SITE DESCRIPTION AND HISTORY

EDL is located south of the SSPF at the southeast corner of the East Avenue Southeast and 2<sup>nd</sup> Street Southeast intersection. The EDL Building was constructed in 1966 to support astronaut training for the Apollo Space Program, including mock simulators such as the Lunar Lander. The building is currently utilized as office space, a prototype machine shop, and material testing. The site consists of the EDL Building and associated support facilities (NASA 2005a).

A 2003 SWMU assessment recommended confirmatory sampling at EDL, which was performed in 2004 (J-BOSC 2003). Concentrations of VC were confirmed in groundwater exceeding the GCTL. In 2005, an RFI and risk evaluation confirmed the previous assessment, identifying VC as potentially causing an unacceptable human health risk if groundwater was to be used as a source of drinking water (LFR 2006a). To address contaminant concentrations that exceeded the GCTL, MNA of groundwater was selected to reduce VC concentrations (NASA 2005c). Annual LTM sampling of groundwater commenced at EDL in 2006, and transitioned to the current biennial groundwater sampling schedule in 2012.

### 10.2 FIELD ACTIVITIES

Field activities were conducted at EDL in November 2022. Groundwater levels were measured at four monitoring wells, and samples from two monitoring wells were collected during the event. The following table shows the network of monitoring wells used for groundwater level measurements and sampling at EDL.

Well ID	Screen Interval (ft bls)	Analysis
EDL-MW0004	30-40	WL + VC
EDL-MW0005	30-40	WL Only
EDL-MW0006R	30-40	WL + VC
EDL-MW0007	30-40	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

DPT groundwater sampling was performed at three locations in January 2023. The three locations were chosen to fill a historical data gap and complete a horizontal delineation of the VC plume along the southern boundary at EDL.

Groundwater samples collected during the November 2022 LTM and January 2023 DPT events were analyzed for VC by Method 8260. Below are the respective GCTLs and NADCs for the COC present at EDL.

COC	GCTL (µg/L)	NADC (µg/L)
VC	1	100

### 10.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the November 2022 sampling event were used to calculate groundwater elevations presented in **Table 10-1**. Groundwater elevations were used to determine the contours and flow direction for the intermediate aquifer zone (30 ft bls to 40 ft bls) at EDL, shown on **Figure 10-1**. The flow direction during the November 2022 sampling event was inward from the west and southeast, and outward to the north and south. Historically, groundwater flow direction has been toward the northeast on the western portion of the site and toward the northwest on the eastern portion of the site.

### 10.4 ANALYTICAL RESULTS

#### 10.4.1 Groundwater Analytical Results – Monitoring Wells

The concentrations of VC at monitoring wells EDL-MW0004 (2.4 µg/L) and EDL-MW0006R (1.5 µg/L) were above the GCTL. A summary of the analytical results is presented in **Table 10-2**. Analytical results are depicted on **Figure 10-2**.

#### 10.4.2 Groundwater Analytical Results – DPT

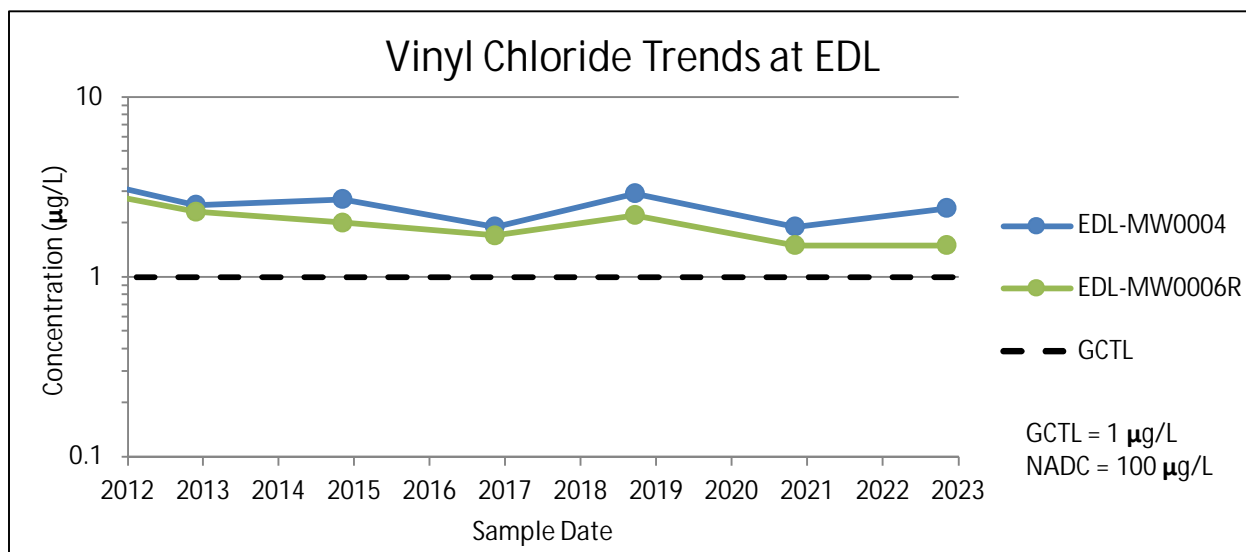
Groundwater samples were collected from the center of a 4 ft screen at the following depths: 30 ft bls, 40 ft bls, and 50 ft bls. The depth intervals were kept similar to past EDL site assessments to analyze COC concentrations above and below the present contaminated zone.

VC was not detected at EDL-DPT0012 and EDL-DPT0013. VC was detected below the GCTL at EDL-DPT0014 at 30 ft (0.94 I µg/L). A summary of the analytical results is presented in **Table 8-2**. **Figure 8-3** depicts the analytical results of the groundwater samples collected from each DPT location.

### 10.5 TREND ANALYSIS

November 2022 sampling results from monitoring wells EDL-MW0004 and EDL-MW0006R were compared to historical analytical trends. VC concentrations in both monitoring wells have been stable, remaining slightly above the GCTL. The following trend chart shows the VC concentrations at EDL since 2012.





## 10.6 CONCLUSION AND RECOMMENDATION

The southern boundary at EDL has been horizontally delineated south of EDL-MW0004 by DPT sampling in January 2023; however, concentrations of VC at select EDL monitoring wells remain slightly above the GCTL. Biennial LTM frequency is recommended to continue at monitoring wells EDL-MW0004 and EDL-MW0006R for VC analysis. Groundwater level measurements are recommended to continue at four monitoring wells.

The following table shows the recommended monitoring wells for water level measurements and groundwater sampling for the next sampling event at EDL scheduled for November 2024.

Well ID	Screen Interval (ft bls)	Analysis
EDL-MW0004	30-40	WL + VC
EDL-MW0005	30-40	WL Only
EDL-MW0006R	30-40	WL + VC
EDL-MW0007	30-40	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

**Table 10-1**  
**Engineering Development Laboratory - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	EDL-MW0004		EDL-MW0005		EDL-MW0006R	
<b>Screen Interval (ft bls):</b>	30 - 40		30 - 40		30 - 40	
<b>TOC Elevation (ft NAVD88):</b>	8.03		7.39		9.44	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	5.73	2.30	5.00	2.39	7.14	2.30
November 2016	5.74	2.29	5.02	2.37	7.15	2.29
March 2018	6.83	1.20	6.12	1.27	8.19	1.25
November 2020	4.92	3.11	4.14	3.25	6.33	3.11
November 2022	5.03	3.00	4.25	3.14	6.45	2.99

<b>INTERMEDIATE WELL ID:</b>	EDL-MW0007	
<b>Screen Interval (ft bls):</b>	30 - 40	
<b>TOC Elevation (ft NAVD88):</b>	8.44	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.05	2.39
November 2016	6.10	2.34
March 2018	7.18	1.26
November 2020	5.23	3.21
November 2022	5.38	3.06

**Notes:**

bls = below land surface

BTOC = below top of casing

EDL = Engineering Development Laboratory

ft = feet

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 10-2**  
**Engineering Development Laboratory - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>EDL-MW0004</b>	7/11/2005	30 - 40	<b>2.3</b>
	5/22/2006	30 - 40	<b>2.3</b>
	11/7/2006	30 - 40	<b>3.0</b>
	5/7/2007	30 - 40	<b>2.9</b>
	11/6/2007	30 - 40	<b>4.3</b>
	5/1/2008	30 - 40	<b>2.5</b>
	11/3/2008	30 - 40	<b>2.4</b>
	5/11/2009	30 - 40	<b>2.5</b>
	11/9/2009	30 - 40	<b>2.2</b>
	11/1/2010	30 - 40	<b>2.14</b>
	11/1/2011	30 - 40	<b>3.18</b>
	11/27/2012	30 - 40	<b>2.5</b>
	11/10/2014	30 - 40	<b>2.7</b>
	11/17/2016	30 - 40	<b>1.9</b>
9/25/2018	30 - 40	<b>2.9</b>	
11/10/2020	30 - 40	<b>1.9</b>	
11/15/2022	30 - 40	<b>2.4</b>	
<b>EDL-MW0006</b>	7/11/2005	30 - 40	<b>3.8</b>
	5/22/2006	30 - 40	<b>3.4</b>
	11/7/2006	30 - 40	<b>3.9</b>
	5/7/2007	30 - 40	<b>3.7</b>
	11/6/2007	30 - 40	<b>2.3</b>
	5/1/2008	30 - 40	<b>4.8</b>
11/3/2008	30 - 40	<b>4.6</b>	
<b>EDL-MW0006R</b>	6/1/2009	30 - 40	<b>2.2</b>
	11/9/2009	30 - 40	<b>2.3</b>
	11/1/2010	30 - 40	<b>1.93</b>
	11/1/2011	30 - 40	<b>2.82</b>
	11/27/2012	30 - 40	<b>2.3</b>
	11/10/2014	30 - 40	<b>2.0</b>
	11/17/2016	30 - 40	<b>1.7</b>
	9/25/2018	30 - 40	<b>2.2</b>
	11/10/2020	30 - 40	<b>1.5</b>
11/15/2022	30 - 40	<b>1.5</b>	

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

EDL = Engineering Development Laboratory

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

**Table 10-3**  
**Engineering Development Laboratory - Long Term Monitoring (LTM)**  
**DPT Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC)</i> <i>by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>EDL-DPT0012</b>	1/12/2023	28 - 32	0.71 U
	1/12/2023	38 - 42	0.71 U
	1/12/2023	48 - 52	0.71 U
<b>EDL-DPT0013</b>	1/12/2023	28 - 32	0.71 U
	1/12/2023	38 - 42	0.71 U
	1/12/2023	48 - 52	0.71 U
<b>EDL-DPT0014</b>	1/13/2023	28 - 32	<b>0.94 I</b>
	1/13/2023	38 - 42	0.71 U
	1/13/2023	48 - 52	0.71 U

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

EDL = Engineering Development Laboratory

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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





I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

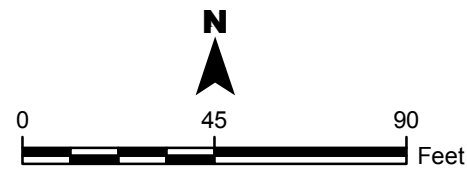


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- Legend**
-  Monitoring Well (LTM)
  -  Monitoring Well (LTM-Water Level Only)
  -  Monitoring Well (Non-LTM)
  -  Building

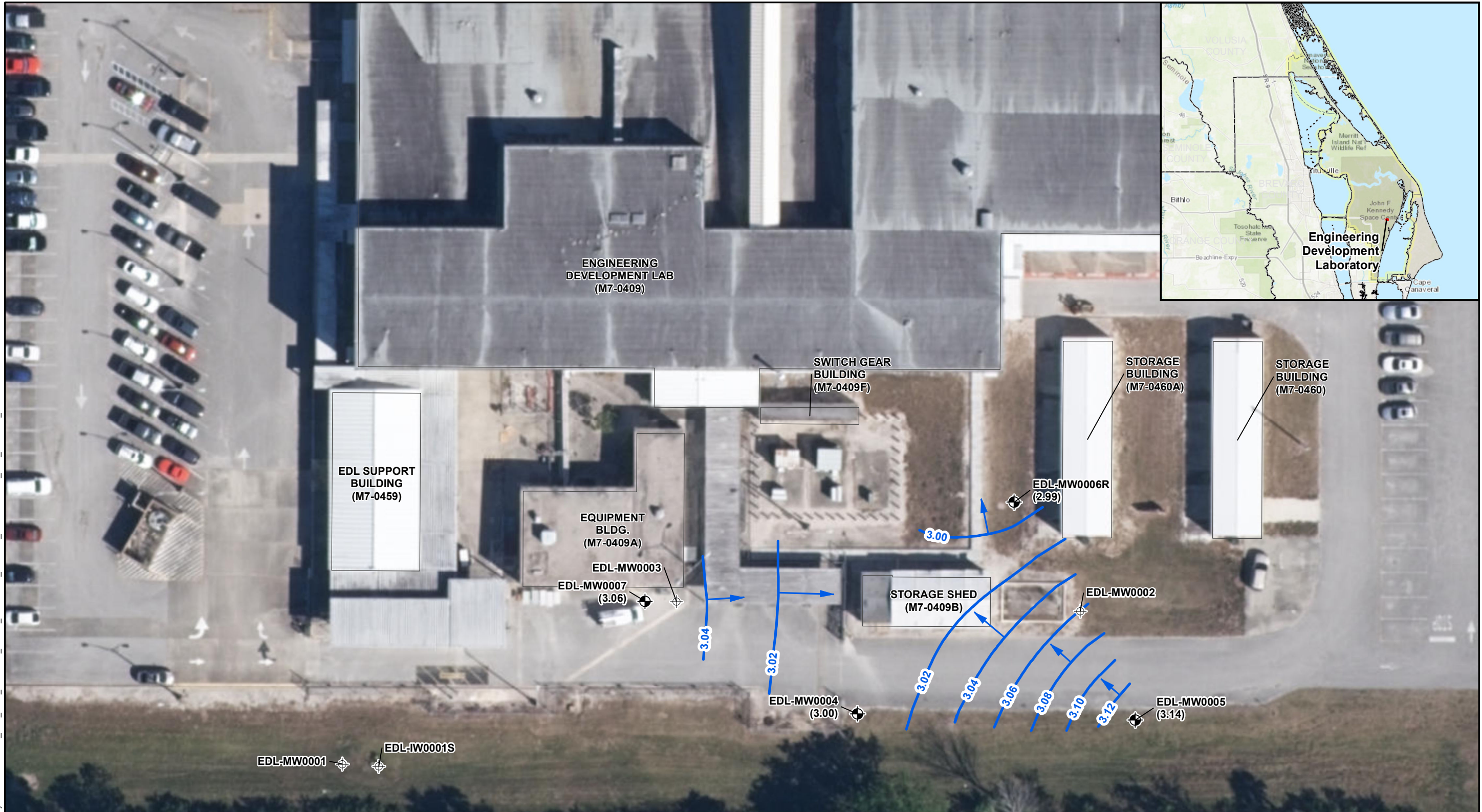
**Notes:**

- (30-40) = Monitoring well screen interval in feet below land surface
- SWMU = Solid Waste Management Unit
- LTM = Long Term Monitoring
- Aerial Source: FDOT 2018







**FIGURE 10**  
**Site Map**

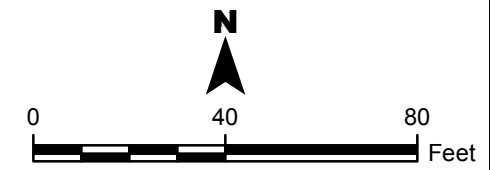
2022 - Industrial Area Long Term Monitoring  
 Engineering Development Laboratory (EDL)  
 SWMU 085  
 NASA Kennedy Space Center, Florida



Date Saved: 12/1/2022 11:59:47 AM  
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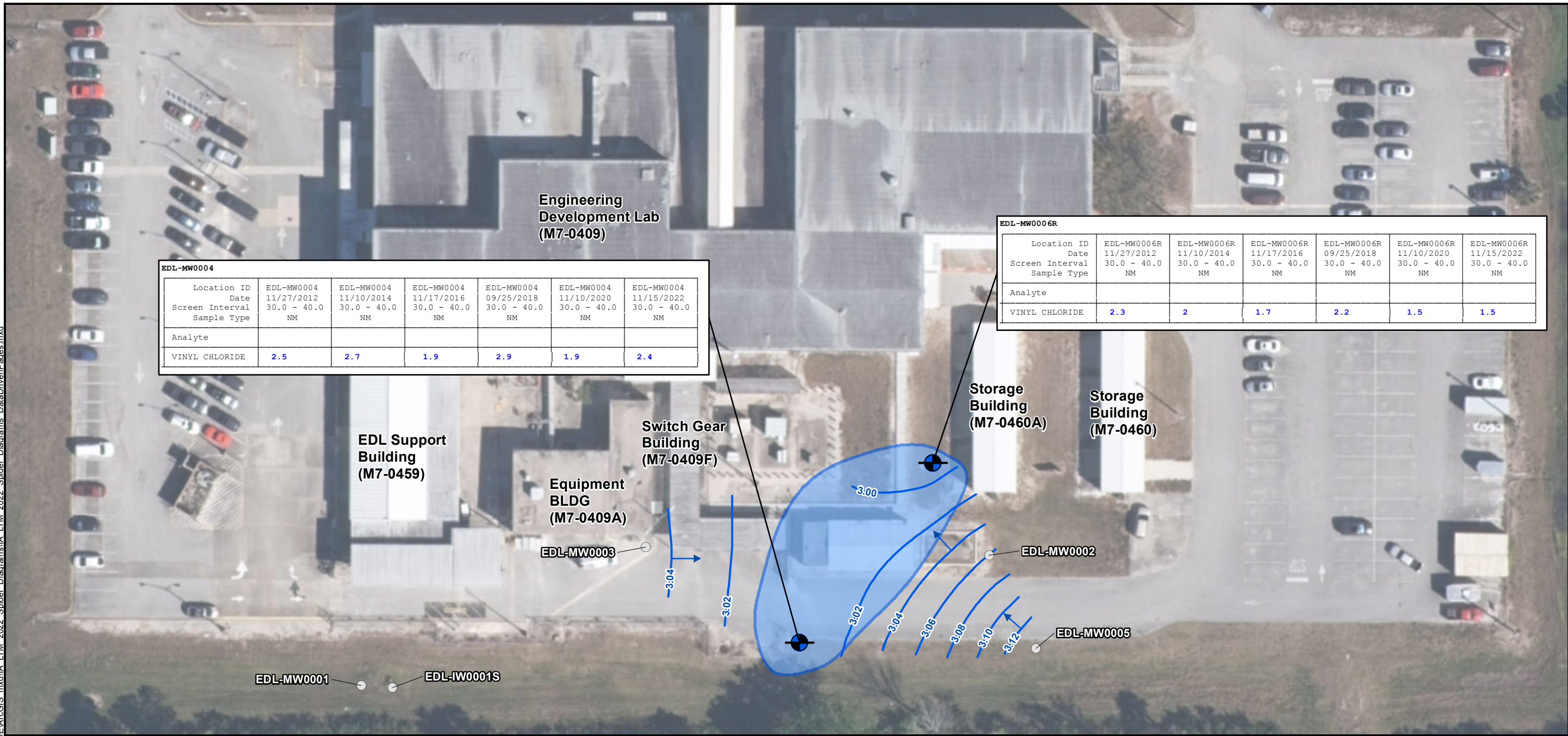
- Legend**
-  Monitoring Well (30-40 ft bls)
  -  Monitoring Well (Non-LTM)
  -  Groundwater Contour (NAVD88 ft)
  -  Approximate Direction of Groundwater Flow
  - (3.00) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- SWMU = Solid Waste Management Unit
  - LTM = Long Term Monitoring
  - Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 15, 2022
  - Groundwater Contour Interval = 0.02 ft
  - ft bls = feet below land surface
  - Aerial Source: FDOT 2018



**FIGURE 10-1**  
**Groundwater Elevation Map – November 2022**

2022 - Industrial Area Long Term Monitoring  
 Engineering Development Laboratory (EDL)  
 SWMU 085  
 NASA Kennedy Space Center, Florida



EDL-MW0004						
Location ID	EDL-MW0004	EDL-MW0004	EDL-MW0004	EDL-MW0004	EDL-MW0004	EDL-MW0004
Date	11/27/2012	11/10/2014	11/17/2016	09/25/2018	11/10/2020	11/15/2022
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	2.5	2.7	1.9	2.9	1.9	2.4

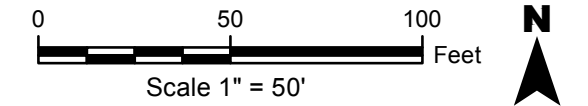
EDL-MW0006R						
Location ID	EDL-MW0006R	EDL-MW0006R	EDL-MW0006R	EDL-MW0006R	EDL-MW0006R	EDL-MW0006R
Date	11/27/2012	11/10/2014	11/17/2016	09/25/2018	11/10/2020	11/15/2022
Screen Interval	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0	30.0 - 40.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
VINYL CHLORIDE	2.3	2	1.7	2.2	1.5	1.5

Date Saved: 2/13/2023 3:20:24 PM  
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- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - November 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling

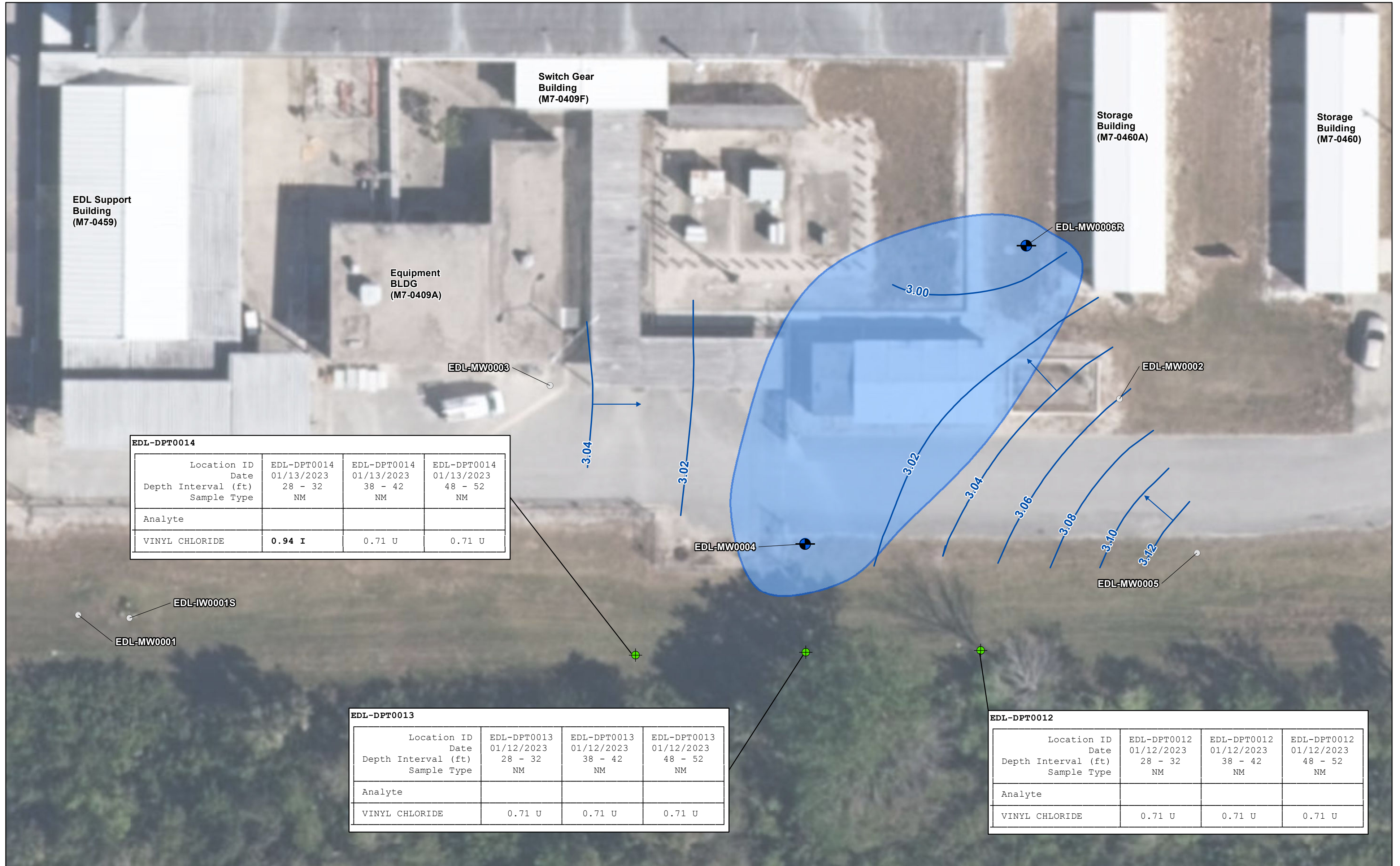
- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  7. Blue font indicates an exceedance of FDEP GCTLs.
  8. Aerial Source: ESRI 2018.
  9. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	1



**FIGURE 10-2**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Engineering Development Laboratory (EDL)  
 SWMU 085  
 NASA Kennedy Space Center, Florida



**EDL-DPT0014**

Location ID	EDL-DPT0014	EDL-DPT0014	EDL-DPT0014
Date	01/13/2023	01/13/2023	01/13/2023
Depth Interval (ft)	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM
Analyte			
VINYL CHLORIDE	<b>0.94 I</b>	0.71 U	0.71 U

**EDL-DPT0013**

Location ID	EDL-DPT0013	EDL-DPT0013	EDL-DPT0013
Date	01/12/2023	01/12/2023	01/12/2023
Depth Interval (ft)	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM
Analyte			
VINYL CHLORIDE	0.71 U	0.71 U	0.71 U

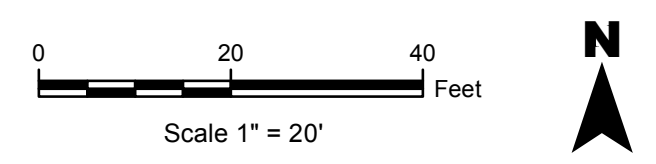
**EDL-DPT0012**

Location ID	EDL-DPT0012	EDL-DPT0012	EDL-DPT0012
Date	01/12/2023	01/12/2023	01/12/2023
Depth Interval (ft)	28 - 32	38 - 42	48 - 52
Sample Type	NM	NM	NM
Analyte			
VINYL CHLORIDE	0.71 U	0.71 U	0.71 U

- Legend**
- DPT Location, Sample Results Below GCTL
  - Intermediate LTM Well, Sample Results Exceed GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - November 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from MW Sampling

- Notes:**
1. DPT = Direct Push Technology
  2. LTM = Long Term Monitoring
  3. MW = Monitoring Well
  4. NM = Normal Sample
  5. SWMU = Solid Waste Management Unit
  6. All results and screening criteria presented in µg/L.
  7. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
  8. U = Result was below the laboratory MDL.
  9. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  10. **Bolded** results indicate the presence of an analyte at the specified concentration.
  11. **Blue** font indicates an exceedance of FDEP GCTLs.
  12. Aerial Source: FDOT 2018.
  13. Depth is presented in feet below land surface.
  14. Depth of screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	<b>1</b>



**FIGURE 10-3**  
**DPT Sampling Analytical Results**

2023 - Industrial Area Long Term Monitoring  
 Engineering Development Laboratory (EDL)  
 SWMU 085  
 NASA Kennedy Space Center, Florida



## 11. LAUNCH EQUIPMENT TEST FACILITY

This section provides a summary of the LETF site (SWMU 091). Refer to **Figure 11** for a site map.

### 11.1 SITE DESCRIPTION AND HISTORY

The LETF area is located south of the O&C Building and northwest of the intersection of East Avenue Southeast and 3<sup>rd</sup> Street Southeast. The LETF area is comprised of several buildings and large support structures, including the Supply, Shipping, and Receiving Warehouse/Payload Support Building, the LETF, the LETF Shipping and Receiving Building, the Waste and Water Support Building, the Cryogenic Testing Laboratory, and other support facilities. The majority of these facilities were constructed between 1963 and 1966. In 1976, the eastern portion of LETF was constructed to support launch equipment testing for the Space Shuttle Program (ARCADIS 2014).

During an RFI in 2006, Confirmatory sampling found VC concentrations in groundwater exceeding GCTLs. The assessment also showed that the VC plume in the eastern portion of the site was separate from the plume at the M7-0505 Treatment Tank Area (SWMU 039). In 2010, additional assessment during the RFI indicated that the LETF VC plume was delineated (ARCADIS 2011a). To address contaminant concentrations that exceeded GCTLs, MNA of groundwater was selected to reduce VC concentrations (ARCADIS 2014).

The remedy included LTM sampling of four monitoring wells, which began in 2008 on a semi-annual schedule. In 2009, groundwater sampling results showed increasing VC concentrations at monitoring well LETF-MW0001. Based on the VC concentration increases, additional groundwater assessment was conducted, which found VC exceeding both the GCTL and NADC. LETF was then removed from the LTM program for remedial action.

A remedial Alternatives Evaluation was completed in 2010 and a Remedial Action Plan was presented to the KSCRT in 2011 (ARCADIS 2011a), which recommended treatment of the VC plume area exceeding the NADC with an AS system. In 2012, the AS system began operation and groundwater monitoring was performed to monitor the effectiveness of the AS treatment. In 2013, VC groundwater concentration results across the site were below the NADC, and concentrations within the radius of influence of the AS system had fallen below the GCTL. In June 2013, the AS system was deactivated (ARCADIS 2014). The site was placed back into the LTM program in 2014 to monitor VC concentrations. Annual groundwater sampling resumed at LETF in July 2015, and transitioned to the current biennial sampling schedule in 2018.

## 11.2 FIELD ACTIVITIES

Field activities were performed at LETF in November 2021. Groundwater levels were measured at 14 monitoring wells and samples from six monitoring wells were collected. The following table shows the network of wells used for groundwater level measurements and sampling at LETF.

Well ID	Screen Interval (ft bls)	Analysis
LETF-MW0001	22.5-27.5	WL + VC
LETF-MW0002	22.5-27.5	WL + VC
LETF-MW0003	22.5-27.5	WL Only
LETF-MW0004	33.5-38.5	WL Only
LETF-MW0005	22.5-27.5	WL + VC
LETF-MW0006	33.5-38.5	WL Only
LETF-MW0007	33.5-38.5	WL + VC
LETF-MW0008	22.5-27.5	WL Only
LETF-MW0009	22.5-27.5	WL Only
LETF-MW0010	22.5-27.5	WL Only
LETF-MW0011	22.5-27.5	WL Only
LETF-PSB-MW0001I	22-27	WL + VC
LETF-PSB-MW0002I	22-27	WL + VC
LETF-PSB-MW0003I	20-25	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

Groundwater samples collected during the November 2021 event were analyzed for VC by Method 8260. Below are the respective GCTL and NADC for the COC present at LETF.

COC	GCTL (µg/L)	NADC (µg/L)
VC	1	100

## 11.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

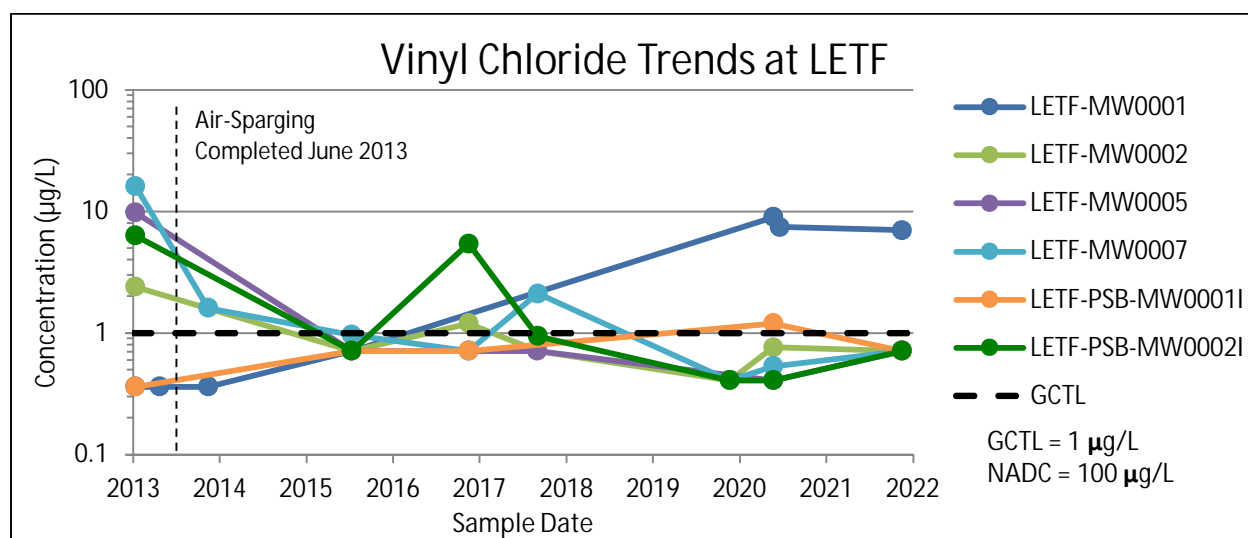
Groundwater levels collected during the November 2021 sampling event were used to calculate groundwater elevations presented in **Table 11-1**. Groundwater elevations were used to determine the contours and flow direction for the shallow-intermediate aquifer zone (20 ft bls to 37.5 ft bls), shown on **Figure 11-1**. The groundwater flow direction in November 2021 was centered around the drainage ditch between the LETF facility and the prototype shop. The historical flow direction generally ranges from southeast to southwest.

#### 11.4 ANALYTICAL RESULTS

VC concentrations exceeded the GCTL in monitoring well LETF-MW0001 (7.0 µg/L) in November 2021. A summary of the current and historical analytical results is presented in **Table 11-2**. Analytical results are depicted on **Figure 11-2**.

#### 11.5 TREND ANALYSIS

Once the AS system at LETF was shut down in June 2013, VC concentrations in several monitoring wells in the network slightly increased, but many are now below detection limits. VC at monitoring well LETF-MW0001 was below detection limits through 2015 and was taken out of the sampling schedule until the May 2020 event, where VC concentrations were found to be exceeding the GCTL. The following trend chart shows the VC concentrations at LETF since 2013.



#### 11.6 CONCLUSION AND RECOMMENDATION

VC concentrations continue to exceed the GCTL at monitoring well LETF-MW0001; therefore, the biennial sampling frequency is recommended to continue at LETF. However, with the consecutive non-detect and low-level VC concentrations at the remaining sampled monitoring wells, it is recommended that the sampling scope be reduced to two monitoring wells (LETF-MW0001 and downgradient LETF-PSB-MW0001) for VC analysis. Groundwater levels are recommended to continue to be measured at 14 monitoring wells.

The following table shows the recommended monitoring wells for water level measurements and groundwater sampling for the next sampling event at LETF scheduled for May 2023.

Well ID	Screen Interval (ft bls)	Analysis
LETf-MW0001	22.5-27.5	WL + VC
LETf-MW0002	22.5-27.5	WL Only
LETf-MW0003	22.5-27.5	WL Only
LETf-MW0004	33.5-38.5	WL Only
LETf-MW0005	22.5-27.5	WL Only
LETf-MW0006	33.5-38.5	WL Only
LETf-MW0007	33.5-38.5	WL Only
LETf-MW0008	22.5-27.5	WL Only
LETf-MW0009	22.5-27.5	WL Only
LETf-MW0010	22.5-27.5	WL Only
LETf-MW0011	22.5-27.5	WL Only
LETf-PSB-MW0001I	22-27	WL + VC
LETf-PSB-MW0002I	22-27	WL Only
LETf-PSB-MW0003I	20-25	WL Only

ID = identification

MW = monitoring well

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

**Table 11-1**  
**Launch Equipment Test Facility - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	LETF-MW0001		LETF-MW0002		LETF-MW0003	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	9.55		9.48		9.36	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	8.31	1.24	8.12	1.36	8.15	1.21
November 2016	6.94	2.61	6.70	2.78	6.79	2.57
September 2017	6.33	3.22	6.18	3.30	6.16	3.20
November 2019	6.40	3.15	6.17	3.31	6.23	3.13
May 2020	6.93	2.62	6.81	2.67	Not Measured	
November 2021	5.45	4.10	5.34	4.14	5.27	4.09
May 2023	6.00	3.55	5.88	3.60	5.83	3.53

<b>INTERMEDIATE WELL ID:</b>	LETF-MW0004		LETF-MW0005		LETF-MW0006	
<b>Screen Interval (ft bls):</b>	33.5 - 38.5		22.5 - 27.5		33.5 - 38.5	
<b>TOC Elevation (ft NAVD88):</b>	9.55		9.68		6.80	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	8.31	1.24	8.40	1.28	5.70	1.10
November 2016	6.94	2.61	7.20	2.48	4.20	2.60
September 2017	6.28	3.27	6.40	3.28	3.55	3.25
November 2019	6.36	3.19	Not Measured		Not Measured	
May 2020	Not Measured		6.94	2.74	Not Measured	
November 2021	5.48	4.07	5.55	4.13	2.62	4.18
May 2023	5.97	3.58	6.13	3.55	3.17	3.63

<b>INTERMEDIATE WELL ID:</b>	LETF-MW0007		LETF-MW0008		LETF-MW0009	
<b>Screen Interval (ft bls):</b>	33.5 - 38.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	9.40		9.10		9.48	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	8.18	1.22	7.8	1.30	8.16	1.32
November 2016	6.90	2.50	6.37	2.73	6.77	2.71
September 2017	6.18	3.22	5.83	3.27	6.23	3.25
November 2019	6.23	3.17	5.85	3.25	6.23	3.25
May 2020	6.81	2.59	Not Measured		Not Measured	
November 2021	5.28	4.12	5.03	4.07	5.31	4.17
May 2023	5.83	3.57	5.53	3.57	5.89	3.59

<b>INTERMEDIATE WELL ID:</b>	LETF-MW0010		LETF-MW0011		LETF-PSB-MW0001I	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22 - 27	
<b>TOC Elevation (ft NAVD88):</b>	9.65		8.63		8.86	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	8.37	1.28	7.44	1.19	7.58	1.28
November 2016	6.97	2.68	6.30	2.33	6.22	2.64
September 2017	6.42	3.23	5.38	3.25	5.57	3.29
November 2019	6.43	3.22	5.49	3.14	5.65	3.21
May 2020	Not Measured		Not Measured		6.15	2.71
November 2021	5.48	4.17	4.56	4.07	4.75	4.11
May 2023	6.06	3.59	5.10	3.53	5.27	3.59

<b>INTERMEDIATE WELL ID:</b>	LETF-PSB-MW0002I		LETF-PSB-MW0003I	
<b>Screen Interval (ft bls):</b>	22 - 27		20 - 25	
<b>TOC Elevation (ft NAVD88):</b>	6.72		7.25	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
July 2015	5.66	1.06	6.19	1.06
November 2016	4.22	2.50	4.88	2.37
September 2017	3.53	3.19	4.02	3.23
November 2019	3.64	3.08	4.13	3.12
May 2020	4.17	2.55	Not Measured	
November 2021	2.66	4.06	3.11	4.14
May 2023	3.16	3.56	3.68	3.57

**Notes:**

- bls = below land surface
- BTOC = below top of casing
- ft = feet
- LETF = Launch Equipment Test Facility
- MW = monitoring well
- NAVD88 = North American Vertical Datum of 1988
- TOC = top of casing

**Table 11-2**  
**Launch Equipment Test Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC) by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>LETf-MW0001</b>	5/22/2007	22.5 - 27.5	<b>180</b>
	12/16/2008	22.5 - 27.5	<b>25</b>
	5/14/2009	22.5 - 27.5	<b>140</b>
	12/3/2009	22.5 - 27.5	<b>170</b>
	5/19/2010	22.5 - 27.5	<b>160</b>
	11/3/2010	22.5 - 27.5	<b>86.1</b>
	5/4/2011	22.5 - 27.5	<b>77.5</b>
	11/16/2011	22.5 - 27.5	<b>89.4</b>
	4/16/2012	22.5 - 27.5	0.36 U
	7/24/2012	22.5 - 27.5	0.36 U
	10/10/2012	22.5 - 27.5	0.36 U
	1/9/2013	22.5 - 27.5	0.36 U
	4/23/2013	22.5 - 27.5	0.36 U
	11/14/2013	22.5 - 27.5	0.36 U
	7/14/2015	22.5 - 27.5	0.71 U
	5/28/2020	22.5 - 27.5	<b>9.0</b>
	6/26/2020	22.5 - 27.5	<b>7.4</b>
	11/23/2021	22.5 - 27.5	<b>7.0</b>
	5/26/2023	22.5 - 27.5	<b>7.6</b>
<b>LETf-MW0002</b>	5/22/2007	22.5 - 27.5	<b>4.8</b>
	5/14/2009	22.5 - 27.5	<b>14</b>
	12/3/2009	22.5 - 27.5	<b>10</b>
	5/18/2010	22.5 - 27.5	<b>12</b>
	11/3/2010	22.5 - 27.5	<b>10.9</b>
	5/4/2011	22.5 - 27.5	<b>11</b>
	11/16/2011	22.5 - 27.5	<b>13.7</b>
	1/10/2013	22.5 - 27.5	<b>2.4</b>
	7/14/2015	22.5 - 27.5	0.71 U
	11/18/2016	22.5 - 27.5	<b>1.2</b>
	9/5/2017	22.5 - 27.5	0.71 U
	11/26/2019	22.5 - 27.5	0.41 U
	5/28/2020	22.5 - 27.5	<b>0.76 I</b>
	11/23/2021	22.5 - 27.5	0.71 U

**Table 11-2**  
**Launch Equipment Test Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Volatile Organic Compounds (VOC) by Method 8260</i>
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
<b>LETf-MW0005</b>	5/22/2007	22.5 - 27.5	<b>21</b>
	5/14/2009	22.5 - 27.5	<b>13</b>
	12/3/2009	22.5 - 27.5	<b>14</b>
	5/19/2010	22.5 - 27.5	<b>11</b>
	11/3/2010	22.5 - 27.5	<b>5.77</b>
	5/4/2011	22.5 - 27.5	<b>6.2</b>
	11/16/2011	22.5 - 27.5	<b>6.78</b>
	1/9/2013	22.5 - 27.5	<b>9.8</b>
	7/14/2015	22.5 - 27.5	0.71 U
	11/18/2016	22.5 - 27.5	0.71 U
	9/5/2017	22.5 - 27.5	0.71 U
	5/28/2020	22.5 - 27.5	0.41 U
	11/23/2021	22.5 - 27.5	0.71 U
	<b>LETf-MW0007</b>	5/22/2007	33.5 - 38.5
5/14/2009		33.5 - 38.5	<b>59</b>
12/3/2009		33.5 - 38.5	<b>45</b>
5/18/2010		33.5 - 38.5	<b>48</b>
11/3/2010		33.5 - 38.5	<b>56.7</b>
5/4/2011		33.5 - 38.5	<b>57.1</b>
11/16/2011		33.5 - 38.5	<b>60.2</b>
7/24/2012		33.5 - 38.5	<b>60.1</b>
10/10/2012		33.5 - 38.5	<b>50</b>
1/9/2013		33.5 - 38.5	<b>16</b>
11/14/2013		33.5 - 38.5	<b>1.6</b>
7/14/2015		33.5 - 38.5	<b>0.96 I</b>
11/18/2016		33.5 - 38.5	0.71 U
9/6/2017		33.5 - 38.5	<b>2.1</b>
11/26/2019		33.5 - 38.5	0.41 U
5/28/2020		33.5 - 38.5	<b>0.53 I</b>
11/23/2021		33.5 - 38.5	0.71 U

**Table 11-2**  
**Launch Equipment Test Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260
Analyte			VINYL CHLORIDE
FDEP GCTLs (µg/L)			1
FDEP NADCs (µg/L)			100
Location ID	Sample Date	Screened Interval (ft bls)	
LETf-PSB-MW0001I	9/21/2006	22 - 27	<b>92.3</b>
	5/14/2009	22 - 27	<b>79</b>
	12/3/2009	22 - 27	<b>23</b>
	5/19/2010	22 - 27	<b>3.5</b>
	11/3/2010	22 - 27	<b>8.29</b>
	5/4/2011	22 - 27	<b>4.6</b>
	11/16/2011	22 - 27	<b>0.64 I</b>
	1/10/2013	22 - 27	0.36 U
	7/14/2015	22 - 27	0.71 U
	11/18/2016	22 - 27	0.71 U
	5/28/2020	22 - 27	<b>1.2</b>
	11/23/2021	22 - 27	0.71 U
	5/26/2023	22 - 27	0.71 U
LETf-PSB-MW0002I	9/19/2006	22 - 27	<b>26.2</b>
	5/14/2009	22 - 27	<b>6.5</b>
	12/3/2009	22 - 27	<b>3.8</b>
	5/18/2010	22 - 27	0.80 U
	11/3/2010	22 - 27	<b>3.94</b>
	5/4/2011	22 - 27	<b>10.2</b>
	11/16/2011	22 - 27	<b>7.7</b>
	1/9/2013	22 - 27	<b>6.3</b>
	7/14/2015	22 - 27	0.71 U
	11/18/2016	22 - 27	<b>5.4</b>
	9/6/2017	22 - 27	<b>0.94 I</b>
	11/26/2019	22 - 27	0.41 U
	5/28/2020	22 - 27	0.41 U
11/23/2021	22 - 27	0.71 U	

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

LETf = Launch Equipment Test Facility

MW = monitoring well

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit




U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit



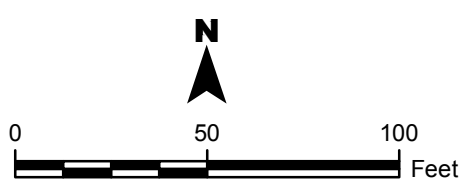
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- Legend**
-  Monitoring Well (LTM)
  -  Monitoring Well (LTM - Water Level Only)
  -  Building

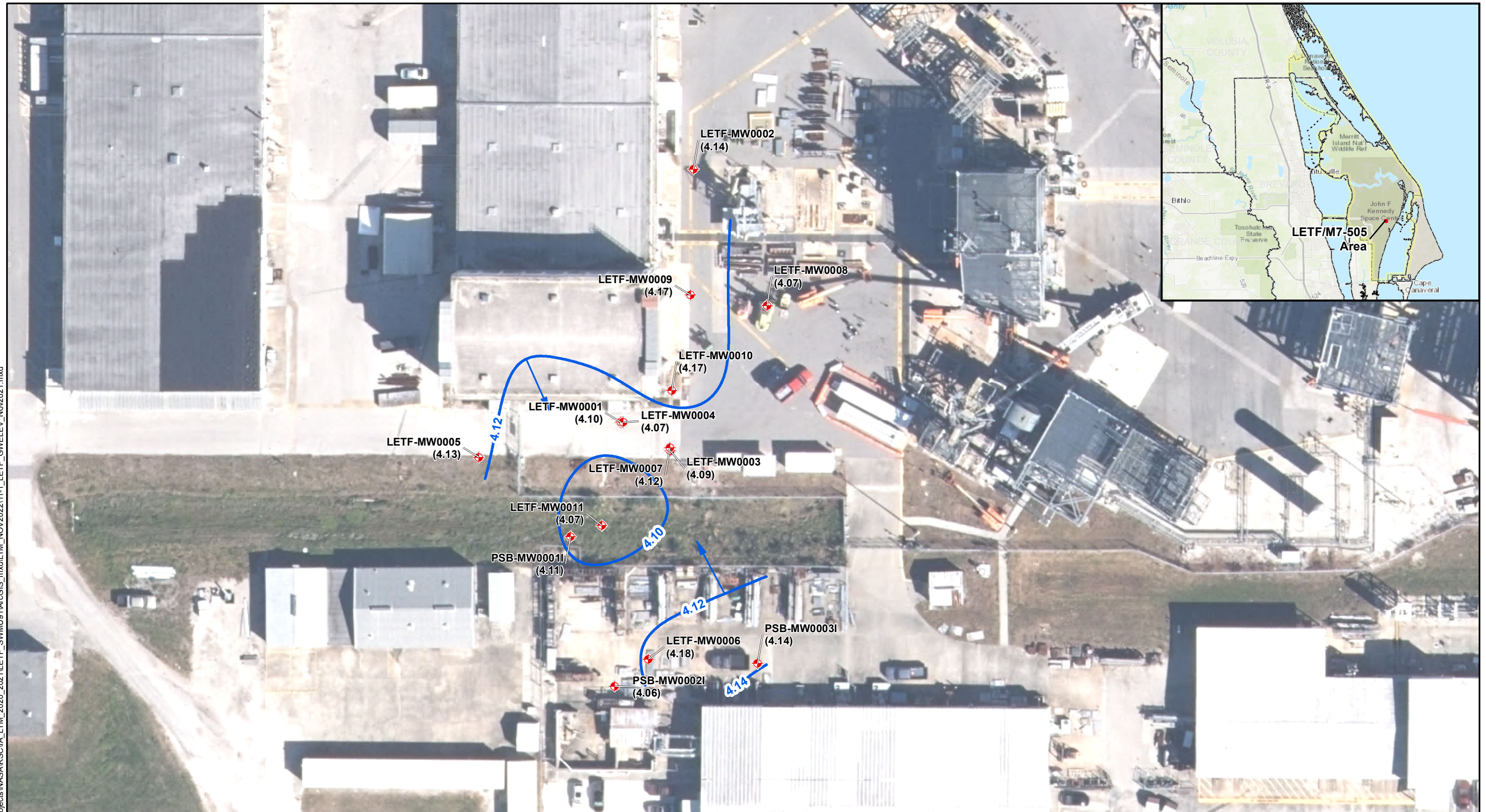
**Notes:**

- (20-25) = Monitoring well screen interval in feet below land surface
- SWMU = Solid Waste Management Unit
- Long Term Monitoring (LTM)
- Aerial Source: FDOT 2018



**FIGURE 11**  
**Site Map**  
 2022 - Industrial Area Long Term Monitoring  
 Launch Equipment Test Facility (LETf)  
 SWMU 091  
 NASA Kennedy Space Center, Florida

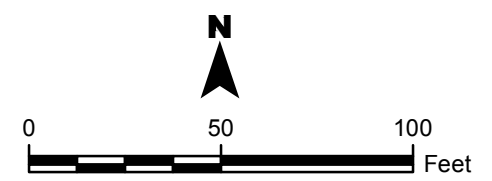
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- Legend**
- ◆ Monitoring Well (20-38.5 ft bls)
  - Approximate Direction of Groundwater Flow
  - Groundwater Contour (NAVD88 ft)
  - (4.06) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

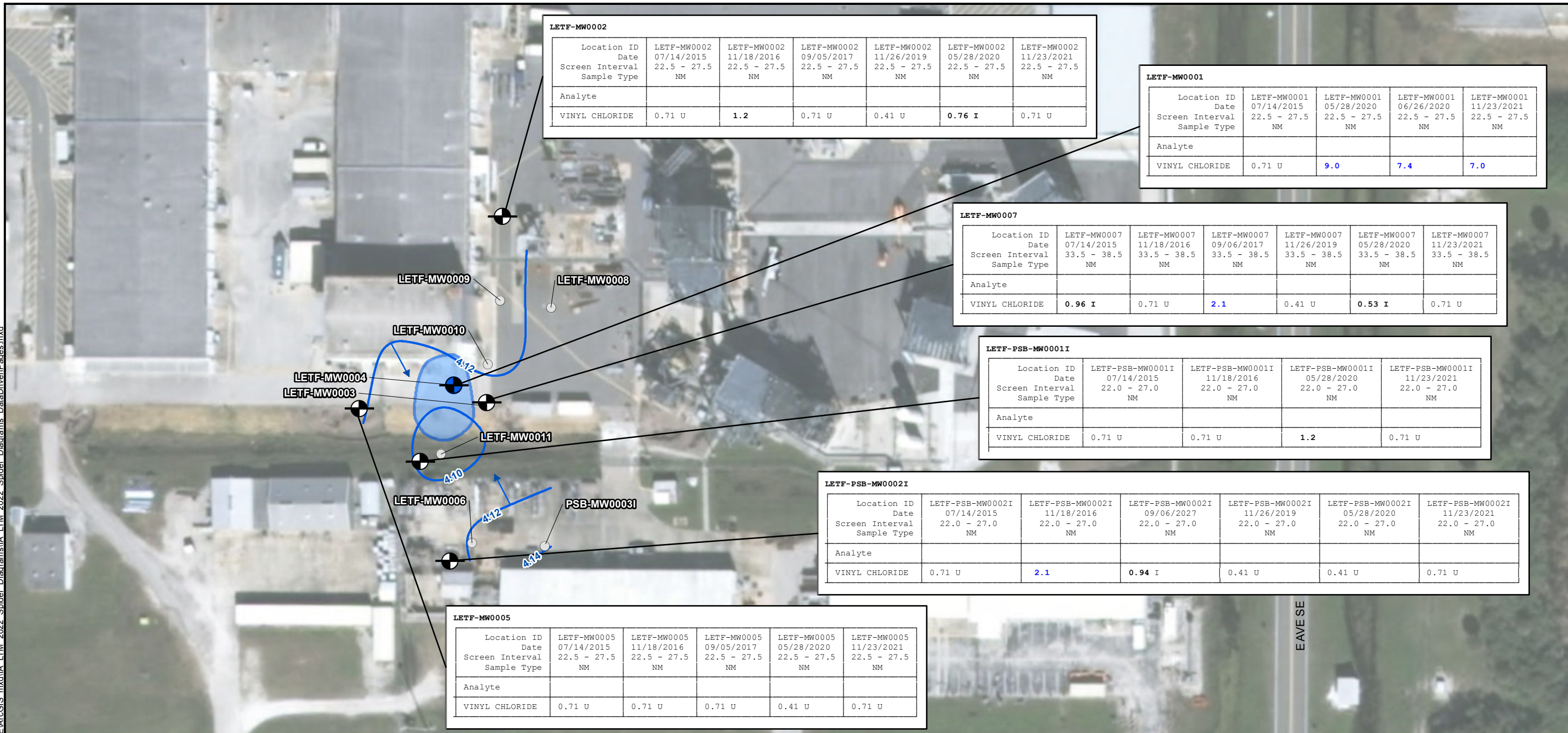
- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on November 23, 2021
- Groundwater Contour Interval = 0.02 ft
- (20-37.5 ft bls) = Monitoring well screen interval in feet below land surface
- NM = Not Measured
- SWMU = Solid Waste Management Unit
- Long Term Monitoring (LTM)
- Aerial Source: FDOT 2018



**FIGURE 11-1**  
**Groundwater Elevation Map – November 2021**

2021 - Industrial Area Long Term Monitoring  
 Launch Equipment Test Facility (LETF)  
 SWMU 091  
 NASA Kennedy Space Center, Florida

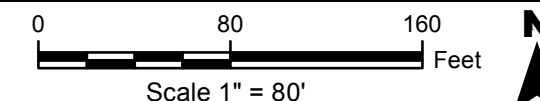
Date Saved: 2/13/2023 3:20:24 PM  
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- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Intermediate LTM Well, Sample Results Below GCTL
  - Non-LTM, No Sample Results
  - Intermediate Groundwater Elevation Contours - November 2021
  - Direction of Groundwater Flow
  - Approximate Extent of Vinyl Chloride Greater Than GCTLs from Monitoring Well Sampling

- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
  7. U = Result was below the laboratory MDL.
  8. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  9. **Bolded** results indicate the presence of an analyte at the specified concentration.
  10. **Blue** font indicates an exceedance of FDEP GCTLs.
  11. Aerial Source: ESRI 2018.
  12. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
VINYL CHLORIDE	<b>1</b>



**FIGURE 11-2**  
**Groundwater Sampling Analytical Results**  
 2022 - Industrial Area Long Term Monitoring  
 Launch Equipment Test Facility (LETf)  
 SWMU 091  
 NASA Kennedy Space Center, Florida

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## 12. MOBIL SERVICE STATION

This section provides a summary of the MOBIL site (SWMU 093). Refer to **Figure 12** for a site map.

### 12.1 SITE DESCRIPTION AND HISTORY

MOBIL is the KSC fueling service station, located at the intersection of Third Street Southeast and C Avenue Southeast. Constructed in 1967, the fueling service station was formerly known as the NASA Union 76, which changed to the Citgo Service Station in 2000 and it finally became a Mobil Station in 2011. The fueling service station is comprised of a small service station that provides on-site gasoline, diesel, and ethanol dispensers under a canopy. One compartmentalized 22,000-gallon UST containing gasoline and diesel fuel is located on the east side of the fuel dispensers. A 5,000-gallon ethanol above ground storage tank (AST) is also located on the eastern portion of the site (NASA 2012).

Between 2005 and 2006, a SWMU assessment and confirmatory sampling were conducted, which identified total xylene concentrations exceeding the GCTL and methyl tert-butyl ether (MTBE) exceeding the NADC (J-BOSC 2006). In 2007, a supplemental petroleum site assessment confirmed MTBE and total xylene exceedances, plus benzene, ethylbenzene, and naphthalene were also detected at concentrations exceeding their respective GCTLs (NASA 2012).

In 2009, a remedial alternatives evaluation was completed which described two pilot tests targeting the petroleum-impacted groundwater (LFR 2009a). An AS/SVE pilot test was performed, but the lithology at MOBIL limited the effectiveness of the AS/SVE system. Thus, full-scale implementation of AS/SVE was not recommended. The second pilot test, in situ chemical oxidation using RegenOx™, was injected into the groundwater. Results from the chemical oxidation pilot test indicated that the lithology also limited oxidant distribution, thus full-scale implementation was not recommended. Based on the limited effects from the two pilot tests, MNA and LTM were recommended and approved by the KSCRT as the remedy to treat the petroleum-impacted groundwater at MOBIL (NASA 2012). In 2010, semi-annual LTM sampling of groundwater began at the site until 2012, when the sampling frequency changed to the current biennial groundwater sampling schedule.

A historical review was completed in January 2023 to determine the extent of vertical delineation at the site. DPT groundwater samples were collected around the site at various depths in 2005 and 2006. The highest measured contamination in the 33ft to 37 ft interval was located at DPT0013 in 2006 (LFR 2006b). Monitoring wells CGO-MW0009 (screened 32.5 ft bls to 37.5 ft bls) and CGO-MW0013 (screened 42.5 ft bls to 47.5 ft bls) were installed at this location. Monitoring well CGO-MW0009 had a benzene exceedance in 2007, but no GCTL exceedances in 2008 or 2010. The samples collected from monitoring well CGO-MW0013 in 2007, 2008, and

2010 were non-detect (ARCADIS 2011b). Historical groundwater DPT and monitoring well analytical figures from 2006 and 2010 are provided in **Appendix M**.

## 12.2 FIELD ACTIVITIES

Field activities were conducted at MOBIL in May 2022. Groundwater levels were measured at nine monitoring wells, and samples from three monitoring wells were collected during the event. Monitoring well CGO-MW0019 was added to the 2022 sampling schedule to verify horizontal delineation. The following table shows the network of wells used for groundwater level measurements and sampling at MOBIL.

Well ID	Screen Interval (ft bls)	Analysis
CGO-MW0005	22.5-27.5	WL Only
CGO-MW0006	22.5-27.5	WL + select VOCs and select PAHs
CGO-MW0007	22.5-27.5	WL Only
CGO-MW0014	22.5-27.5	WL Only
CGO-MW0015	22.5-27.5	WL Only
CGO-MW0018	22.5-27.5	WL + select VOCs
CGO-MW0019	22.5-27.5	WL + select VOCs
CGO-MW0023	22.5-27.5	WL Only
CGO-MW0024	22.5-27.5	WL Only

ID = identification

MW = monitoring well

Select PAHs = naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene analysis by Method 8270

Select VOCs = benzene, 1,2,4-TMB, xylenes, and MTBE analysis by Method 8260

WL = water level measurement

The groundwater samples collected at monitoring wells CGO-MW0006, CGO-MW0018, and CGO-MW0019 were analyzed for VOCs by Method 8260, and samples from CGO-MW0006 were also analyzed for PAHs by Method 8270. The following table shows the COCs for MOBIL with their respective GCTLs and NADCs.

COC	GCTL (µg/L)	NADC (µg/L)
Benzene	1	100
Isopropylbenzene	0.8	8
1,2,4-TMB	10	100
Xylenes	20	200
MTBE	20	200
Naphthalene	14	140
1-Methylnaphthalene	28	280
2-Methylnaphthalene	28	280

### 12.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

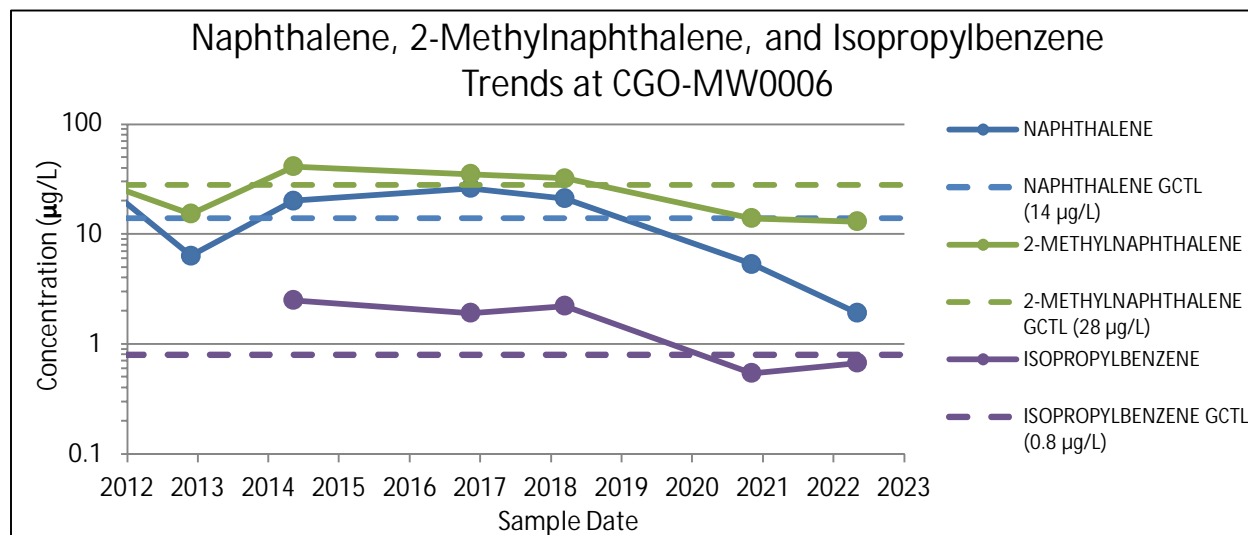
Groundwater levels collected during the May 2022 sampling event were used to calculate groundwater elevations presented in **Table 12-1**. Groundwater elevations were used to determine the contours and flow direction for the intermediate groundwater horizon (22.5 ft bls to 27.5 ft bls), shown on **Figure 12-1**. The groundwater flow direction was radially outward with a high mound centered around monitoring well CGO-MW0019. Groundwater flow direction has been historically toward the south-southwest.

### 12.4 ANALYTICAL RESULTS

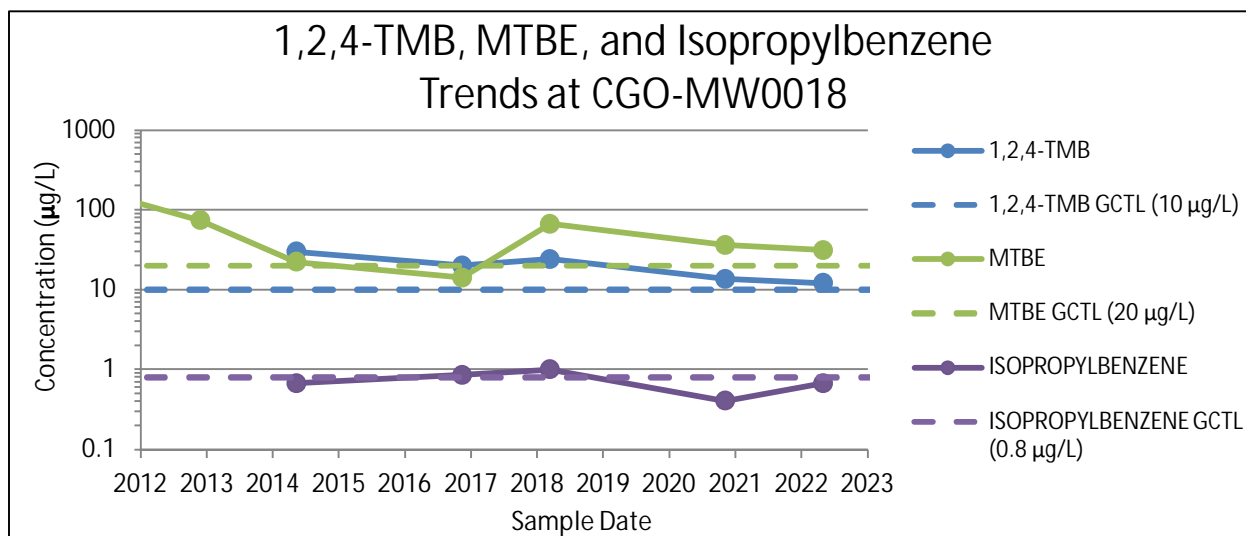
Select PAHs were detected at monitoring well CGO-MW0006; however, none of the results exceeded GCTLs. Monitoring well CGO-MW0018 had GCTL exceedances of MTBE (31 µg/L) and 1,2,4-trimethylbenzene (TMB) (12 µg/L). The select VOCs analyzed at monitoring well CGO-MW0019 were below the respective GCTLs. A summary of the recent and historical analytical results is presented in **Table 12-2**. Analytical results are depicted on **Figure 12-2**.

### 12.5 TREND ANALYSIS

Monitoring well CGO-MW0006 has exhibited a decreasing trend since 2014 and has been below GCTLs for the second consecutive event. The following trend chart shows the naphthalene, 2-methylnaphthalene, and isopropylbenzene concentrations at CGO-MW0006 since 2012.



MTBE and 1,2,4-TMB remain above GCTLs at monitoring well CGO-MW0018 but have both shown recent declines since the 2018 sampling event. Isopropylbenzene exceeded the GCTL in 2016 and 2018 but has dropped below the GCTL in 2020 and 2022. The following trend chart shows the MTBE, 1,2,4-TMB, and isopropylbenzene concentrations at CGO-MW0018 since 2012.



Monitoring well CGO-MW0019 was recently added to the sampling schedule and was previously sampled in 2009. Although no recent trends can be generated for CGO-MW0019, the analytical results from 2009 and 2022 were below GCTLs.

## 12.6 CONCLUSION AND RECOMMENDATION

The analytes at monitoring wells CGO-MW0006 and CGO-MW0019 were below GCTLs in May 2022. MTBE and 1,2,4-TMB concentrations at monitoring well CGO-MW0018 remain above GCTLs, but are continuing to decrease.

Eight historically clean monitoring wells are recommended to be abandoned. Historical groundwater data are provided in **Table 12-2**. These eight monitoring wells were installed during assessment and early LTM activities, before the plume was determined to be isolated in the intermediate zone at this site (22.5 ft bls to 27.5 ft bls). The eight monitoring wells proposed for abandonment, located around the perimeter of the site, are screened above or below the monitored plume, and not used for plume delineation.

The following table lists the proposed monitoring wells to abandon and their screen intervals:

Well ID	Screen Interval (ft bls)
CGO-MW0002	2-12
CGO-MW0003	2-12
CGO-MW0004	2-12
CGO-MW0009	32.5-37.5
CGO-MW0010	32.5-37.5
CGO-MW0012	32.5-37.5
CGO-MW0013	42.5-47.5
CGO-MW0016	32.5-27.5



The biennial LTM sampling frequency is recommended to continue at MOBIL with monitoring wells CGO-MW0005, CGO-MW0023, and CGO-MW0024 added into the sampling program to verify downgradient VOC concentrations. Six monitoring wells are recommended to be analyzed for select VOCs (benzene, 1,2,4-TMB, xylenes, and MTBE), and monitoring well CGO-MW0006 will also be analyzed for select PAHs (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). Groundwater levels are recommended to continue to be measured at nine monitoring wells.

The following table shows the recommended monitoring wells for water level measurements and groundwater sampling for the next sampling event at MOBIL, scheduled for November 2024.

<b>Well ID</b>	<b>Screen Interval (ft bls)</b>	<b>Analysis</b>
CGO-MW0005	22.5-27.5	WL + select VOCs
CGO-MW0006	22.5-27.5	WL + select VOCs and select PAHs
CGO-MW0007	22.5-27.5	WL Only
CGO-MW0014	22.5-27.5	WL Only
CGO-MW0015	22.5-27.5	WL Only
CGO-MW0018	22.5-27.5	WL + select VOCs
CGO-MW0019	22.5-27.5	WL + select VOCs
CGO-MW0023	22.5-27.5	WL + select VOCs
CGO-MW0024	22.5-27.5	WL + select VOCs

ID = identification

MW = monitoring well

Select PAHs = naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene analysis by Method 8270

Select VOCs = benzene, 1,2,4-TMB, xylenes, and MTBE analysis by Method 8260

WL = water level measurement

**Table 12-1**  
**Mobil Service Station - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	CGO-MW0005		CGO-MW0006		CGO-MW0007	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	6.74		8.70		6.71	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	3.62	3.12	5.62	3.08	3.73	2.98
November 2016	3.21	3.53	5.21	3.49	3.32	3.39
March 2018	3.21	3.53	5.21	3.49	3.32	3.39
November 2020	2.00	4.74	4.06	4.64	2.14	4.57
May 2022	3.49	3.25	5.50	3.20	3.62	3.09

<b>INTERMEDIATE WELL ID:</b>	CGO-MW0014		CGO-MW0015		CGO-MW0018	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	7.82		6.83		6.60	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	4.72	3.10	3.74	3.09	3.45	3.15
November 2016	4.34	3.48	3.38	3.45	3.09	3.51
March 2018	4.34	3.48	3.38	3.45	3.09	3.51
November 2020	3.19	4.63	2.27	4.56	1.83	4.77
May 2022	4.58	3.24	3.64	3.19	3.39	3.21

<b>INTERMEDIATE WELL ID:</b>	CGO-MW0019		CGO-MW0023		CGO-MW0024	
<b>Screen Interval (ft bls):</b>	22.5 - 27.5		22.5 - 27.5		22.5 - 27.5	
<b>TOC Elevation (ft NAVD88):</b>	6.38		6.75		6.73	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	3.21	3.17	3.64	3.11	3.62	3.11
November 2016	2.34	4.04	3.24	3.51	3.22	3.51
March 2018	2.34	4.04	3.24	3.51	3.22	3.51
November 2020	1.65	4.73	2.08	4.67	2.05	4.68
May 2022	2.84	3.54	3.57	3.18	3.54	3.19

**Notes:**

bls = below land surface

BTOC = below top of casing

CGO = Citgo Service Station

ft = feet

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 12-2**  
**Mobil Service Station - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260					
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	1,2,4-TRIMETHYL BENZENE	1,3,5-TRIMETHYL BENZENE	BENZENE	ISOPROPYL BENZENE	METHYL TERT- BUTYL ETHER	TOTAL XYLENES
FDEP GCTLs (µg/L)			28	28	14	10	10	1	0.8	20	20
FDEP NADCs (µg/L)			280	280	140	100	100	100	8	200	200
Location ID	Sample Date	Screened Interval (ft bls)									
CGO-MW0001	5/30/2007	2 - 12	0.04 U	0.041 U	<b>0.080 I</b>	NA	NA	0.088 U	NA	<b>36</b>	<b>13.2</b>
	5/21/2008	2 - 12	0.038 U	0.039 U	0.048 U	NA	NA	0.2 U	NA	<b>40</b>	<b>9.9</b>
	4/30/2009	2 - 12	NA	NA	NA	NA	NA	0.52 U	NA	<b>25</b>	<b>0.4 I</b>
	7/24/2009	2 - 12	NA	NA	NA	NA	NA	0.52 U	NA	<b>12</b>	<b>0.69 I</b>
	5/18/2010	2 - 12	NA	NA	NA	NA	NA	0.21 U	NA	<b>3.8</b>	1.24 U
	11/15/2011	2 - 12	NA	NA	NA	NA	NA	0.21 U	NA	0.14 U	0.55 U
CGO-MW0002	5/30/2007	2 - 12	0.042 U	0.043 U	0.053 U	NA	NA	0.088 U	NA	<b>4.6</b>	0.273 U
	5/21/2008	2 - 12	0.039 U	0.04 U	0.049 U	NA	NA	0.2 U	NA	<b>9.8</b>	<b>17.5</b>
CGO-MW0003	5/30/2007	2 - 12	0.037 U	0.038 U	<b>0.054 I</b>	NA	NA	0.088 U	NA	<b>2.4</b>	<b>0.49 I</b>
	5/21/2008	2 - 12	0.039 U	0.04 U	0.048 U	NA	NA	0.2 U	NA	<b>4.0</b>	<b>0.32 I</b>
CGO-MW0004	5/30/2007	2 - 12	0.036 U	0.037 U	<b>0.068 I</b>	NA	NA	0.088 U	NA	1.3 U	0.273 U
	5/21/2008	2 - 12	0.039 U	0.04 U	0.048 U	NA	NA	0.2 U	NA	<b>1.1 I</b>	0.72 U
CGO-MW0005	5/30/2007	22.5 - 27.5	0.041 U	0.042 U	0.051 U	NA	NA	<b>4.3</b>	NA	<b>190</b>	<b>1.1</b>
	5/21/2008	22.5 - 27.5	0.039 U	0.04 U	0.048 U	NA	NA	<b>7.1</b>	NA	<b>230</b>	<b>0.51 I</b>
	4/30/2009	22.5 - 27.5	NA	NA	NA	NA	NA	<b>8.1</b>	NA	<b>240</b>	0.32 U
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	<b>3.5</b>	NA	<b>140</b>	0.32 U
CGO-MW0006	5/30/2007	22.5 - 27.5	<b>10</b>	<b>16</b>	<b>16</b>	NA	NA	<b>0.64 I</b>	NA	1.3 U	<b>3.44 I</b>
	5/22/2008	22.5 - 27.5	<b>11</b>	<b>19</b>	<b>15</b>	NA	NA	0.2 U	NA	0.16 U	<b>2.80</b>
	5/18/2010	22.5 - 27.5	<b>12</b>	<b>26</b>	<b>18</b>	NA	NA	<b>0.38 I</b>	NA	0.14 U	<b>1.63</b>
	11/15/2010	22.5 - 27.5	<b>11</b>	<b>23</b>	<b>19</b>	NA	NA	<b>0.32 I</b>	NA	0.14 U	<b>1.76 I</b>
	5/11/2011	22.5 - 27.5	<b>10.9</b>	<b>17.6</b>	<b>20.1</b>	NA	NA	<b>0.49 I</b>	NA	0.24 U	<b>0.31 I</b>
	11/2/2011	22.5 - 27.5	<b>12.1</b>	<b>26.5</b>	<b>22.9</b>	NA	NA	<b>0.51 I</b>	NA	0.24 U	0.14 U
	11/27/2012	22.5 - 27.5	<b>6.17</b>	<b>15.2</b>	<b>6.32</b>	NA	NA	<b>0.44 I</b>	NA	0.24 U	<b>1.6</b>
	5/14/2014	22.5 - 27.5	<b>22</b>	<b>41</b>	<b>20</b>	<b>3.0</b>	0.58 U	0.71 U	<b>2.5</b>	0.60 U	1.3 U
	11/16/2016	22.5 - 27.5	<b>16</b>	<b>35</b>	<b>26</b>	<b>1.8</b>	0.58 U	0.71 U	<b>1.9</b>	0.60 U	1.3 U
	3/19/2018	22.5 - 27.5	<b>17</b>	<b>32</b>	<b>21</b>	<b>1.9</b>	0.58 U	0.71 U	<b>2.2</b>	0.60 U	<b>1.3 I</b>
	11/11/2020	22.5 - 27.5	<b>8.0</b>	<b>13.8</b>	<b>7.3</b>	<b>0.51 I</b>	0.27 U	0.31 U	<b>0.54 I</b>	0.23 U	0.72 U
	5/11/2022	22.5 - 27.5	<b>6.5</b>	<b>13</b>	<b>1.9</b>	0.69 U	0.58 U	0.71 U	0.67 U	0.60 U	1.3 U
CGO-MW0007	5/31/2007	22.5 - 27.5	0.043 U	0.044 U	<b>0.076 I</b>	NA	NA	<b>140</b>	NA	<b>80</b>	0.273 U
	5/22/2008	22.5 - 27.5	0.039 U	0.04 U	<b>0.056 I</b>	NA	NA	<b>280</b>	NA	<b>75</b>	<b>1.9</b>
	5/18/2010	22.5 - 27.5	NA	NA	NA	NA	NA	<b>410</b>	NA	<b>14</b>	<b>50.8</b>
	11/16/2010	22.5 - 27.5	NA	NA	NA	NA	NA	<b>251</b>	NA	<b>6.9</b>	<b>127.5</b>
	5/11/2011	22.5 - 27.5	NA	NA	NA	NA	NA	<b>167</b>	NA	<b>4.37</b>	<b>170.6</b>
	11/2/2011	22.5 - 27.5	NA	NA	NA	NA	NA	<b>110</b>	NA	<b>3.07</b>	<b>239</b>
	11/27/2012	22.5 - 27.5	NA	NA	NA	NA	NA	<b>7.7</b>	NA	<b>1.7 I</b>	<b>230</b>
	5/14/2014	22.5 - 27.5	NA	NA	NA	<b>12.0</b>	<b>3.1</b>	<b>2.0</b>	<b>2.4</b>	<b>3.6</b>	<b>250</b>
	11/16/2016	22.5 - 27.5	NA	NA	NA	<b>6.6</b>	<b>1.2</b>	0.71 U	<b>0.81 I</b>	1.0 U	<b>10</b>
3/19/2018	22.5 - 27.5	NA	NA	NA	<b>2.6</b>	<b>0.74 I</b>	1.0 U	<b>1.0 U</b>	<b>0.96 I</b>	<b>2.0 U</b>	

**Table 12-2**  
**Mobil Service Station - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260					
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	1,2,4-TRIMETHYL BENZENE	1,3,5-TRIMETHYL BENZENE	BENZENE	ISOPROPYL BENZENE	METHYL TERT- BUTYL ETHER	TOTAL XYLENES
FDEP GCTLs (µg/L)			28	28	14	10	10	1	0.8	20	20
FDEP NADCs (µg/L)			280	280	140	100	100	100	8	200	200
Location ID	Sample Date	Screened Interval (ft bls)									
CGO-MW0008	5/30/2007	22.5 - 27.5	0.042 U	0.043 U	<b>0.087 I</b>	NA	NA	0.088 U	NA	<b>62</b>	<b>3.9 I</b>
	5/21/2008	22.5 - 27.5	0.039 U	0.04 U	0.049 U	NA	NA	0.2 U	NA	<b>110</b>	<b>6.4</b>
	5/18/2010	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>38</b>	<b>15.6</b>
	11/16/2010	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>24.7</b>	<b>19.8</b>
	5/11/2011	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>17.5</b>	<b>11.93</b>
	11/2/2011	22.5 - 27.5	NA	NA	NA	NA	NA	<b>0.38 I</b>	NA	<b>5.6</b>	<b>2.09</b>
CGO-MW0009	5/31/2007	32.5 - 37.5	0.042 U	0.043 U	<b>0.13</b>	NA	NA	<b>4.5</b>	NA	1.3 U	<b>1.47 I</b>
	5/22/2008	32.5 - 37.5	0.047 U	0.042 U	<b>0.26</b>	NA	NA	0.2 U	NA	<b>1.2 I</b>	0.72 U
	5/18/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>0.95 I</b>	1.24 U
	11/15/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>9.28</b>	0.55 U
CGO-MW0010	5/30/2007	32.5 - 37.5	0.039 U	0.042 U	<b>1.2</b>	NA	NA	<b>0.47 I</b>	NA	1.3 U	<b>94</b>
	5/22/2008	32.5 - 37.5	0.04 U	0.041 U	<b>0.95</b>	NA	NA	0.2 U	NA	<b>1.0 I</b>	<b>35</b>
	5/18/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>0.65 I</b>	<b>3.5</b>
	11/15/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	0.14 U	<b>0.55 I</b>
CGO-MW0011	5/30/2007	32.5 - 37.5	<b>0.23</b>	<b>0.047 I</b>	<b>1.1</b>	NA	NA	0.088 U	NA	<b>7.2</b>	0.273 U
	5/21/2008	32.5 - 37.5	<b>0.16</b>	0.041 U	<b>0.93</b>	NA	NA	0.2 U	NA	<b>10</b>	0.72 U
	4/30/2009	32.5 - 37.5	NA	NA	NA	NA	NA	0.52 U	NA	<b>6.2</b>	0.32 U
	7/24/2009	32.5 - 37.5	NA	NA	NA	NA	NA	0.52 U	NA	<b>3.8</b>	0.32 U
CGO-MW0012	5/31/2007	32.5 - 37.5	0.041 U	0.042 U	<b>0.071 I</b>	NA	NA	<b>0.36 I</b>	NA	<b>1.7 I</b>	0.273 U
	5/22/2008	32.5 - 37.5	0.042 U	0.043 U	0.052 U	NA	NA	<b>2.0</b>	NA	<b>2.7</b>	0.72 U
	5/18/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	<b>0.84 I</b>	1.24 U
	11/15/2010	32.5 - 37.5	NA	NA	NA	NA	NA	0.21 U	NA	0.14 U	0.55 U
CGO-MW0013	5/31/2007	42.5 - 47.5	0.04 U	0.041 U	<b>0.13</b>	NA	NA	0.088 U	NA	1.3 U	0.273 U
	5/22/2008	42.5 - 47.5	0.039 U	0.04 U	<b>0.07 I</b>	NA	NA	0.2 U	NA	0.16 U	0.72 U
	5/18/2010	42.5 - 47.5	NA	NA	NA	NA	NA	0.21 U	NA	0.14 U	1.24 U
	11/15/2010	42.5 - 47.5	NA	NA	NA	NA	NA	0.21 U	NA	0.14 U	0.55 U
CGO-MW0014	8/7/2007	22.5 - 27.5	NA	NA	NA	NA	NA	0.088 U	NA	<b>1.8 I</b>	0.273 U
	5/22/2008	22.5 - 27.5	0.039 U	0.04 U	<b>0.054 I</b>	NA	NA	<b>0.84 I</b>	NA	<b>3.6</b>	0.72 U
	11/16/2016	22.5 - 27.5	NA	NA	NA	1.0 U	1.0 U	0.71 U	1.0 U	0.60 U	1.3 U
CGO-MW0015	8/7/2007	22.5 - 27.5	NA	NA	NA	NA	NA	0.088 U	NA	<b>1.9 I</b>	0.273 U
	5/21/2008	22.5 - 27.5	0.039 U	0.04 U	0.048 U	NA	NA	0.2 U	NA	<b>2.6</b>	0.72 U
CGO-MW0016	8/7/2007	32.5 - 37.5	NA	NA	NA	NA	NA	0.088 U	NA	1.3 U	0.273 U
	5/22/2008	32.5 - 37.5	0.04 U	0.041 U	0.050 U	NA	NA	0.2 U	NA	0.16 U	0.72 U
CGO-MW0017	8/13/2008	2 -12	0.02 U	0.022 U	0.028 U	NA	NA	2.6 U	NA	<b>23</b>	<b>10.1 I</b>
	4/30/2009	2 -12	NA	NA	NA	NA	NA	0.52 U	NA	<b>12</b>	<b>0.37 I</b>
	7/24/2009	2 -12	NA	NA	NA	NA	NA	0.52 U	NA	<b>11</b>	0.32 U

**Table 12-2**  
**Mobil Service Station - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260					
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	1,2,4-TRIMETHYL BENZENE	1,3,5-TRIMETHYL BENZENE	BENZENE	ISOPROPYL BENZENE	METHYL TERT- BUTYL ETHER	TOTAL XYLENES
FDEP GCTLs (µg/L)			28	28	14	10	10	1	0.8	20	20
FDEP NADCs (µg/L)			280	280	140	100	100	100	8	200	200
Location ID	Sample Date	Screened Interval (ft bls)									
CGO-MW0018	8/13/2008	22.5 - 27.5	0.2 U	0.22 U	0.28 U	NA	NA	6.8	NA	280	6.4
	4/30/2009	22.5 - 27.5	NA	NA	NA	NA	NA	6.3	NA	160	2.7
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	4	NA	300	0.31 I
	5/18/2010	22.5 - 27.5	NA	NA	NA	NA	NA	1.5	NA	130	1.24 U
	11/15/2010	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	125	0.32 I
	5/11/2011	22.5 - 27.5	NA	NA	NA	NA	NA	0.24 I	NA	79	0.6 I
	11/2/2011	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	131	0.14 U
	11/27/2012	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	73	0.74 I
	5/14/2014	22.5 - 27.5	NA	NA	NA	30	7.6	0.71 U	0.67 U	22	1.3 U
	11/16/2016	22.5 - 27.5	NA	NA	NA	20	4.4	0.71 U	0.85 I	14	1.3 U
	3/19/2018	22.5 - 27.5	NA	NA	NA	24	5.5	0.71 U	1.0	66	1.3 I
11/11/2020	22.5 - 27.5	NA	NA	NA	13.6	2.4	0.31 U	0.40 I	35.9	0.72 U	
5/11/2022	22.5 - 27.5	NA	NA	NA	12	2.4	0.71 U	0.67 U	31	1.3 U	
CGO-MW0019	8/13/2008	22.5 - 27.5	0.02 U	0.022 U	0.029 U	NA	NA	2.6 U	NA	44	1.6 U
	4/30/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	42	0.63 I
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	0.072 U	0.32 U
	5/11/2022	22.5 - 27.5	NA	NA	NA	0.69 U	0.58 U	0.71 U	0.67 U	7.9	1.3 U
CGO-MW0020	8/13/2008	22.5 - 27.5	0.02 U	0.022 U	0.028 U	NA	NA	2.6 U	NA	150	1.60 U
	4/30/2009	22.5 - 27.5	NA	NA	NA	NA	NA	1.6	NA	100	0.32 U
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	2.9	NA	190	0.41 I
	5/18/2010	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	23	1.24 U
	11/15/2010	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	4.44	0.55 U
	5/11/2011	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	3.76	0.14 U
	11/2/2011	22.5 - 27.5	NA	NA	NA	NA	NA	0.21 U	NA	19	0.14 U
CGO-MW0021	8/13/2008	32.5 - 37.5	0.051 I	0.022 U	1.1	NA	NA	2.6 U	NA	5.3 I	1.60 U
	4/30/2009	32.5 - 37.5	NA	NA	NA	NA	NA	0.52 U	NA	4.8	0.32 U
	7/24/2009	32.5 - 37.5	NA	NA	NA	NA	NA	0.52 U	NA	5.5	0.32 U
CGO-MW0022	8/13/2008	22.5 - 27.5	0.035 I	0.022 U	1.0	NA	NA	2.6 U	NA	0.36 U	1.60 U
	4/30/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	1.4 I	0.32 U
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	4.2	0.32 U
CGO-MW0023	5/1/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	25	0.32 U
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.52 U	NA	52	0.32 U
CGO-MW0024	5/1/2009	22.5 - 27.5	NA	NA	NA	NA	NA	0.94 I	NA	71	1.1
	7/24/2009	22.5 - 27.5	NA	NA	NA	NA	NA	1.2	NA	110	1.5

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

CGO = Citgo Service Station

MW = monitoring well

NA = Not Analyzed

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

**Highlighted cell** indicates an exceedance of FDEP NADCs





I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

The numeric value presented for non-detects is the sample-specific reporting detection limit

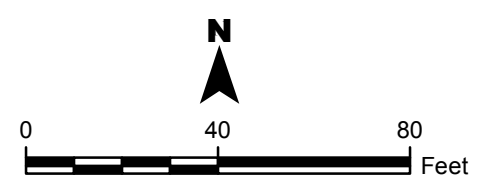
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- Legend**
-  Monitoring Well (LTM)
  -  Monitoring Well (LTM - Water Level Only)
  -  Monitoring Well (Non-LTM)
  -  Building

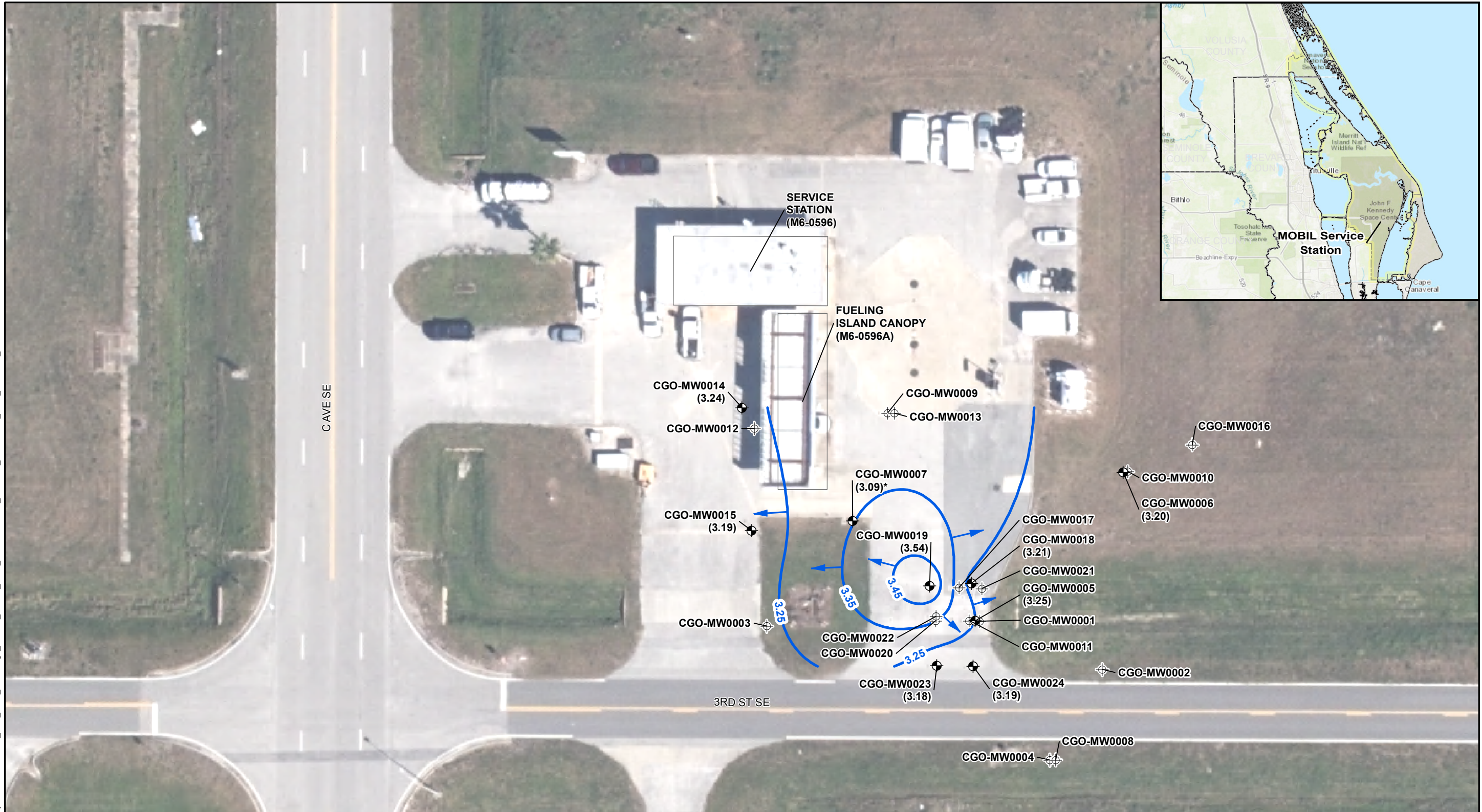
**Notes:**

- (22.5-27.5) = Monitoring well screen interval in feet below land surface
- PRL = Potential Release Location
- LTM = Long Term Monitoring
- Aerial Source: FDOT, 2018








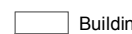
**FIGURE 12**  
**Site Map**

2022 - Industrial Area Long Term Monitoring  
 Mobil Service Station (MOBIL)  
 SWMU 093  
 NASA Kennedy Space Center, Florida



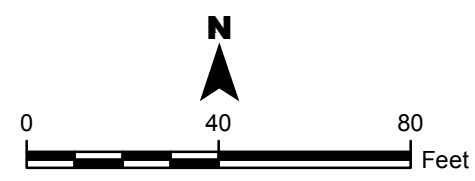
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**Legend**

-  Monitoring Well (22.5-27.5 ft bls)
-  Monitoring Well (Non-LTM)
-  Groundwater Contour (NAVD88 ft)
-  Approximate Direction of Groundwater Flow
-  (3.19) Groundwater Elevation Contour (NAVD88 ft)
-  Building

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 11, 2022
- Groundwater Contour Interval = 0.10 ft
- CGO = Citigo Service Station
- \* = Not used in contouring
- LTM = Long Term Monitoring
- Aerial Source: FDOT 2018
- PRL = Potential Release Location
- ft bls = feet below land surface



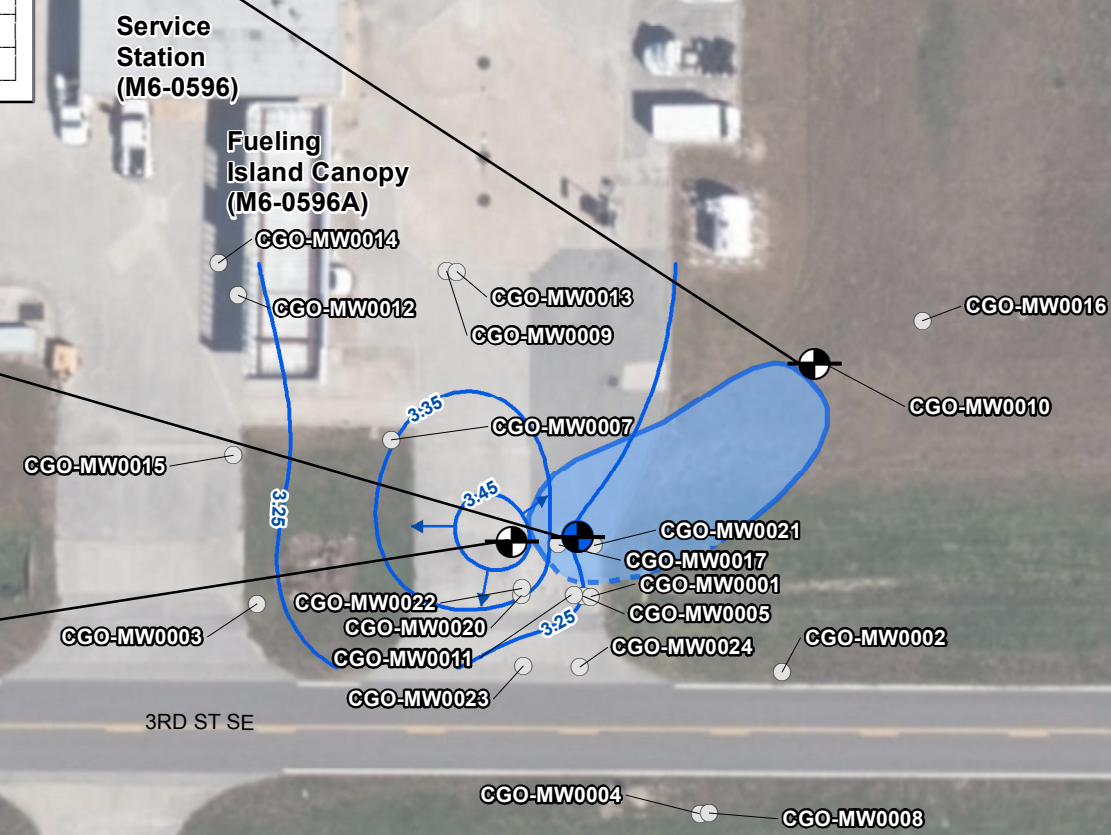
**FIGURE 12-1**  
**Groundwater Elevation Map – May 2022**  
 2022 - Industrial Area Long Term Monitoring  
 Mobil Service Station (MOBIL)  
 SWMU 093  
 NASA Kennedy Space Center, Florida

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CGO-MW0006							
Location ID	CGO-MW0006	CGO-MW0006	CGO-MW0006	CGO-MW0006	CGO-MW0006	CGO-MW0006	CGO-MW0006
Date	11/27/2012	05/14/2014	11/16/2016	03/19/2018	11/11/2020	05/11/2022	05/11/2022
Screen Interval	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
1,2,4-TRIMETHYLBENZENE	NA	3	1.8	1.9	0.51 I	0.69 U	
1,3,5-TRIMETHYLBENZENE	NA	0.58 U	0.58 U	0.58 U	0.27 U	0.58 U	
BENZENE	0.44 I	0.71 U	0.71 U	0.71 U	0.31 U	0.71 U	
ISOPROPYLBENZENE	NA	2.5	1.9	2.2	0.54 I	0.67 U	
METHYL TERT-BUTYL ETHER	0.24 U	0.6 U	0.6 U	0.6 U	0.23 U	0.60 U	
TOTAL XYLENES	NA	1.3 U	1.3 U	1.3 I	0.72 U	1.3 U	
1-METHYLNAPHTHALENE	6.17	22	16	17	8.0	6.5	
2-METHYLNAPHTHALENE	15.2	41	35	32	13.8	13	
NAPHTHALENE	6.32	20	26	21	7.3	1.9	

CGO-MW0018							
Location ID	CGO-MW0018	CGO-MW0018	CGO-MW0018	CGO-MW0018	CGO-MW0018	CGO-MW0018	CGO-MW0018
Date	11/27/2012	05/14/2014	11/16/2016	03/19/2018	11/11/2020	05/11/2022	05/11/2022
Screen Interval	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5	22.5 - 27.5
Sample Type	NM	NM	NM	NM	NM	NM	NM
Analyte							
1,2,4-TRIMETHYLBENZENE	NA	30	20	24	13.6	12	
1,3,5-TRIMETHYLBENZENE	NA	7.6	4.4	5.5	2.4	2.4	
BENZENE	0.21 U	0.71 U	0.71 U	0.71 U	0.31 U	0.71 U	
ISOPROPYLBENZENE	NA	0.67 U	0.85 I	1	0.40 I	0.67 U	
METHYL TERT-BUTYL ETHER	73	22	14	66	35.9	31	
TOTAL XYLENES	NA	1.3 U	1.3 U	1.3 I	0.72 U	1.3 U	

CGO-MW0019	
Location ID	CGO-MW0019
Date	05/11/2022
Screen Interval	22.5 - 27.5
Sample Type	NM
Analyte	
1,2,4-TRIMETHYLBENZENE	0.69 U
1,3,5-TRIMETHYLBENZENE	0.58 U
BENZENE	0.71 U
ISOPROPYLBENZENE	0.67 U
METHYL TERT-BUTYL ETHER	7.9
TOTAL XYLENES	1.3 U



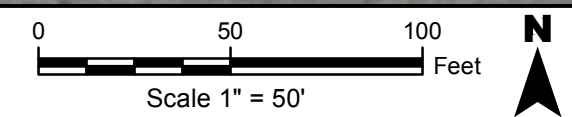
**Legend**

- Intermediate LTM Well, Sample Results Exceed GCTL
- Intermediate LTM Well, Sample Results Below GCTL
- Non-LTM, No Sample Results
- Intermediate Groundwater Elevation Contours - May 2022
- Direction of Groundwater Flow
- Approximate Extent of Multiple Contaminants Greater Than GCTLs from Monitoring Well Sampling (Dashed Where Inferred)

**Notes:**

- LTM = Long Term Monitoring
- MW = Monitoring Well
- NM = Normal Sample
- SWMU = Solid Waste Management Unit
- All results and screening criteria presented in µg/L.
- I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
- U = Result was below the laboratory MDL.
- FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
- Bolded** results indicate the presence of an analyte at the specified concentration.
- Blue** font indicates an exceedance of FDEP GCTLs.
- Aerial Source: ESRI 2018.
- Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
1,2,4-TRIMETHYLBENZENE	10
1,3,5-TRIMETHYLBENZENE	10
BENZENE	1
ISOPROPYLBENZENE	0.8
METHYL TERT BUTYL ETHER	20
TOTAL XYLENES	20
1-METHYL NAPHTHALENE	28
2-METHYL NAPHTHALENE	28
NAPHTHALENE	14



**FIGURE 12-2**  
**Groundwater Sampling Analytical Results**  
 2022 - Industrial Area Long Term Monitoring  
 Mobil Service Station (MOBIL)  
 SWMU 093  
 NASA Kennedy Space Center, Florida



### **13. GENERAL SERVICES ADMINISTRATION SEIZED PROPERTY**

This section provides a summary of the GSSP site (SWMU 095). Refer to **Figure 13** for a site map.

#### **13.1 SITE DESCRIPTION AND HISTORY**

The GSSP is located on the western edge of the KSC industrial area on the north side of the Kennedy Parkway North and 5th Street Southeast/Odyssey Way intersection. The site was developed in 1989 for storage and auctioning of vehicles, trucks, and boats seized by various government agencies. Minor vehicle maintenance was also performed at the site. Major vehicle repairs were handled off-site and outside of KSC property. Vehicle detailing activities were also performed at the GSA Vehicle Maintenance Facility. The site is currently an open field, and the impacts from these historical activities extend from west of the KSC Child Care Facility toward the borrow pond located west of Kennedy Parkway (Geosyntec 2012).

An RFI (Geosyntec 2007) and RFI Addendum (Geosyntec 2010) were completed in 2007 through 2010 to assess groundwater contaminants at GSSP, including tetrachloroethene (PCE) and its degradation products. GCTL exceedances were found across the site at various depths between 4 ft bls and 50 ft bls. Near the center of the site, a PCE source area was found, and a Source Area IM was conducted in 2008. The IM included open soil excavation to a depth of 12.5 ft bls that was aerated and then backfilled with a hydrogen releasing compound (Geosyntec 2012).

Between 2010 and 2011, another IM was performed downgradient of the PCE source area utilizing enhanced reductive dechlorination (ERD) to reduce VOC concentrations to below NADCs within the treatment zone. Six drums containing emulsified oil plus 500 liters of microbial culture were injected at 46 locations throughout the treatment zone where TCE concentrations exceeded the NADC. A solar powered recirculation system aided in the distribution of amendments (Geosyntec 2012). Once the ERD IM and performance monitoring sampling was completed at GSSP, annual interim groundwater monitoring was approved. The site was added to the IA LTM program in 2012 and annual sampling has continued through the present.

The primary COCs at GSSP are VOCs (PCE; TCE; cis-1,2-DCE; trans-1,2-dichloroethene [trans-1,2-DCE]; and VC); however, naphthalene concentrations were detected above the GCTL at monitoring well GSSP-MW0024 in 2018. Monitoring well GSSP-MW0025 was found destroyed during the 2018 sampling event; therefore, it was abandoned along with adjacent monitoring well GSSP-MW0024 (Jacobs-CORE 2019a). Monitoring well GSSP-MW0024 was re-installed in April 2019 to continue COC analysis (Jacobs-CORE 2019b).

A historical review was completed in January 2023 to determine the extent of horizontal delineation downgradient from the present VOC plume. The typical groundwater flow is toward the northwest with a VOC source area east of Kennedy Parkway. During an RFI in 2007, DPT investigations confirmed plume delineation to the north, south, and west. DPT locations DPT0045, DPT0049, and DPT0051 had VOC exceedances east of the borrow pit pond; however, DPT0055 and surface water SW0001, located downgradient from the VOC plume, were non-detect (Geosyntec 2007). A summary of historical DPT analytical results from select DPT locations and an analytical figure from the 2007 RFI are presented in **Appendix N**.

### 13.2 FIELD ACTIVITIES

Field activities were performed at GSSP in November 2021 and November 2022. Groundwater samples were collected from 14 monitoring wells and groundwater levels were measured at 33 monitoring wells during both sampling events. The following table shows the network of monitoring wells used for groundwater level measurements and sampling at GSSP.

Well ID	Screen Interval (ft bls)	Analysis
GSSP-MW0006	5-15	WL Only
GSSP-MW0007	25-35	WL Only
GSSP-MW0008	5-15	WL Only
GSSP-MW0009	25-35	WL Only
GSSP-MW0013	5-15	WL + select VOCs
GSSP-MW0014	25-35	WL Only
GSSP-MW0019	15-25	WL + select VOCs
GSSP-MW0020	25-35	WL + select VOCs
GSSP-MW0021	40-50	WL Only
GSSP-MW0022	15-25	WL Only
GSSP-MW0023	25-35	WL Only
GSSP-MW0024R	15-25	WL + select VOCs and select PAHs
GSSP-MW0026	5-15	WL Only
GSSP-MW0027	5-15	WL Only
GSSP-MW0034	5-15	WL + select VOCs
GSSP-MW0035	15-25	WL + select VOCs and select PAHs
GSSP-MW0036	30-40	WL + select VOCs
GSSP-MW0039	25-35	WL Only
GSSP-MW0042	30-40	WL Only
GSSP-MW0043R	5-15	WL Only
GSSP-MW0044R	25-35	WL + select VOCs
GSSP-MW0045	15-25	WL Only
GSSP-MW0047	15-25	WL Only
GSSP-MW0049	55-60	WL Only
GSSP-MW0053	15-25	WL + select VOCs and select PAHs
GSSP-MW0054	25-35	WL Only
GSSP-MW0055	5-15	WL Only
GSSP-MW0058	10-15	WL Only
GSSP-MW0059	16-21	WL + select VOCs

Well ID	Screen Interval (ft bls)	Analysis
GSSP-MW0060	10-15	WL + select VOCs
GSSP-MW0061	16-21	WL + select VOCs
GSSP-MW0062	10-15	WL + select VOCs
GSSP-MW0063	16-21	WL + select VOCs

ID = identification

MW = monitoring well

Select PAHs = naphthalene analysis by Method 8270

Select VOCs = PCE, TCE, cis-1,2-DCE, trans-1,2-DCE and VC analysis by Method 8260

WL = water level measurement

Groundwater samples collected during the 2021 and 2022 annual sampling events were analyzed, as prescribed in the table above, for one or more of the following: select VOCs by Method 8260 and naphthalene by Method 8270. The following table shows the COCs for GSSP with their respective GCTL and NADC.

COC	GCTL (µg/L)	NADC (µg/L)
PCE	3	300
TCE	3	300
cis-1,2-DCE	70	700
trans-1,2-DCE	100	1,000
VC	1	100
Naphthalene	14	140

### 13.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the 2021 and 2022 annual sampling events were used to calculate groundwater elevations presented in **Table 13-1**. Groundwater elevations collected during this event were used to determine the contours and flow direction for the shallow (2.5 ft bls to 15 ft bls), shallow-intermediate (15 ft bls to 25 ft bls), and intermediate aquifer zones (25 ft bls to 40 ft bls), shown on **Figure 13-1** through **Figure 13-6**. During both sampling events, the groundwater flow direction for the shallow and shallow-intermediate aquifer zones was toward the northwest, while the groundwater flow direction in the intermediate aquifer zone was toward the west-northwest. The groundwater flow direction at GSSP is historically toward the west-northwest.

### 13.4 ANALYTICAL RESULTS

Groundwater samples from 14 monitoring wells were analyzed in November 2021 and November 2022. A summary of the analytical results is presented in **Table 13-2**. Analytical results are depicted on **Figure 13-7**.

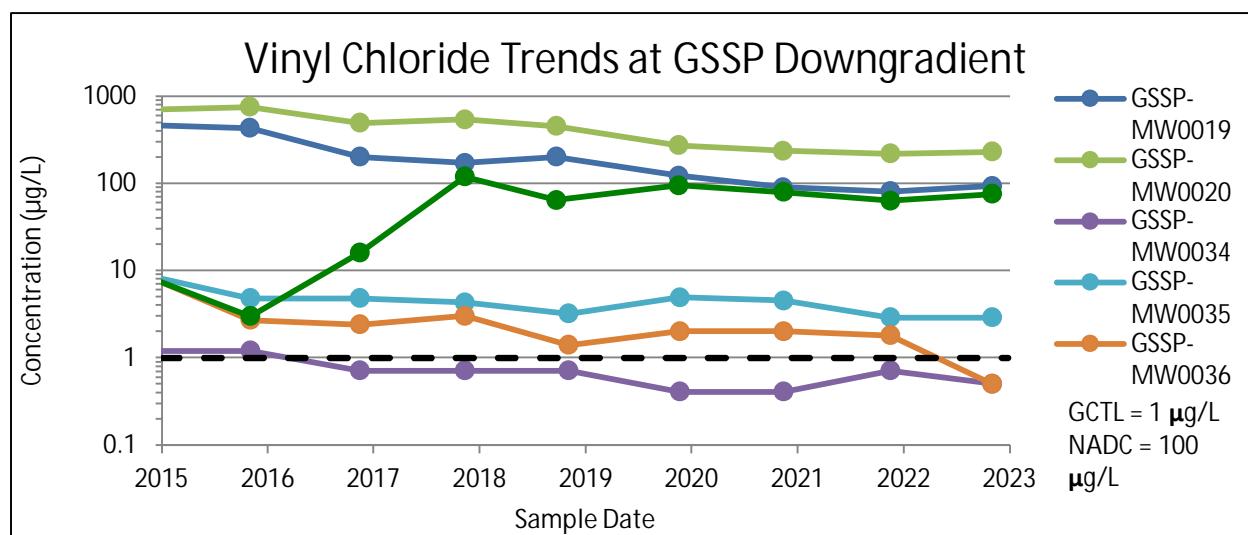
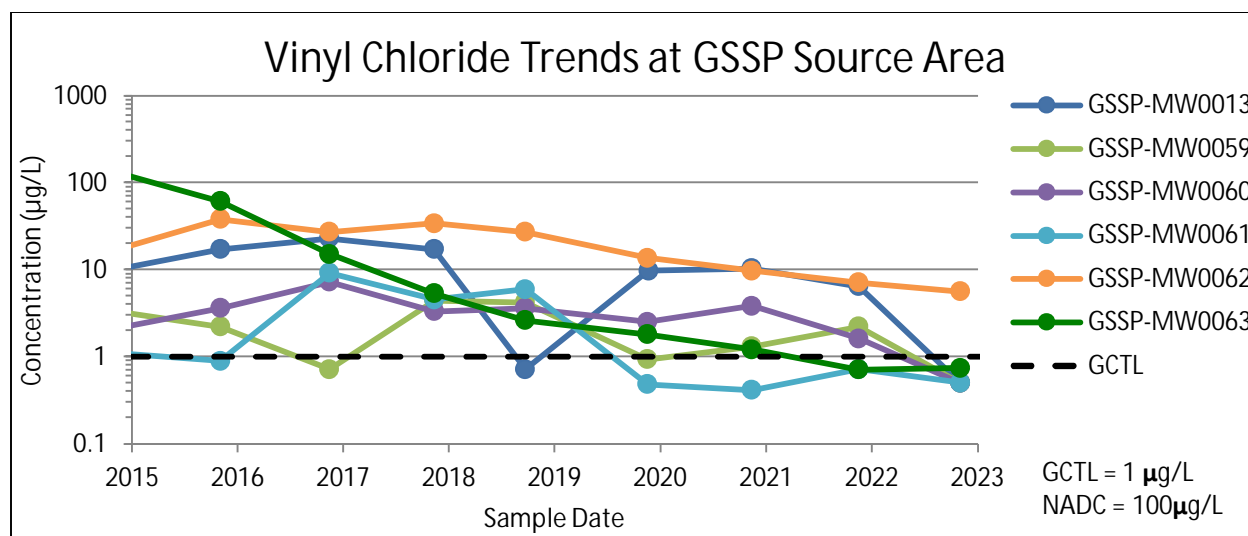
Analytical results for each COC present at GSSP are discussed below:

- PCE
  - PCE was not detected at GSSP during the 2021 and 2022 sampling events.
- TCE
  - TCE was not detected at GSSP during the 2021 and 2022 sampling events.
- cis-1,2-DCE
  - No concentrations of cis-1,2-DCE were detected above the GCTL in November 2021 or November 2022.
- trans-1,2-DCE
  - No concentrations of trans-1,2-DCE were detected above the GCTL in November 2021 or November 2022.
- VC
  - In November 2021, VC was detected at concentrations above the GCTL in monitoring wells GSSP-MW0013 (6.4 µg/L), GSSP-MW0019 (81 µg/L), GSSP-MW0035 (2.9 µg/L), GSSP-MW0036 (1.8 µg/L), GSSP-MW0053 (63 µg/L), GSSP-MW0059 (2.2 µg/L), GSSP-MW0060 (1.6 µg/L), and GSSP-MW0062 (7.1 µg/L). The VC concentration in monitoring well GSSP-MW0020 (220 µg/L) exceeded both the GCTL and the NADC.
  - In November 2022, VC was detected at concentrations above the GCTL in monitoring wells GSSP-MW0019 (93 µg/L), GSSP-MW0035 (2.9 µg/L), GSSP-MW0053 (75 µg/L), and GSSP-MW0062 (5.6 µg/L). The VC concentration in monitoring well GSSP-MW0020 (230 µg/L) exceeded both the GCTL and the NADC.
- Naphthalene
  - No concentrations of naphthalene were detected above the GCTL in November 2021.
  - In November 2022, naphthalene was detected at a concentration above the GCTL in monitoring well GSSP-MW0024R (18 µg/L).

### 13.5 TREND ANALYSIS

The following trend charts present the current and historical concentrations for VC at former source area and downgradient wells, and naphthalene at monitoring well GSSP-MW0024R and select upgradient and downgradient wells. PCE, TCE, cis-1,2-DCE, and trans-1,2-DCE concentrations have remained below their respective GCTLs since 2011 except for a TCE detection at monitoring well GSSP-MW0019 in 2018. VC concentrations at GSSP show an

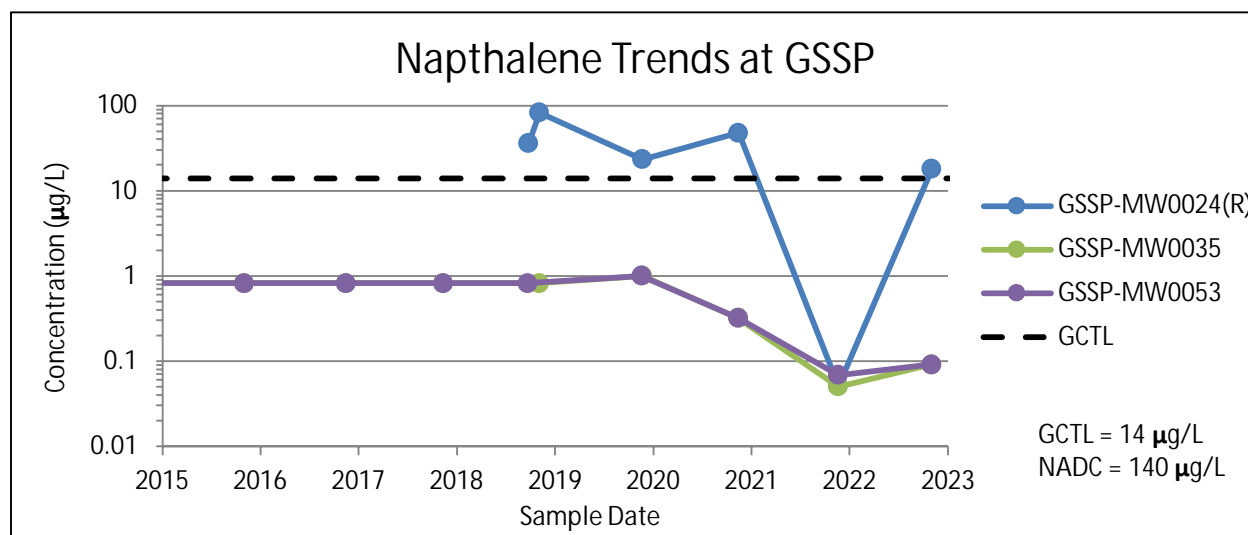
overall decreasing trend. Three monitoring wells had an increase in VC concentration between 2021 and 2022: GSSP-MW0019 (81 µg/L to 93 µg/L), GSSP-MW0020 (220 µg/L to 230 µg/L), and GSSP-MW0053 (63 µg/L to 75 µg/L). The following trend charts show concentrations of VC at former source area and downgradient wells since 2015.



A Mann-Kendall trend analysis was performed for VC at GSSP, and the results are summarized in the following table. Sampling results, from the past 10 years of data, show that VC concentrations are decreasing, stable, or have no significant trend at each sampled monitoring well except at GSSP-MW0053. Monitoring well GSSP-MW0053 shows an increasing trend over the past 10 years; however, VC concentrations have stabilized within the past five years.

<b>Mann-Kendall Statistics Summary VC at GSSP</b>			
<b>Monitoring Well</b>	<b>Concentration Trend</b>	<b>Monitoring Well</b>	<b>Concentration Trend</b>
GSSP-MW0013	Probably Decreasing	GSSP-MW0044R	Decreasing
GSSP-MW0019	Decreasing	GSSP-MW0053	Increasing
GSSP-MW0020	Decreasing	GSSP-MW0059	No Trend
GSSP-MW0024R	Stable	GSSP-MW0060	Stable
GSSP-MW0034	Decreasing	GSSP-MW0061	No Trend
GSSP-MW0035	Decreasing	GSSP-MW0062	Decreasing
GSSP-MW0036	Decreasing	GSSP-MW0063	Decreasing

Naphthalene concentrations present at monitoring well GSSP-MW0024R have fluctuated over the past four years, but are statistically stable. Naphthalene has not been detected in monitoring wells upgradient or downgradient of monitoring well GSSP-MW0024(R). The following trend chart shows concentrations of naphthalene at monitoring well GSSP-MW0024(R) and select upgradient and downgradient wells.



### 13.6 CONCLUSION AND RECOMMENDATION

Concentrations of select COCs exceeded GCTLs in nine monitoring wells sampled in November 2021 and in five monitoring wells in November 2022. VC concentrations exceeded the NADC at monitoring well GSSP-MW0020 in 2021 and 2022. Concentrations of VC continue to show an overall declining trend along with geotechnical parameters indicative of favorable conditions for reductive dechlorination (analyzed in 2019).

Site COCs are recommended to be reduced to VC only for each sampled well and retain naphthalene analysis at monitoring wells GSSP-MW0024R, GSSP-MW0035, and GSSP-MW0053. Select VOC concentrations, other than VC, have not exceeded GCTLs in the past four annual sampling events.

The annual LTM sampling frequency is recommended to continue with an expanded sampling event every five years (the next expanded event to be scheduled for November 2024). The next sampling event, scheduled for November 2023, will include water level measurements at 33 monitoring wells and groundwater samples from 14 monitoring wells.

The following table shows the recommended monitoring wells for water level collection and groundwater sampling for the next sampling event at GSSP scheduled for November 2023.

Well ID	Screen Interval (ft bls)	Analysis
GSSP-MW0006	5-15	WL Only
GSSP-MW0007	25-35	WL Only
GSSP-MW0008	5-15	WL Only
GSSP-MW0009	25-35	WL Only
GSSP-MW0013	5-15	WL + VC
GSSP-MW0014 <sup>a</sup>	25-35	WL Only
GSSP-MW0019	15-25	WL + VC
GSSP-MW0020	25-35	WL + VC
GSSP-MW0021 <sup>a</sup>	40-50	WL Only
GSSP-MW0022 <sup>a</sup>	15-25	WL Only
GSSP-MW0023 <sup>a</sup>	25-35	WL Only
GSSP-MW0024R	15-25	WL + VC and Naphthalene
GSSP-MW0026 <sup>a</sup>	5-15	WL Only
GSSP-MW0027 <sup>a</sup>	5-15	WL Only
GSSP-MW0034	5-15	WL + VC
GSSP-MW0035	15-25	WL + VC and Naphthalene
GSSP-MW0036	30-40	WL + VC
GSSP-MW0039 <sup>a</sup>	25-35	WL Only
GSSP-MW0042 <sup>a</sup>	30-40	WL Only
GSSP-MW0043R <sup>a</sup>	5-15	WL Only
GSSP-MW0044R	25-35	WL + VC
GSSP-MW0045	15-25	WL Only
GSSP-MW0047	15-25	WL Only
GSSP-MW0049	55-60	WL Only
GSSP-MW0053	15-25	WL + VC and Naphthalene
GSSP-MW0054	25-35	WL Only
GSSP-MW0055	5-15	WL Only
GSSP-MW0058	10-15	WL Only
GSSP-MW0059	16-21	WL + VC
GSSP-MW0060	10-15	WL + VC
GSSP-MW0061	16-21	WL + VC
GSSP-MW0062	10-15	WL + VC
GSSP-MW0063	16-21	WL + VC

ID = identification

MW = monitoring well

Naphthalene = naphthalene analysis by Method 8270

VC = vinyl chloride analysis by Method 8260

WL = water level measurement

<sup>a</sup> monitoring well sampled during expanded sampling events

**Table 13-1**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

SHALLOW WELL ID:	GSSP-MW0006		GSSP-MW0008		GSSP-MW0013	
Screen Interval (ft bls):	5 - 15		5 - 15		5 - 15	
TOC Elevation (ft NAVD88):	7.93		6.29		5.60	
Date	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	5.72	2.21	2.18	4.11	3.41	2.19
November 2014	4.56	3.37	2.36	3.93	2.26	3.34
November 2015	5.42	2.51	2.89	3.40	3.08	2.52
November 2016	4.67	3.26	2.64	3.65	2.33	3.27
November 2017	3.88	4.05	1.97	4.32	1.50	4.10
September 2018	7.38	0.55	3.85	2.44	3.84	1.76
November 2019	3.87	4.06	1.58	4.71	1.48	4.12
November 2020	3.81	4.12	1.49	4.80	1.46	4.14
November 2021	3.29	4.64	0.65	5.64	0.83	4.77
November 2022	4.57	3.36	2.46	3.83	2.22	3.38

SHALLOW WELL ID:	GSSP-MW0026		GSSP-MW0027		GSSP-MW0034	
Screen Interval (ft bls):	5 - 15		5 - 15		5 - 15	
TOC Elevation (ft NAVD88):	5.88		5.60		7.30	
Date	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	3.98	1.90	3.89	1.71	7.18	0.12
November 2014	2.85	3.03	2.68	2.92	5.89	1.41
November 2015	3.67	2.21	3.29	2.31	6.78	0.52
November 2016	2.90	2.98	2.81	2.79	5.84	1.46
November 2017	2.10	3.78	1.98	3.62	4.68	2.62
September 2018	3.51	2.37	3.07	2.53	Not Measured	
November 2019	2.08	3.80	1.89	3.71	4.94	2.36
November 2020	2.13	3.75	2.02	3.58	4.69	2.61
November 2021	1.55	4.33	1.59	4.01	4.18	3.12
November 2022	2.80	3.08	2.59	3.01	5.28	2.02

SHALLOW WELL ID:	GSSP-MW0043R		GSSP-MW0055		GSSP-MW0058	
Screen Interval (ft bls):	5 - 15		5 - 15		10 - 15	
TOC Elevation (ft NAVD88):	7.54		5.39		7.19	
Date	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	5.02	2.52	3.38	2.01	4.85	2.34
November 2014	3.94	3.60	2.64	2.75	3.75	3.44
November 2015	4.72	2.82	3.13	2.26	4.57	2.62
November 2016	4.07	3.47	2.68	2.71	3.85	3.34
November 2017	3.36	4.18	2.33	3.06	3.06	4.13
September 2018	4.70	2.84	3.12	2.27	4.53	2.66
November 2019	3.12	4.42	2.38	3.01	2.97	4.22
November 2020	3.00	4.54	2.58	2.81	2.91	4.28
November 2021	2.18	5.36	2.21	3.18	2.28	4.91
November 2022	3.83	3.71	2.73	2.66	3.68	3.51

SHALLOW WELL ID:	GSSP-MW0060		GSSP-MW0062	
Screen Interval (ft bls):	10 - 15		10 - 15	
TOC Elevation (ft NAVD88):	7.59		6.50	
Date	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	5.49	2.10	4.19	2.31
November 2014	4.18	3.41	3.06	3.44
November 2015	4.99	2.60	3.91	2.59
November 2016	4.25	3.34	3.17	3.33
November 2017	3.46	4.13	2.35	4.15
September 2018	4.65	2.94	3.94	2.56
November 2019	3.42	4.17	2.30	4.20
November 2020	3.37	4.22	2.27	4.23
November 2021	2.70	4.89	1.65	4.85
November 2022	4.15	3.44	2.99	3.51

SHALLOW - INTERMEDIATE WELL ID:	GSSP-MW0019		GSSP-MW0022		GSSP-MW0024	
Screen Interval (ft bls):	15 - 25		15 - 25		15 - 25	
TOC Elevation (ft NAVD88):	6.30		4.97		7.37	
Date	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	4.34	1.96	3.05	1.92	Not Measured	
November 2014	3.25	3.05	2.02	2.95	Not Measured	
November 2015	4.04	2.26	2.81	2.16	Not Measured	
November 2016	3.35	2.95	2.09	2.88	Not Measured	
November 2017	2.48	3.82	1.08	3.89	Not Measured	
September 2018	3.89	2.41	3.90	1.07	3.07	4.30
November 2019	2.50	3.80	1.20	3.77	Abandoned	
November 2020	2.51	3.79	1.15	3.82	--	
November 2021	1.88	4.42	0.44	4.53	--	
November 2022	3.20	3.10	1.89	3.08	--	



**Table 13-1**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW - INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0024R</b>		<b>GSSP-MW0035</b>		<b>GSSP-MW0045</b>	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	4.32		7.19		7.91	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	--		7.03	0.16	5.72	2.19
November 2014	--		5.78	1.41	4.55	3.36
November 2015	--		6.65	0.54	5.38	2.53
November 2016	--		5.59	1.60	4.68	3.23
November 2017	--		4.58	2.61	3.88	4.03
September 2018	Not Installed		Not Measured		7.41	0.50
November 2019	0.97	3.35	4.88	2.31	3.85	4.06
November 2020	0.90	3.42	4.60	2.59	3.82	4.09
November 2021	0.27	4.05	4.10	3.09	3.28	4.63
November 2022	1.55	2.77	5.23	1.96	4.57	3.34

<b>SHALLOW - INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0047</b>		<b>GSSP-MW0053</b>		<b>GSSP-MW0059</b>	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		16 - 21	
<b>TOC Elevation (ft NAVD88):</b>	6.29		6.17		7.34	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	3.90	2.39	4.26	1.91	5.04	2.30
November 2014	2.75	3.54	3.21	2.96	3.93	3.41
November 2015	3.54	2.75	3.98	2.19	4.47	2.87
November 2016	2.86	3.43	3.30	2.87	3.98	3.36
November 2017	2.13	4.16	2.39	3.78	3.18	4.16
September 2018	3.58	2.71	3.82	2.35	4.70	2.64
November 2019	2.03	4.26	2.43	3.74	3.13	4.21
November 2020	2.00	4.29	2.45	3.72	3.10	4.24
November 2021	1.47	4.82	1.83	4.34	2.45	4.89
November 2022	2.75	3.54	3.12	3.05	3.88	3.46

<b>SHALLOW - INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0061</b>		<b>GSSP-MW0063</b>	
<b>Screen Interval (ft bls):</b>	16 - 21		16 - 21	
<b>TOC Elevation (ft NAVD88):</b>	7.76		6.57	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	5.31	2.45	4.24	2.33
November 2014	4.32	3.44	3.14	3.43
November 2015	5.12	2.64	3.95	2.62
November 2016	4.42	3.34	3.24	3.33
November 2017	3.60	4.16	2.43	4.14
September 2018	4.65	3.11	3.94	2.63
November 2019	3.54	4.22	2.35	4.22
November 2020	3.53	4.23	2.34	4.23
November 2021	2.89	4.87	1.74	4.83
November 2022	4.30	3.46	3.08	3.49

<b>INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0007</b>		<b>GSSP-MW0009</b>		<b>GSSP-MW0014</b>	
<b>Screen Interval (ft bls):</b>	25 - 35		25 - 35		25 - 35	
<b>TOC Elevation (ft NAVD88):</b>	7.90		6.30		5.38	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	5.67	2.23	3.89	2.41	Not Measured	
November 2014	4.53	3.37	2.74	3.56	2.14	3.24
November 2015	5.35	2.55	3.50	2.80	2.94	2.44
November 2016	4.67	3.23	2.89	3.41	2.28	3.10
November 2017	3.83	4.07	2.16	4.14	1.36	4.02
September 2018	7.36	0.54	3.59	2.71	3.84	1.54
November 2019	3.80	4.10	2.03	4.27	1.33	4.05
November 2020	3.78	4.12	1.99	4.31	1.33	4.05
November 2021	3.24	4.66	1.47	4.83	0.69	4.69
November 2022	4.52	3.38	2.71	3.59	2.05	3.33

<b>INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0020</b>		<b>GSSP-MW0023</b>		<b>GSSP-MW0036</b>	
<b>Screen Interval (ft bls):</b>	25 - 35		25 - 35		30 - 40	
<b>TOC Elevation (ft NAVD88):</b>	6.30		4.82		7.15	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	4.38	1.92	2.95	1.87	7.09	0.06
November 2014	3.29	3.01	1.93	2.89	5.83	1.32
November 2015	4.09	2.21	2.67	2.15	6.90	0.25
November 2016	3.37	2.93	1.93	2.89	5.68	1.47
November 2017	2.51	3.79	1.02	3.80	4.68	2.47
September 2018	3.94	2.36	3.75	1.07	Not Measured	
November 2019	2.55	3.75	1.10	3.72	4.97	2.18
November 2020	2.54	3.76	1.12	3.70	4.65	2.50
November 2021	1.91	4.39	0.44	4.38	4.23	2.92
November 2022	3.23	3.07	1.78	3.04	5.29	1.86

**Table 13-1**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0039</b>		<b>GSSP-MW0042</b>		<b>GSSP-MW0044R</b>	
<b>Screen Interval (ft bls):</b>	25 - 35		30 - 40		25 - 35	
<b>TOC Elevation (ft NAVD88):</b>	7.82		6.17		7.15	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	7.64	0.18	6.45	-0.28	4.92	2.23
November 2014	6.41	1.41	5.23	0.94	3.94	3.21
November 2015	7.28	0.54	6.08	0.09	4.74	2.41
November 2016	6.24	1.58	5.15	1.02	4.08	3.07
November 2017	5.20	2.62	4.14	2.03	3.21	3.94
September 2018	3.70	4.12	5.96	0.21	4.70	2.45
November 2019	5.50	2.32	4.38	1.79	3.15	4.00
November 2020	5.22	2.60	4.04	2.13	3.10	4.05
November 2021	4.74	3.08	3.76	2.41	2.44	4.71
November 2022	5.84	1.98	4.64	1.53	3.90	3.25

<b>INTERMEDIATE WELL ID:</b>	<b>GSSP-MW0054</b>	
<b>Screen Interval (ft bls):</b>	25 - 35	
<b>TOC Elevation (ft NAVD88):</b>	6.10	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	4.17	1.93
November 2014	3.12	2.98
November 2015	3.92	2.18
November 2016	3.20	2.90
November 2017	2.33	3.77
September 2018	3.73	2.37
November 2019	2.38	3.72
November 2020	2.39	3.71
November 2021	1.78	4.32
November 2022	3.09	3.01

<b>DEEP WELL ID:</b>	<b>GSSP-MW0021</b>		<b>GSSP-MW0049</b>	
<b>Screen Interval (ft bls):</b>	40 - 50		55 - 60	
<b>TOC Elevation (ft NAVD88):</b>	6.07		7.49	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2013	4.26	1.81	5.01	2.48
November 2014	3.14	2.93	3.91	3.58
November 2015	3.92	2.15	4.74	2.75
November 2016	3.14	2.93	4.02	3.47
November 2017	2.26	3.81	3.23	4.26
September 2018	3.76	2.31	4.64	2.85
November 2019	2.27	3.80	3.11	4.38
November 2020	2.21	3.86	3.04	4.45
November 2021	1.60	4.47	2.42	5.07
November 2022	2.92	3.15	3.82	3.67

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

GSSP = General Services Administration Seized Property

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

TOC = top of casing

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0013	6/4/2007	5 - 15	NA	NA	5.0 U	5.6	6.6	64.9	105
	6/3/2008	5 - 15	NA	NA	20 U	20 U	20 U	55	360
	7/1/2009	5 - 15	NA	NA	1.0 U	1.3	6.3	14.7	490
	10/26/2010	5 - 15	NA	NA	0.25 U	0.26 U	12.1	55.6	645
	9/21/2011	5 - 15	NA	NA	0.25 U	0.49 I	10.6	2.2	36.7
	11/1/2012	5 - 15	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.90 I
	11/6/2013	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	28
	11/11/2014	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	10
	11/4/2015	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.65 I	17
	11/15/2016	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	1.3	23
	11/13/2017	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	1.4	17
	9/25/2018	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	5 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.53 I	9.7
	11/17/2020	5 - 15	NA	NA	0.22 U	0.35 U	0.22 U	0.54 I	10.3
11/22/2021	5 - 15	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	6.4	
11/8/2022	5 - 15	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	
GSSP-MW0014	6/4/2007	25 - 35	NA	NA	1.0 U	1.0 U	1.0	1.0 U	572
	7/1/2009	25 - 35	NA	NA	5.0 U	50	13	210	1,700
	10/26/2010	25 - 35	NA	NA	1.3 U	25	9.3	245	1,180
	9/21/2011	25 - 35	NA	NA	0.25 U	4.9	15.8	388	699
	11/1/2012	25 - 35	NA	NA	0.22 U	0.36 U	0.24 I	0.36 U	25
	11/11/2014	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.87 I
	11/4/2015	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.97 I
	11/17/2016	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	25 - 35	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0019	6/5/2007	15 - 25	NA	NA	1.0 U	1.0 U	5.0	25.5	586
	7/1/2009	15 - 25	NA	NA	1.0 U	4.4	15.8	44.2	1,000
	10/26/2010	15 - 25	NA	NA	1.3 U	1.3 U	11.6	10.1	957
	9/22/2011	15 - 25	NA	NA	0.25 U	0.63 I	17.1	38	1,210
	10/31/2012	15 - 25	NA	NA	0.22 U	0.36 U	16	25	1,500
	11/4/2013	15 - 25	NA	0.82 U	0.76 U	0.89 U	16	21	740
	11/12/2014	15 - 25	NA	8.2 U	7.6 U	8.9 U	7.3 U	5.3 U	470
	11/3/2015	15 - 25	NA	0.82 U	0.76 U	0.89 U	4.7	1.4	430
	11/17/2016	15 - 25	NA	1.6 U	1.5 U	1.8 U	2.1	1.4 I	200
	11/13/2017	15 - 25	NA	1.6 U	1.5 U	1.8 U	2.4	1.6 I	170
	9/25/2018	15 - 25	NA	1.6 U	1.5 U	6.8	2.3	8.3	200
	11/22/2019	15 - 25	NA	1.0 U	0.22 U	0.35 U	1.6	1.4	122
	11/17/2020	15 - 25	NA	NA	0.22 U	0.35 U	1.1	2.2	89.4
	11/22/2021	15 - 25	NA	NA	0.76 U	0.89 U	1.0	2.5	81
11/8/2022	15 - 25	NA	NA	0.50 U	0.50 U	0.74 I	0.78 I	93	

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM</i>	<i>Volatile Organic Compounds (VOC) by Method 8260</i>					
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0020	6/5/2007	25 - 35	NA	NA	1.0 U	1.0 U	<b>7.9</b>	<b>41.2</b>	<b>718</b>
	7/1/2009	25 - 35	NA	NA	1.0 U	1.0 U	<b>8.1</b>	<b>5.3</b>	<b>990</b>
	10/26/2010	25 - 35	NA	NA	1.3 U	1.3 U	<b>7.7</b>	1.3 U	<b>896</b>
	9/22/2011	25 - 35	NA	NA	0.25 U	0.26 U	<b>13.5</b>	<b>0.59 I</b>	<b>1,490</b>
	10/31/2012	25 - 35	NA	NA	0.22 U	0.36 U	<b>11</b>	<b>0.45 I</b>	<b>1,200</b>
	11/4/2013	25 - 35	NA	0.82 U	0.76 U	0.89 U	<b>14</b>	0.53 U	<b>1,100</b>
	11/12/2014	25 - 35	NA	8.2 U	7.6 U	8.9 U	7.3 U	5.3 U	<b>700</b>
	11/3/2015	25 - 35	NA	4.1 U	3.8 U	4.4 U	<b>7.6</b>	2.6 U	<b>750</b>
	11/17/2016	25 - 35	NA	4.1 U	3.8 U	4.4 U	<b>5.6</b>	2.6 U	<b>490</b>
	11/13/2017	25 - 35	NA	8.2 U	7.6 U	8.9 U	7.3 U	5.3 U	<b>540</b>
	9/25/2018	25 - 35	NA	4.1 U	3.8 U	4.4 U	<b>3.6 I</b>	<b>5.0</b>	<b>450</b>
	11/22/2019	25 - 35	NA	1.0 U	0.22 U	0.35 U	<b>2.7</b>	0.28 U	<b>271</b>
	11/17/2020	25 - 35	NA	NA	0.22 U	0.35 U	<b>2.6</b>	0.28 U	<b>235</b>
11/22/2021	25 - 35	NA	NA	0.76 U	0.89 U	<b>2.4</b>	0.53 U	<b>220</b>	
11/8/2022	25 - 35	NA	NA	0.50 U	0.50 U	<b>1.5</b>	0.50 U	<b>230</b>	
GSSP-MW0021	6/5/2007	40 - 50	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	7/1/2009	40 - 50	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	<b>1.4</b>
	10/26/2010	40 - 50	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.22 U
	9/22/2011	40 - 50	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	<b>0.77 I</b>
	10/31/2012	40 - 50	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/5/2013	40 - 50	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/22/2019	40 - 50	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>0.43 I</b>
GSSP-MW0022	6/5/2007	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	6/30/2009	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	10/26/2010	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.22 U
	9/22/2011	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.22 U
	10/31/2012	15 - 25	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/5/2013	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/12/2014	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	15 - 25	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0023	6/5/2007	25 - 35	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	6/30/2009	25 - 35	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	10/26/2010	25 - 35	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.22 U
	9/22/2011	25 - 35	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.22 U
	10/31/2012	25 - 35	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/5/2013	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	25 - 35	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0024	6/5/2007	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	<b>0.59 I</b>	<b>5.5</b>
	7/1/2009	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	<b>2.3</b>
	9/26/2018	15 - 25	NA	<b>36.0</b>	0.76 U	0.89 U	<b>1.5</b>	0.53 U	0.71 U
	11/7/2018	15 - 25	NA	<b>82.0</b>	0.76 U	0.89 U	<b>1.3</b>	0.53 U	0.71 U

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0024R	11/25/2019	15 - 25	9.2	23.2	0.22 U	0.35 U	0.66 I	0.28 U	0.41 U
	11/17/2020	15 - 25	47.6	NA	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
	11/22/2021	15 - 25	0.051 I	NA	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/8/2022	15 - 25	18	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
GSSP-MW0026	9/25/2007	5 - 15	NA	NA	0.25 U	0.38 U	0.20 U	0.28 U	0.34 U
	7/1/2009	5 - 15	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	11/1/2012	5 - 15	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/5/2013	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/12/2014	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	5 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0027	9/25/2007	5 - 15	NA	NA	1.3 U	1.9 U	1.0 U	1.4 U	150
	7/1/2009	5 - 15	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	10/25/2010	5 - 15	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	1.2
	9/22/2011	5 - 15	NA	NA	0.25 U	0.26 U	1.9	0.31 I	189
	11/1/2012	5 - 15	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.45 I
	11/4/2013	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/10/2014	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	5 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0034	9/24/2007	5 - 15	NA	NA	0.25 U	0.38 U	0.20 U	0.28 U	0.34 U
	7/1/2009	5 - 15	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	4.7
	10/25/2010	5 - 15	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	4.8
	9/22/2011	5 - 15	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	5.0
	11/1/2012	5 - 15	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	3.9
	11/6/2013	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	2.7
	11/12/2014	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	1.2
	11/4/2015	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	1.2
	11/17/2016	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/13/2017	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/7/2018	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	5 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
	11/17/2020	5 - 15	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
	11/22/2021	5 - 15	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
11/8/2022	5 - 15	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0035	9/24/2007	15 - 25	NA	NA	0.25 U	0.38 U	0.20 U	0.34 U	0.28 U
	7/1/2009	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	6.1
	10/25/2010	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	8.0
	9/22/2011	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	12
	11/1/2012	15 - 25	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	14
	11/6/2013	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	11
	11/12/2014	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	8.9
	11/4/2015	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	4.8
	11/17/2016	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	4.8
	11/13/2017	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	4.3
	11/7/2018	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	3.2
	11/25/2019	15 - 25	0.33 U	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	4.9
	11/17/2020	15 - 25	0.32 U	NA	0.22 U	0.35 U	0.22 U	0.28 U	4.5
11/22/2021	15 - 25	0.050 U	NA	0.76 U	0.89 U	0.73 U	0.53 U	2.9	
11/8/2022	15 - 25	0.091 U	NA	0.50 U	0.50 U	0.50 U	0.50 U	2.9	
GSSP-MW0036	9/24/2007	30 - 40	NA	NA	0.25 U	0.38 U	0.20 U	0.28 U	7.1
	7/1/2009	30 - 40	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	23.5
	10/25/2010	30 - 40	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	39.4
	9/22/2011	30 - 40	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	29
	11/1/2012	30 - 40	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	25
	11/6/2013	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	17
	11/12/2014	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	8.7
	11/4/2015	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	2.7
	11/17/2016	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	2.4
	11/13/2017	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	3.0
	11/7/2018	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	1.4
	11/25/2019	30 - 40	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	2.0
	11/17/2020	30 - 40	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	2.0
11/22/2021	30 - 40	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	1.8	
11/8/2022	30 - 40	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	
GSSP-MW0039	9/24/2007	25 - 35	NA	NA	0.25 U	0.38 U	0.20 U	0.28 U	0.34 U
	6/30/2009	25 - 35	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	11/6/2013	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	25 - 35	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0042	9/24/2007	30 - 40	NA	NA	0.25 U	0.38 U	0.20 U	0.28 U	0.34 U
	6/30/2009	30 - 40	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	11/1/2012	30 - 40	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/6/2013	30 - 40	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/25/2019	30 - 40	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0043R	1/13/2009	5 - 15	NA	NA	0.22 U	0.32 U	<b>2.9</b>	<b>99</b>	<b>4.0</b>
	10/26/2010	5 - 15	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	<b>2.8</b>
	9/21/2011	5 - 15	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	<b>2.1</b>
	10/31/2012	5 - 15	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	<b>0.54 I</b>
	11/5/2013	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/11/2014	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/3/2015	5 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/22/2019	5 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
GSSP-MW0044R	1/13/2009	25 - 35	NA	NA	0.22 U	<b>5.7</b>	<b>1.6</b>	<b>19.6</b>	<b>230</b>
	10/26/2010	25 - 35	NA	NA	0.25 U	0.26 U	<b>1.1</b>	<b>28.3</b>	<b>105</b>
	9/21/2011	25 - 35	NA	NA	0.25 U	0.26 U	<b>0.64 I</b>	<b>2.6</b>	<b>48.3</b>
	10/31/2012	25 - 35	NA	NA	0.22 U	0.36 U	<b>0.35 I</b>	<b>0.43 I</b>	<b>37</b>
	11/5/2013	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>33</b>
	11/11/2014	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>18</b>
	11/3/2015	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>2.8</b>
	11/17/2016	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/13/2017	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>1.5</b>
	9/25/2018	25 - 35	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/22/2019	25 - 35	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>1.0</b>
	11/17/2020	25 - 35	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U
	11/22/2021	25 - 35	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/8/2022	25 - 35	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
GSSP-MW0053	9/11/2009	15 - 25	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	<b>93.8</b>
	10/25/2010	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	<b>6.5</b>
	9/21/2011	15 - 25	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	<b>12.3</b>
	10/31/2012	15 - 25	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	<b>6.1</b>
	11/5/2013	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>4.1</b>
	11/10/2014	15 - 25	NA	0.82 U	0.76 U	0.89 U	<b>0.93 I</b>	0.53 U	<b>8.4</b>
	11/4/2015	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>3.0</b>
	11/17/2016	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>16</b>
	11/13/2017	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>120</b>
	9/25/2018	15 - 25	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>64</b>
	11/22/2019	15 - 25	0.32 U	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>94.7</b>
	11/17/2020	15 - 25	0.32 U	NA	0.22 U	0.35 U	0.22 U	0.28 U	<b>79.1</b>
	11/22/2021	15 - 25	<b>0.069 I</b>	NA	0.76 U	0.89 U	0.73 U	0.53 U	<b>63</b>
	11/8/2022	15 - 25	0.091 U	NA	0.50 U	0.50 U	0.50 U	0.50 U	<b>75</b>

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0059	8/26/2010	16 - 21	NA	NA	2.2 U	25.4	35.9	365	477
	10/27/2010	16 - 21	NA	NA	0.25 U	0.76 I	24.3	47.2	477
	11/30/2010	16 - 21	NA	NA	0.25 U	0.26 U	13.5	0.26 U	25.6
	1/27/2011	16 - 21	NA	NA	0.25 U	0.26 U	12	0.26 U	0.76 I
	3/3/2011	16 - 21	NA	NA	0.25 U	0.26 U	15.3	0.26 U	0.29 I
	6/2/2011	16 - 21	NA	NA	0.25 U	0.26 U	8.9	0.26 U	0.22 U
	9/22/2011	16 - 21	NA	NA	0.25 U	0.26 U	0.35 U	0.26 U	0.38 I
	11/1/2012	16 - 21	NA	NA	0.22 U	0.36 U	0.19 U	0.36 U	0.36 U
	11/6/2013	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.81 I
	11/11/2014	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	3.3
	11/4/2015	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	2.2
	11/16/2016	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/14/2017	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	4.4
	9/25/2018	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.62 I	4.2
	11/22/2019	16 - 21	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	0.93 I
11/17/2020	16 - 21	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	1.3	
11/22/2021	16 - 21	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	2.2	
11/8/2022	16 - 21	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	
GSSP-MW0060	8/25/2010	10 - 15	NA	NA	0.44 U	0.24 U	8.2	29.4	649
	10/27/2010	10 - 15	NA	NA	0.25 U	0.26 U	3.9	10.5	93.9
	11/29/2010	10 - 15	NA	NA	0.25 U	0.26 U	1.6	2.1	112
	1/27/2011	10 - 15	NA	NA	0.25 U	0.26 U	1.8	1.3	133
	3/4/2011	10 - 15	NA	NA	0.25 U	1.3	1.0	1.9	134
	6/2/2011	10 - 15	NA	NA	0.25 U	6.3	1.4	6.3	151
	9/22/2011	10 - 15	NA	NA	0.25 U	0.26 U	1.3	0.26 U	104
	11/1/2012	10 - 15	NA	NA	0.22 U	0.36 U	0.23 I	0.36 U	0.36 U
	11/6/2013	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	12
	11/11/2014	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	2.1
	11/4/2015	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	3.6
	11/16/2016	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	7.2
	11/14/2017	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	3.3
	9/25/2018	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.71 I	3.6
	11/22/2019	10 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	2.5
11/17/2020	10 - 15	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	3.8	
11/22/2021	10 - 15	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	1.6	
11/8/2022	10 - 15	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	



**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0061	8/25/2010	16 - 21	NA	NA	0.88 U	<b>110</b>	<b>6.4</b>	<b>110</b>	<b>232</b>
	10/27/2010	16 - 21	NA	NA	0.25 U	<b>4.4</b>	<b>4.9</b>	<b>147</b>	<b>216</b>
	11/29/2010	16 - 21	NA	NA	0.25 U	<b>2.2</b>	<b>2.0</b>	<b>28.9</b>	<b>138</b>
	1/27/2011	16 - 21	NA	NA	0.25 U	<b>0.74 I</b>	<b>0.66 I</b>	<b>6.8</b>	<b>70.5</b>
	3/4/2011	16 - 21	NA	NA	0.25 U	<b>2.0</b>	<b>0.59 I</b>	<b>5.3</b>	<b>53.1</b>
	6/2/2011	16 - 21	NA	NA	0.25 U	<b>0.26 I</b>	0.35 U	<b>0.76 I</b>	<b>46.6</b>
	9/22/2011	16 - 21	NA	NA	0.25 U	0.26 U	<b>0.41 I</b>	0.26 U	<b>77.5</b>
	11/1/2012	16 - 21	NA	NA	0.22 U	0.36 U	<b>0.76 I</b>	0.36 U	0.36 U
	11/6/2013	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U
	11/11/2014	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>1.1</b>
	11/4/2015	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>0.89 I</b>
	11/16/2016	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>9.1</b>
	11/14/2017	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>4.5</b>
	9/25/2018	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.78 I</b>	<b>5.9</b>
	11/22/2019	16 - 21	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>0.48 I</b>
11/17/2020	16 - 21	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	0.41 U	
11/22/2021	16 - 21	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U	
11/8/2022	16 - 21	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	
GSSP-MW0062	8/25/2010	10 - 15	NA	NA	<b>0.46 I</b>	<b>39.8</b>	<b>6.8</b>	<b>31.1</b>	<b>1,340</b>
	10/27/2010	10 - 15	NA	NA	0.25 U	<b>5.3</b>	<b>16.9</b>	<b>213</b>	<b>743</b>
	11/29/2010	10 - 15	NA	NA	0.25 U	0.26 U	<b>9.6</b>	<b>4.9</b>	<b>639</b>
	1/27/2011	10 - 15	NA	NA	0.25 U	0.26 U	<b>16.4</b>	<b>1.7</b>	<b>144</b>
	3/4/2011	10 - 15	NA	NA	0.25 U	0.26 U	<b>15.8</b>	<b>2.5</b>	<b>132</b>
	6/2/2011	10 - 15	NA	NA	0.25 U	0.26 U	<b>11.1</b>	<b>1.1</b>	<b>78.7</b>
	9/22/2011	10 - 15	NA	NA	0.25 U	0.26 U	<b>6.0</b>	<b>0.53 I</b>	<b>91</b>
	10/31/2012	10 - 15	NA	NA	0.22 U	0.36 U	<b>1.1</b>	<b>0.95 I</b>	<b>180</b>
	11/6/2013	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>54</b>
	11/11/2014	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>17</b>
	11/4/2015	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.83 I</b>	<b>38</b>
	11/16/2016	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.80 I</b>	<b>27</b>
	11/13/2017	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>1.4</b>	<b>34</b>
	9/25/2018	10 - 15	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>1.1</b>	<b>27</b>
	11/22/2019	10 - 15	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>13.6</b>
11/17/2020	10 - 15	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	<b>9.7</b>	
11/22/2021	10 - 15	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	<b>7.1</b>	
11/8/2022	10 - 15	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	<b>5.6</b>	

**Table 13-2**  
**General Services Administration Seized Property - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method 8270 SIM		Volatile Organic Compounds (VOC) by Method 8260				
Analyte			NAPHTHALENE	NAPHTHALENE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	CIS-1,2-DICHLOROETHENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			14	14	3	3	100	70	1
FDEP NADCs (µg/L)			140	140	300	300	1000	700	100
Location ID	Sample Date	Screened Interval (ft bls)							
GSSP-MW0063	8/25/2010	16 - 21	NA	NA	0.44 U	<b>1.1</b>	<b>0.51 I</b>	<b>3.0</b>	<b>87.2</b>
	10/27/2010	16 - 21	NA	NA	0.25 U	<b>1.2</b>	<b>0.69 I</b>	<b>2.9</b>	<b>93.5</b>
	11/29/2010	16 - 21	NA	NA	0.25 U	<b>0.62 I</b>	<b>1.3</b>	<b>12.9</b>	<b>147</b>
	1/27/2011	16 - 21	NA	NA	0.25 U	0.26 U	<b>2.1</b>	<b>1.1</b>	<b>234</b>
	3/4/2011	16 - 21	NA	NA	0.25 U	0.26 U	<b>1.2</b>	<b>0.64 I</b>	<b>51.6</b>
	6/2/2011	16 - 21	NA	NA	0.25 U	<b>0.84 I</b>	<b>4.4</b>	<b>1.4</b>	<b>38.5</b>
	9/22/2011	16 - 21	NA	NA	0.25 U	0.26 U	<b>8.6</b>	<b>8.3</b>	<b>91.2</b>
	11/1/2012	16 - 21	NA	NA	0.22 U	0.36 U	<b>2.6</b>	<b>6.1</b>	<b>340</b>
	11/6/2013	16 - 21	NA	0.82 U	0.76 U	0.89 U	<b>2.2</b>	<b>2.2</b>	<b>200</b>
	11/11/2014	16 - 21	NA	1.6 U	1.5 U	1.8 U	1.5 U	1.1 U	<b>130</b>
	11/4/2015	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.74 I</b>	<b>61</b>
	11/16/2016	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.90 I</b>	<b>15</b>
	11/13/2017	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	<b>0.68 I</b>	<b>5.3</b>
	9/25/2018	16 - 21	NA	0.82 U	0.76 U	0.89 U	0.73 U	0.53 U	<b>2.6</b>
	11/22/2019	16 - 21	NA	1.0 U	0.22 U	0.35 U	0.22 U	0.28 U	<b>1.8</b>
11/17/2020	16 - 21	NA	NA	0.22 U	0.35 U	0.22 U	0.28 U	<b>1.2</b>	
11/22/2021	16 - 21	NA	NA	0.76 U	0.89 U	0.73 U	0.53 U	0.71 U	
11/8/2022	16 - 21	NA	NA	0.50 U	0.50 U	0.50 U	0.50 U	<b>0.74 I</b>	

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

GSSP = General Services Administration Seized Property

MW = monitoring well

NA = Not Analyzed

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

U = Analyte not detected

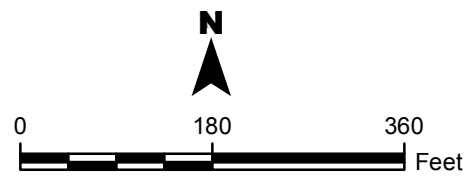
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- Legend**
- ◆ Shallow Monitoring Well (2-15 ft bls)
  - ◆ Shallow-Intermediate Monitoring Well (15-25 ft bls)
  - ◆ Intermediate Monitoring Well (25-40 ft bls)
  - ◆ Deep Monitoring Well (40-60 ft bls)
  - ◆ Monitoring Well (Non-LTM)

- Notes:**
- (15-20) = Monitoring well screen interval in feet below land surface
  - SWMU = Solid Waste Management Unit
  - LTM = Long Term Monitoring
  - Aerial Source: FDOT 2018
  - ft bls = feet below land surface



**FIGURE 13**  
**Site Map**  
 2022 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

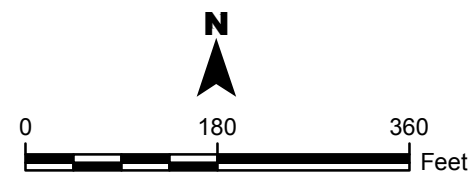
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- Legend**
- ◆ Shallow Monitoring Well (5-15 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (3.12) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on November 22, 2021
- Groundwater Contour Interval = 0.50 ft
- (5-15) = Monitoring well screen interval in feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 13-1**  
**Shallow Zone Groundwater Elevation Map**  
**November 2021**  
 2021 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

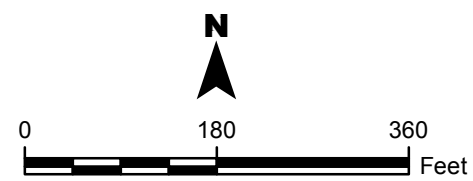
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- Legend**
- ◆ Shallow-Intermediate Monitoring Well (15-25 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - ← Approximate Direction of Groundwater Flow
  - (3.09) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on November 22, 2021
- Groundwater Contour Interval = 0.50 ft
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



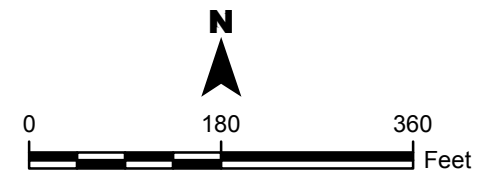
**FIGURE 13-2**  
**Shallow-Intermediate Zone Groundwater Elevation Map**  
**November 2021**  
 2021 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

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- Legend**
- ◆ Intermediate Monitoring Well (25-40 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - ← Approximate Direction of Groundwater Flow
  - (2.41) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 22, 2021
  - Groundwater Contour Interval = 0.50 ft
  - Aerial Source: FDOT 2018
  - ft bls = feet below land surface
  - SWMU = Solid Waste Management Unit



**FIGURE 13-3**  
**Intermediate Zone Groundwater Elevation Map**  
**November 2021**  
 2021 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

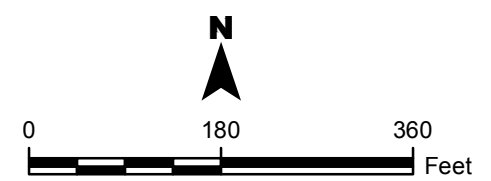
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- Legend**
- Shallow Monitoring Well (5-15 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (3.36) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on November 8, 2022
- Groundwater Contour Interval = 0.40 ft
- (5-15) = Monitoring well screen interval in feet below land surface
- Aerial Source: FDOT 2018



**FIGURE 13-4**  
**Shallow Zone Groundwater Elevation Map**  
**November 2022**  
 2022 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

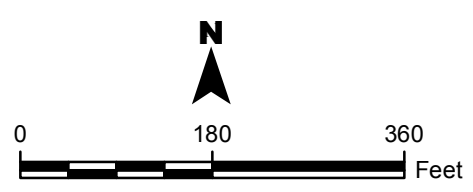
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- Legend**
- ◆ Shallow-Intermediate Monitoring Well (15-25 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - ➔ Approximate Direction of Groundwater Flow
  - (3.09) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on November 8, 2022
- Groundwater Contour Interval = 0.40 ft
- Aerial Source: FDOT 2018
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- \* = Not used in contouring



**FIGURE 13-5**  
**Shallow-Intermediate Zone Groundwater Elevation Map**  
**November 2022**  
 2022 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

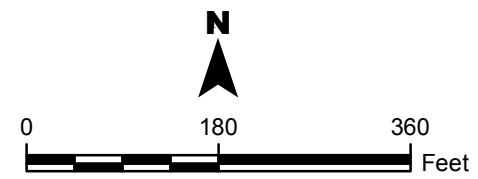


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- Legend**
- Intermediate Monitoring Well (25-40 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (3.07) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 8, 2022
  - Groundwater Contour Interval = 0.40 ft
  - Aerial Source: FDOT 2018
  - ft bls = feet below land surface
  - SWMU = Solid Waste Management Unit



**FIGURE 13-6**  
**Intermediate Zone Groundwater Elevation Map**  
**November 2022**  
 2022 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida



GSSP-MW0036							
Location ID	Date	GSSP-MW0036	GSSP-MW0036	GSSP-MW0036	GSSP-MW0036	GSSP-MW0036	GSSP-MW0036
Screen Interval	Sample Type	11/13/2017	11/07/2018	11/25/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	0.53 U	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>3</b>	<b>1.4</b>	<b>2.0</b>	<b>2.0</b>	<b>1.8</b>	0.50 U

GSSP-MW0053							
Location ID	Date	GSSP-MW0053	GSSP-MW0053	GSSP-MW0053	GSSP-MW0053	GSSP-MW0053	GSSP-MW0053
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	0.53 U	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>120</b>	<b>64</b>	<b>94.7</b>	<b>79.1</b>	<b>63</b>	<b>75</b>
NAFTHALENE		0.82 U	0.82 U	1.0 U	0.32 U	<b>0.069 I</b>	0.091 U

GSSP-MW0013							
Location ID	Date	GSSP-MW0013	GSSP-MW0013	GSSP-MW0013	GSSP-MW0013	GSSP-MW0013	GSSP-MW0013
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/25/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		<b>1.4</b>	0.53 U	<b>0.53 I</b>	<b>0.54 I</b>	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>17</b>	0.71 U	<b>9.7</b>	<b>10.3</b>	<b>6.4</b>	0.50 U

GSSP-MW0060							
Location ID	Date	GSSP-MW0060	GSSP-MW0060	GSSP-MW0060	GSSP-MW0060	GSSP-MW0060	GSSP-MW0060
Screen Interval	Sample Type	11/14/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	<b>0.71 I</b>	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>3.3</b>	<b>3.6</b>	<b>2.5</b>	<b>3.8</b>	<b>1.6</b>	0.50 U

GSSP-MW0061							
Location ID	Date	GSSP-MW0061	GSSP-MW0061	GSSP-MW0061	GSSP-MW0061	GSSP-MW0061	GSSP-MW0061
Screen Interval	Sample Type	11/14/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	<b>0.78 I</b>	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>4.5</b>	<b>5.9</b>	<b>0.48 I</b>	0.41 U	0.71 U	0.50 U

GSSP-MW0059							
Location ID	Date	GSSP-MW0059	GSSP-MW0059	GSSP-MW0059	GSSP-MW0059	GSSP-MW0059	GSSP-MW0059
Screen Interval	Sample Type	11/14/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	<b>0.62 I</b>	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>4.4</b>	<b>4.2</b>	<b>0.93 I</b>	<b>1.3</b>	<b>2.2</b>	0.50 U

GSSP-MW0048							
Location ID	Date	GSSP-MW0048	GSSP-MW0048	GSSP-MW0048	GSSP-MW0048	GSSP-MW0048	GSSP-MW0048
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		0.53 U	0.53 U	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>1.5</b>	0.71 U	<b>1.1</b>	0.41 U	0.71 U	0.50 U

GSSP-MW0020							
Location ID	Date	GSSP-MW0020	GSSP-MW0020	GSSP-MW0020	GSSP-MW0020	GSSP-MW0020	GSSP-MW0020
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		7.6 U	3 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		8.9 U	4 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		5.3 U	<b>5</b>	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		7.3 U	<b>3.6 I</b>	<b>2.7</b>	<b>2.6</b>	<b>2.4</b>	<b>1.5</b>
VINYL CHLORIDE		<b>540</b>	<b>450</b>	<b>271</b>	<b>235</b>	<b>220</b>	<b>230</b>

GSSP-MW0019							
Location ID	Date	GSSP-MW0019	GSSP-MW0019	GSSP-MW0019	GSSP-MW0019	GSSP-MW0019	GSSP-MW0019
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		1.5 U	1 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		1.8 U	<b>6.8</b>	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		<b>1.6 I</b>	<b>0.3</b>	<b>1.4</b>	<b>2.2</b>	<b>2.5</b>	<b>0.78 I</b>
TRANS-1,2-DICHLOROETHENE		<b>2.4</b>	<b>2.3</b>	<b>1.6</b>	<b>1.1</b>	<b>1.0</b>	<b>0.74 I</b>
VINYL CHLORIDE		<b>170</b>	<b>200</b>	<b>122</b>	<b>89.4</b>	<b>81</b>	<b>93</b>

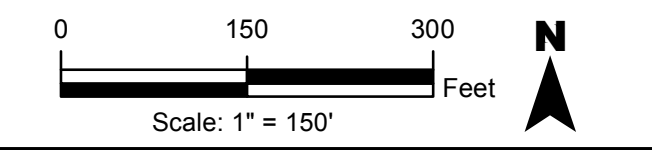
GSSP-MW0063							
Location ID	Date	GSSP-MW0063	GSSP-MW0063	GSSP-MW0063	GSSP-MW0063	GSSP-MW0063	GSSP-MW0063
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		<b>0.68 I</b>	0.53 U	0.28 U	0.28 U	0.53 U	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>5.3</b>	<b>2.6</b>	<b>1.8</b>	<b>1.2</b>	0.71 U	<b>0.74 I</b>

GSSP-MW0062							
Location ID	Date	GSSP-MW0062	GSSP-MW0062	GSSP-MW0062	GSSP-MW0062	GSSP-MW0062	GSSP-MW0062
Screen Interval	Sample Type	11/13/2017	09/25/2018	11/22/2019	11/17/2020	11/22/2021	11/08/2022
Analyte							
TETRACHLOROETHENE		0.76 U	0.76 U	0.22 U	0.22 U	0.76 U	0.50 U
TRICHLOROETHENE		0.89 U	0.89 U	0.35 U	0.35 U	0.89 U	0.50 U
CIS-1,2-DICHLOROETHENE		<b>1.4</b>	<b>1.1</b>	0.28 U	0.28 U	<b>0.55 I</b>	0.50 U
TRANS-1,2-DICHLOROETHENE		0.73 U	0.73 U	0.22 U	0.22 U	0.73 U	0.50 U
VINYL CHLORIDE		<b>34</b>	<b>27</b>	<b>13.6</b>	<b>9.7</b>	<b>7.1</b>	<b>5.6</b>

- Legend**
- Intermediate LTM Well, Sample Results Exceed NADc
  - Intermediate LTM Well, Sample Results Exceeds GCTL
  - Intermediate LTM Well, Sample Results Below GCTL
  - Shallow LTM Well, Sample Results Exceed GCTL
  - Shallow LTM Well, Sample Results Below GCTL
  - Non-LTM Well, No Sample Results
  - Intermediate Groundwater Elevation Contours - November 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Multiple Contaminants Greater Than GCTLs from Monitoring Well Sampling
  - Approximate Extent of Vinyl Chloride Greater Than NADc's from Monitoring Well Sampling

- Notes:**
- LTM = Long Term Monitoring
  - MW = Monitoring Well
  - NM = Normal Sample
  - SWMU = Solid Waste Management Unit
  - All results and screening criteria presented in µg/L
  - I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL)
  - U = Result was below the laboratory MDL
  - FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  - FDEP NADc's = Natural Attenuation Default Concentration, Chapter 62-777, F.A.C.
  - Bolded** results indicate the presence of an analyte at the specified concentration.
  - Blue** font indicates an exceedance of FDEP GCTLs.
  - Red** font indicates an exceedance of FDEP NADc's.
  - Aerial Source: ESRI 2018.
  - Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL	NADc
TETRACHLOROETHENE	3	300
TRICHLOROETHENE	3	300
CIS-1,2-DICHLOROETHENE	70	700
TRANS-1,2-DICHLOROETHENE	100	1000
VINYL CHLORIDE	1	100



**FIGURE 13-7**  
**Groundwater Sampling Analytical Results**  
 2022 - Industrial Area Long Term Monitoring  
 General Services Administration Seized Property (GSSP)  
 SWMU 095  
 NASA Kennedy Space Center, Florida

## 14. SPACE STATION PROCESSING FACILITY

This section provides a summary of the SSPF site (SWMU 098). Refer to **Figure 14** for a site map.

### 14.1 SITE DESCRIPTION AND HISTORY

The SSPF is located in the northeast portion of the KSC IA at the southeast corner of the East Avenue South and 1st Street Southeast intersection. The SSPF was constructed in 1994 to service and process elements, payloads, and experiments for the International Space Station. The site is comprised of the SSPF Building, the Ammonia Vapor Containment Building, support buildings, and a hazardous waste storage area. A loading dock is located on the west side of the SSPF Building. Paved parking areas are located north and east of the SSPF Building, and a grassy area with a hiking trail exists north of the north parking lot (NASA 2010).

Under Title V of the Clean Air Act, ammonia handling operations at SSPF are required to report releases of ammonia exceeding 100 pounds per day to FDEP. In 2005, a SWMU Assessment identified releases of anhydrous ammonia in the vicinity of the Ammonia Vapor Containment Building (LFR 2006c). The SWMU assessment stated that during International Space Station payload operations approximately 25 pounds per day of ammonia were released; however, three releases of ammonia that exceeded 100 pounds in a day were reported to FDEP. The first documented release occurred in 1996. Two of these reportable releases were directly related to operator error, and the third release was attributed to venting required for an emergency repair. Approximately 1,440 pounds of ammonia have been released in the vicinity of the Ammonia Vapor Containment Building (NASA 2010).

In 2006, confirmatory sampling was conducted at SSPF, which confirmed the presence of ammonia in groundwater at concentrations exceeding the GCTL. Between 2007 and 2009, an RFI was conducted to delineate the extent of ammonia in groundwater (LFR 2010b). The RFI found ammonia concentrations below the NADC, but exceeded the GCTL. Following the RFI, an ammonia background study was performed center-wide at KSC to establish naturally occurring ammonia concentrations (LFR 2009b). The background study established an ammonia background concentration of 1,860 µg/L. A cleanup goal was established for the groundwater at SSPF of 3,720 µg/L, which is two times the mean ammonia background concentration. Selection of MNA for groundwater was established to reduce ammonia concentrations below the established site cleanup goal (NASA 2010). The site joined the IA LTM program in 2010 on an annual sampling schedule. In 2012, the sampling frequency was changed to the current biennial groundwater sampling schedule.

## 14.2 FIELD ACTIVITIES

Field activities were performed at SSPF in May 2022. Groundwater levels were measured at 15 monitoring wells and groundwater samples were collected from five monitoring wells. Monitoring well SSPF-MW0013 was added to the 2022 sampling schedule to verify downgradient delineation. The following table shows the network of wells used for groundwater level measurements and sampling at SSPF.

Well ID	Screen Interval (ft bls)	Analysis
SSPF-MW0001	6-16	WL Only
SSPF-MW0002	6-16	WL Only
SSPF-MW0003	6-16	WL Only
SSPF-MW0004	6-16	WL + Ammonia
SSPF-MW0005	6-16	WL Only
SSPF-MW0006	6-16	WL + Ammonia
SSPF-MW0007	6-16	WL Only
SSPF-MW0010	6-16	WL Only
SSPF-MW0013	16-26	WL + Ammonia
SSPF-MW0014	6-16	WL + Ammonia
SSPF-MW0015	2-12	WL Only
SSPF-MW0016	11-21	WL + Ammonia
SSPF-MW0017	6-16	WL Only
SSPF-MW0018	6-16	WL Only
SSPF-MW0020	6-16	WL Only

Ammonia = ammonia analysis by Method 350.1

ID = identification

MW = monitoring well

WL = water level measurement

Groundwater samples collected during the May 2022 sampling event were analyzed for ammonia by Method 350.1. The following table shows the GCTL, NADC, and KSC background concentrations for ammonia.

COC	GCTL	NADC	KSC BKG	2x Mean BKG	KSC Upper ROB
Ammonia as Nitrogen	2,800	28,000	1,860	3,720	9,900

Concentration in µg/L

BKG = Background

ROB = Range of Background

## 14.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the May 2022 sampling event were used to calculate groundwater elevations presented in **Table 14-1**. The 2022 shallow aquifer zone (6 ft bls to 16 ft

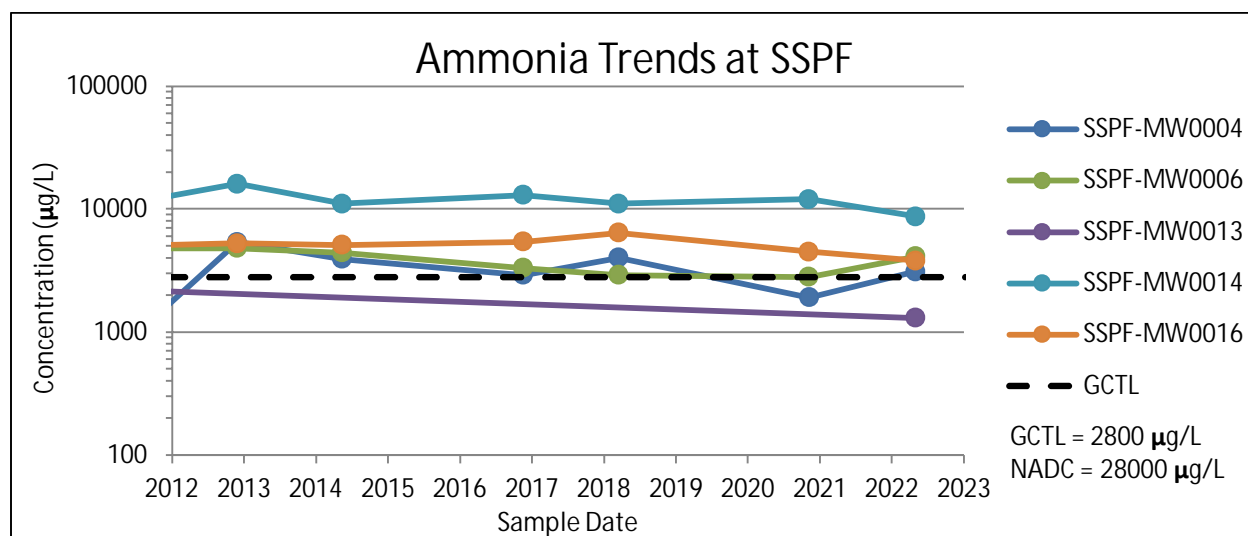
bls) groundwater flow direction was to the north, consistent with a historical north flow direction at the SSPF. The May 2022 groundwater flow is depicted on **Figure 14-1**.

#### 14.4 ANALYTICAL RESULTS

The groundwater sample from monitoring well SSPF-MW0004 (3,100 µg/L) exceeded the GCTL. Groundwater samples from monitoring wells SSPF-MW0006 (4,100 µg/L), SSPF-MW0014 (8,700 µg/L) and SSPF-MW0016 (3,800 µg/L) exceeded the GCTL and KSC treatment goal of 3,720 µg/L (two times the KSC background mean ammonia concentration). A summary of the analytical results is presented in **Table 14-2**. Analytical results are depicted on **Figure 14-2**.

#### 14.5 TREND ANALYSIS

During the May 2022 sampling event, five monitoring wells were sampled and compared to historical sampling trends. The five select monitoring wells have exhibited a slow decrease in ammonia concentration, but monitoring wells SSPF-MW0004 and SSPF-MW0006 had a recent increase in ammonia concentration in 2022. Monitoring well SSPF-MW0013 remains below the GCTL and ammonia was detected at a lower concentration in 2022 than its previous sample in 2010. The following trend chart shows the ammonia concentrations at SSPF since 2012.



#### 14.6 CONCLUSION AND RECOMMENDATION

Ammonia concentrations continue to exceed the GCTL at monitoring well SSPF-MW0004, and exceed both the GCTL and two times the KSC background mean ammonia concentration at monitoring wells SSPF-MW0006, SSPF-MW0014, and SSPF-MW0016. Biennial sampling in alternating wet/dry seasons is recommended to continue at SSPF. Groundwater levels are recommended to be collected at 15 monitoring wells and five groundwater samples will be analyzed for ammonia.

The following table shows the proposed monitoring wells for water level collection and groundwater sampling for the next sampling event at SSPF scheduled for November 2024.

<b>Well ID</b>	<b>Screen Interval (ft bls)</b>	<b>Analysis</b>
SSPF-MW0001	6-16	WL Only
SSPF-MW0002	6-16	WL Only
SSPF-MW0003	6-16	WL Only
SSPF-MW0004	6-16	WL + Ammonia
SSPF-MW0005	6-16	WL Only
SSPF-MW0006	6-16	WL + Ammonia
SSPF-MW0007	6-16	WL Only
SSPF-MW0010	6-16	WL Only
SSPF-MW0013	16-26	WL + Ammonia
SSPF-MW0014	6-16	WL + Ammonia
SSPF-MW0015	2-12	WL Only
SSPF-MW0016	11-21	WL + Ammonia
SSPF-MW0017	6-16	WL Only
SSPF-MW0018	6-16	WL Only
SSPF-MW0020	6-16	WL Only

Ammonia = ammonia analysis by Method 350.1

ID = identification

MW = monitoring well

WL = water level measurement

**Table 14-1**  
**Space Station Processing Facility - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>	SSPF-MW0001		SSPF-MW0002		SSPF-MW0003	
<b>Screen Interval (ft bls):</b>	6 - 16		6 - 16		6 - 16	
<b>TOC Elevation (ft NAVD88):</b>	11.17		11.08		10.50	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	10.09	1.08	10.03	1.05	9.17	1.33
November 2016	9.39	1.78	9.38	1.70	8.32	2.18
March 2018	9.91	1.26	9.84	1.24	9.03	1.47
November 2020	8.34	2.83	8.33	2.75	6.73	3.77
May 2022	9.80	1.37	9.71	1.37	8.43	2.07

<b>SHALLOW WELL ID:</b>	SSPF-MW0004		SSPF-MW0005		SSPF-MW0006	
<b>Screen Interval (ft bls):</b>	6 - 16		6 - 16		6 - 16	
<b>TOC Elevation (ft NAVD88):</b>	9.71		10.55		10.77	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	8.69	1.02	9.58	0.97	9.78	0.99
November 2016	8.02	1.69	8.94	1.61	9.13	1.64
March 2018	8.56	1.15	9.40	1.15	9.61	1.16
November 2020	7.02	2.69	7.90	2.65	8.12	2.65
May 2022	8.38	1.33	9.28	1.27	9.48	1.29

<b>SHALLOW WELL ID:</b>	SSPF-MW0007		SSPF-MW0010		SSPF-MW0014	
<b>Screen Interval (ft bls):</b>	6 - 16		6 - 16		6 - 16	
<b>TOC Elevation (ft NAVD88):</b>	10.79		10.77		7.90	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	9.79	1.00	9.81	0.96	7.11	0.79
November 2016	9.13	1.66	9.18	1.59	6.45	1.45
March 2018	9.63	1.16	9.64	1.13	6.75	1.15
November 2020	8.15	2.64	8.20	2.57	5.37	2.53
May 2022	9.47	1.32	9.47	1.30	6.84	1.06

<b>SHALLOW WELL ID:</b>	SSPF-MW0015		SSPF-MW0017		SSPF-MW0018	
<b>Screen Interval (ft bls):</b>	2 - 12		6 - 16		6 - 16	
<b>TOC Elevation (ft NAVD88):</b>	8.01		4.81		8.15	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.21	1.80	4.52	0.29	6.84	1.31
November 2016	5.00	3.01	4.06	0.75	5.90	2.25
March 2018	5.77	2.24	4.15	0.66	5.93	2.22
November 2020	4.50	3.51	2.92	1.89	4.83	3.32
May 2022	5.40	2.61	4.31	0.50	6.39	1.76

<b>SHALLOW WELL ID:</b>	SSPF-MW0020	
<b>Screen Interval (ft bls):</b>	6 - 16	
<b>TOC Elevation (ft NAVD88):</b>	8.30	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	6.71	1.59
November 2016	6.10	2.20
March 2018	6.41	1.89
November 2020	4.70	3.60
May 2022	6.39	1.91

<b>INTERMEDIATE WELL ID:</b>	SSPF-MW0013		SSPF-MW0016	
<b>Screen Interval (ft bls):</b>	16 - 26		11 - 21	
<b>TOC Elevation (ft NAVD88):</b>	11.02		7.99	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	Not Measured		6.79	1.20
November 2016	Not Measured		6.20	1.79
March 2018	Not Measured		6.66	1.33
November 2020	Not Measured		5.24	2.75
May 2022	10.04	0.98	6.49	1.50

**Notes:**

bls = below land surface

BTOC = below top of casing

ft = feet

MW = monitoring well

NAVD88 = North American Vertical Datum of 1988

SSPF = Space Station Processing Facility

TOC = top of casing

**Table 14-2**  
**Space Station Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Ammonia by Method EPA 350.1</i>
Analyte			AMMONIA
FDEP GCTLs (µg/L)			2,800
2xKSC Background (µg/L)			3,720
FDEP NADCs (µg/L)			28,000
Location ID	Sample Date	Screened Interval (ft bls)	
<b>SSPF-MW0004</b>	5/22/2007	6 - 16	<b>7,400</b>
	10/29/2008	6 - 16	<b>7,100</b>
	2/12/2009	6 - 16	<b>3,000</b>
	8/12/2009	6 - 16	<b>5,400</b>
	5/19/2010	6 - 16	<b>2,100</b>
	11/2/2010	6 - 16	<b>6,790</b>
	5/9/2011	6 - 16	<b>5,850</b>
	11/2/2011	6 - 16	<b>1,450</b>
	11/28/2012	6 - 16	<b>5,360</b>
	5/15/2014	6 - 16	<b>3,900</b>
	11/21/2016	6 - 16	<b>2,900</b>
	3/21/2018	6 - 16	<b>4,000</b>
	11/13/2020	6 - 16	<b>1,900</b>
	5/10/2022	6 - 16	<b>3,100</b>
<b>SSPF-MW0006</b>	10/29/2008	6 - 16	<b>10,000</b>
	8/12/2009	6 - 16	<b>13,000</b>
	5/19/2010	6 - 16	<b>8,400</b>
	11/2/2010	6 - 16	<b>10,500</b>
	5/9/2011	6 - 16	<b>6,450</b>
	11/2/2011	6 - 16	<b>4,790</b>
	11/28/2012	6 - 16	<b>4,780</b>
	5/15/2014	6 - 16	<b>4,400</b>
	11/21/2016	6 - 16	<b>3,300</b>
	3/21/2018	6 - 16	<b>2,900</b>
	11/11/2020	6 - 16	<b>2,800</b>
5/10/2022	6 - 16	<b>4,100</b>	
<b>SSPF-MW0013</b>	10/29/2008	16 - 26	<b>2,500</b>
	5/19/2010	16 - 26	<b>2,300</b>
	5/10/2022	16 - 26	<b>1,300</b>
<b>SSPF-MW0014</b>	10/29/2008	6 - 16	<b>15,000</b>
	8/13/2009	6 - 16	<b>17,000</b>
	5/19/2010	6 - 16	<b>16,000</b>
	11/2/2010	6 - 16	<b>19,200</b>
	5/9/2011	6 - 16	<b>19,400</b>
	11/2/2011	6 - 16	<b>12,300</b>
	11/28/2012	6 - 16	<b>16,000</b>
	5/15/2014	6 - 16	<b>11,000</b>
	11/21/2016	6 - 16	<b>13,000</b>
	3/21/2018	6 - 16	<b>11,000</b>
	11/11/2020	6 - 16	<b>12,000</b>
	5/10/2022	6 - 16	<b>8,700</b>



**Table 14-2**  
**Space Station Processing Facility - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			<i>Ammonia by Method EPA 350.1</i>
Analyte			AMMONIA
FDEP GCTLs (µg/L)			2,800
2xKSC Background (µg/L)			3,720
FDEP NADCs (µg/L)			28,000
Location ID	Sample Date	Screened Interval (ft bls)	
<b>SSPF-MW0016</b>	10/29/2008	11 - 21	<b>4,900</b>
	5/19/2010	11 - 21	<b>3,600</b>
	11/2/2010	11 - 21	<b>4,040</b>
	5/9/2011	11 - 21	<b>4,960</b>
	11/2/2011	11 - 21	<b>5,070</b>
	11/28/2012	11 - 21	<b>5,240</b>
	5/16/2014	11 - 21	<b>5,100</b>
	11/21/2016	11 - 21	<b>5,400</b>
	3/21/2018	11 - 21	<b>6,400</b>
	11/11/2020	11 - 21	<b>4,500</b>
5/10/2022	11 - 21	<b>3,800</b>	

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

2xKSC Background = two times the background KSC levels, established in 2009

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

ft bls = feet below land surface

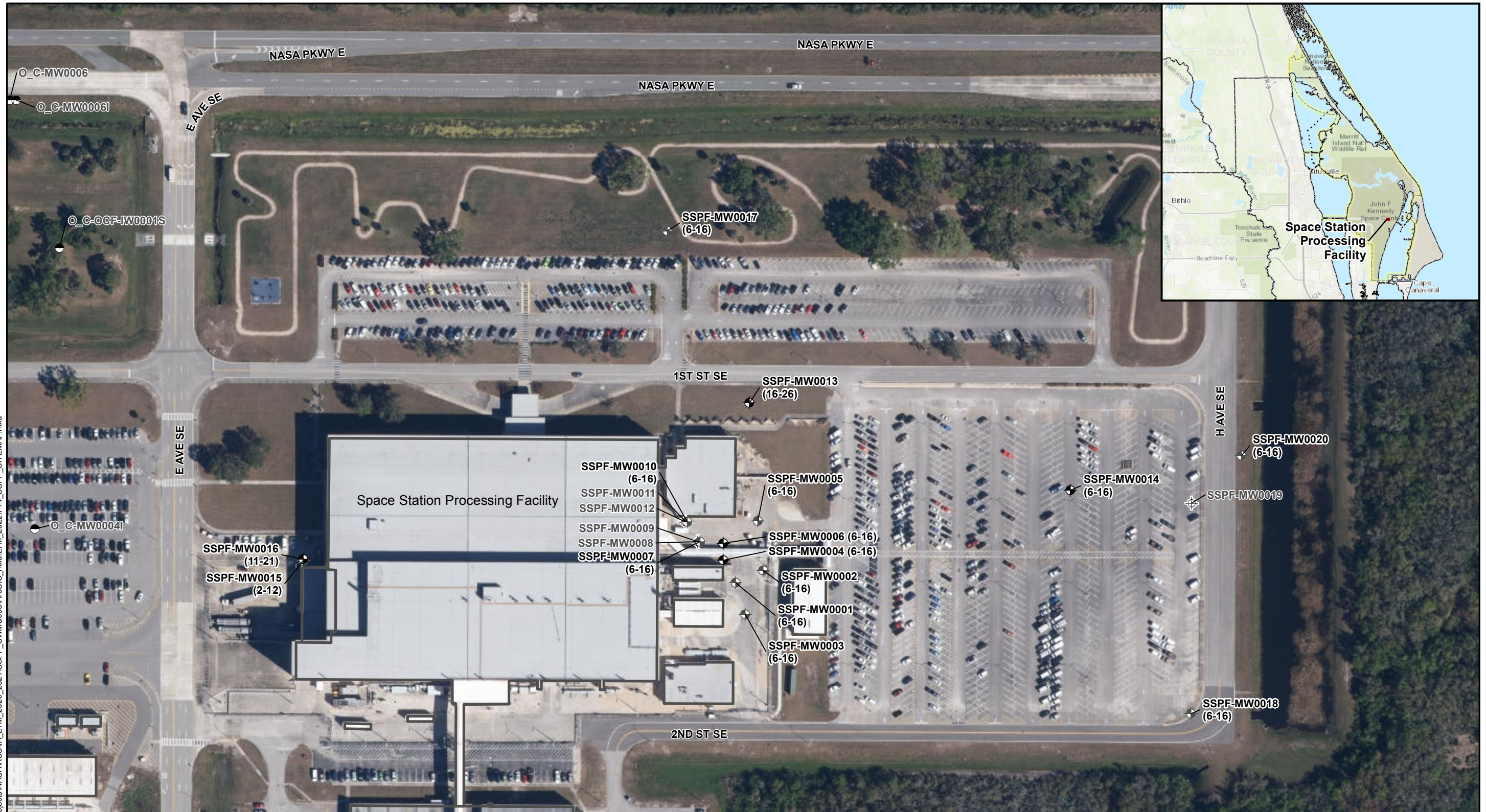
SSPF = Space Station Processing Facility

MW = monitoring well





Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

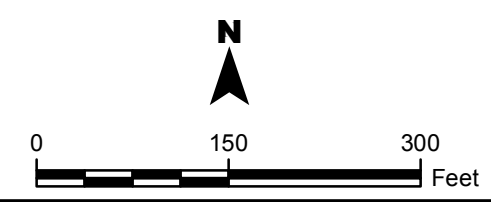


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- Legend**
-  Monitoring Well (LTM)
  -  Monitoring Well (LTM - Water Level Only)
  -  Monitoring Well (Non - LTM)
  -  Monitoring Well (Adjacent Site)

**Notes:**

- (2-12) = Monitoring well screen interval in feet below land surface
- Long Term Monitoring (LTM)
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



**FIGURE 14**  
**Site Map**

2022 - Industrial Area Long Term Monitoring  
 Space Station Processing Facility (SSPF)  
 SWMU 098  
 NASA Kennedy Space Center, Florida

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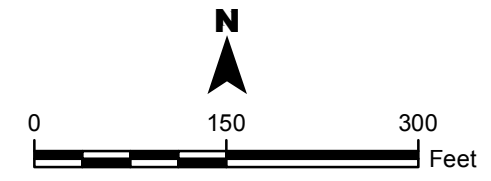
**Legend**

- Monitoring Well (6-16 ft bls)
- Monitoring Well (Non-LTM)
- Groundwater Contour (NAVD88 ft)
- Approximate Direction of Groundwater Flow
- Building

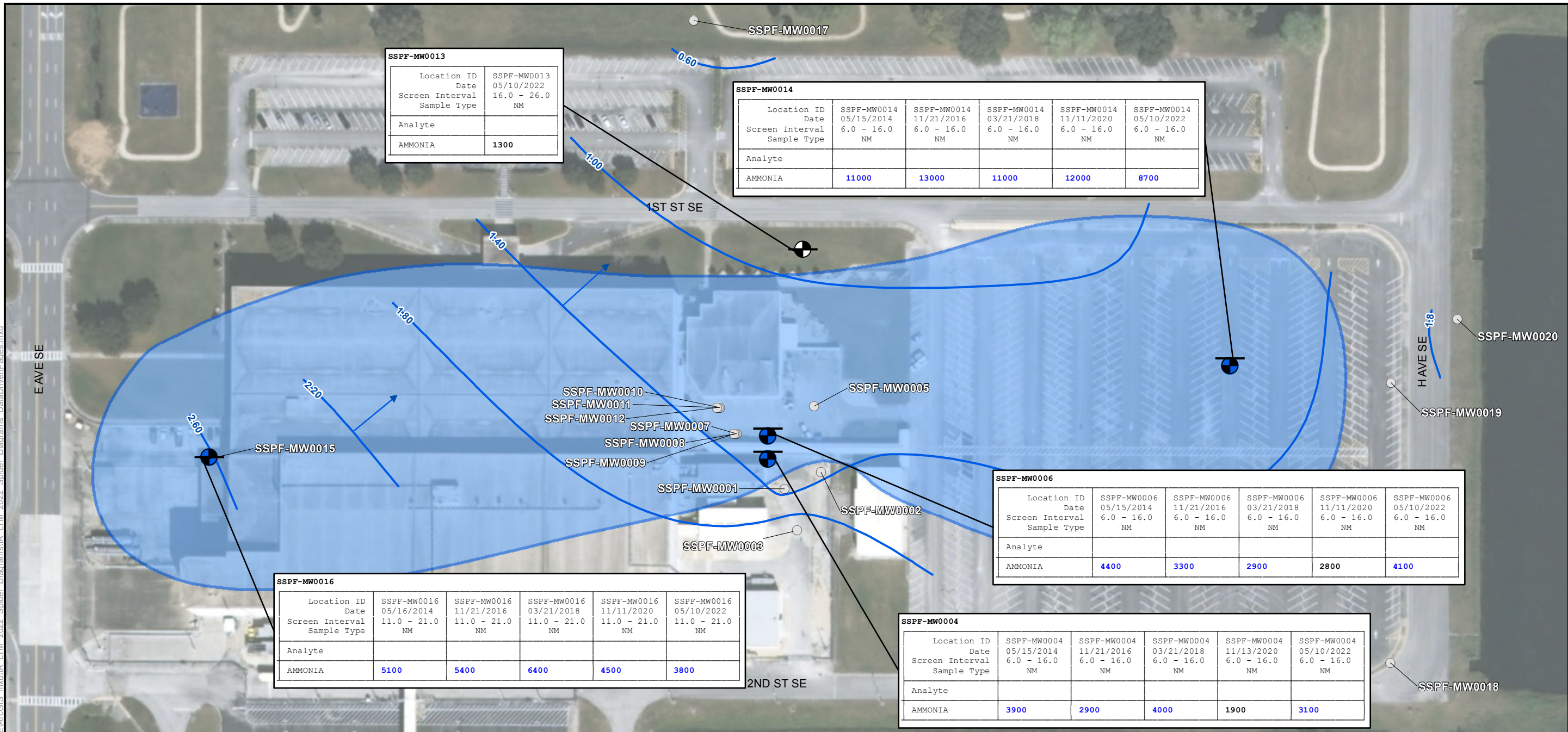
(1.91) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged on May 10, 2022
- Groundwater Contour Interval = 0.40 ft
- \* = Not used in contouring
- Long Term Monitoring (LTM)
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018
- LTM = Long Term Monitoring
- ft bls = feet below land surface



**FIGURE 14-1**  
**Groundwater Elevation Map – May 2022**  
 2022 - Industrial Area Long Term Monitoring  
 Space Station Processing Facility (SSPF)  
 SWMU 098  
 NASA Kennedy Space Center, Florida



SSPF-MW0013	
Location ID	SSPF-MW0013
Date	05/10/2022
Screen Interval	16.0 - 26.0
Sample Type	NM
Analyte	
AMMONIA	<b>1300</b>

SSPF-MW0014					
Location ID	SSPF-MW0014	SSPF-MW0014	SSPF-MW0014	SSPF-MW0014	SSPF-MW0014
Date	05/15/2014	11/21/2016	03/21/2018	11/11/2020	05/10/2022
Screen Interval	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0
Sample Type	NM	NM	NM	NM	NM
Analyte					
AMMONIA	<b>11000</b>	<b>13000</b>	<b>11000</b>	<b>12000</b>	<b>8700</b>

SSPF-MW0006					
Location ID	SSPF-MW0006	SSPF-MW0006	SSPF-MW0006	SSPF-MW0006	SSPF-MW0006
Date	05/15/2014	11/21/2016	03/21/2018	11/11/2020	05/10/2022
Screen Interval	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0
Sample Type	NM	NM	NM	NM	NM
Analyte					
AMMONIA	<b>4400</b>	<b>3300</b>	<b>2900</b>	<b>2800</b>	<b>4100</b>

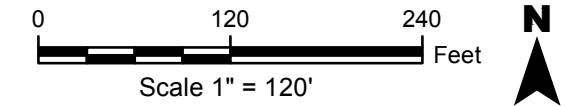
SSPF-MW0016					
Location ID	SSPF-MW0016	SSPF-MW0016	SSPF-MW0016	SSPF-MW0016	SSPF-MW0016
Date	05/16/2014	11/21/2016	03/21/2018	11/11/2020	05/10/2022
Screen Interval	11.0 - 21.0	11.0 - 21.0	11.0 - 21.0	11.0 - 21.0	11.0 - 21.0
Sample Type	NM	NM	NM	NM	NM
Analyte					
AMMONIA	<b>5100</b>	<b>5400</b>	<b>6400</b>	<b>4500</b>	<b>3800</b>

SSPF-MW0004					
Location ID	SSPF-MW0004	SSPF-MW0004	SSPF-MW0004	SSPF-MW0004	SSPF-MW0004
Date	05/15/2014	11/21/2016	03/21/2018	11/13/2020	05/10/2022
Screen Interval	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0	6.0 - 16.0
Sample Type	NM	NM	NM	NM	NM
Analyte					
AMMONIA	<b>3900</b>	<b>2900</b>	<b>4000</b>	<b>1900</b>	<b>3100</b>

Analyte	GCTL
AMMONIA	<b>2800</b>

- Legend**
- Intermediate LTM Well, Sample Results Exceed GCTL
  - Intermediate LTM Well, Sample Results Below GCTL
  - Shallow LTM Well, Sample Results Exceed GCTL
  - Non-LTM, No Sample Results
  - Shallow Groundwater Elevation Contours - May 2022
  - Direction of Groundwater Flow
  - Approximate Extent of Ammonia Greater Than GCTLs from Monitoring Well Sampling

- Notes:**
1. LTM = Long Term Monitoring
  2. MW = Monitoring Well
  3. NM = Normal Sample
  4. SWMU = Solid Waste Management Unit
  5. All results and screening criteria presented in µg/L.
  6. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
  7. **Bolded** results indicate the presence of an analyte at the specified concentration.
  8. **Blue** font indicates an exceedance of FDEP GCTLs.
  9. Aerial Source: ESRI 2018.
  10. Depth of monitoring well screen interval is presented in feet below land surface.



**FIGURE 14-2**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Space Station Processing Facility (SSPF)  
 SWMU 098  
 NASA Kennedy Space Center, Florida

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## **15. FUEL STORAGE AREA #1 UNDERGROUND STORAGE TANK (BUILDING 1044)**

This section provides a summary of the FSA1 site (PRL 157). Refer to **Figure 15** for a site map.

### **15.1 SITE DESCRIPTION AND HISTORY**

The FSA1 site is located on CCSFS, approximately 2 miles south of the CCSFS Industrial Area off of Samuel C Phillips Parkway and is bordered by the Banana River Lagoon to the west. Since the 1950s, the site and surrounding area have been utilized for fuel storage and transfer activities. Current operations at FSA1 include receiving, storing, and dispensing of fuels and oxidizers, including anhydrous hydrazine, monomethyl hydrazine, dimethyl hydrazine, nitrogen tetroxide, jet fuel, and rocket propellant. The former Pump House Building 1044 UST (PRL 157) is located within the boundaries of FSA1 and is part of the IA LTM program.

The area surrounding former Building 1044 is topographically flat except for retention/detention areas that contain stormwater runoff from adjacent paved areas. During its operation, the site was comprised of a tanker loading/unloading area with associated fuel piping within a concrete containment area; Building 1044, which housed pumps for the fueling station; and an associated asphalt drive. A former rocket propellant/jet propellant (RP/JP) storage area, which consisted of five ASTs, was located north of Building 1044. Concrete trenches were constructed to surround the tanker loading/unloading areas for spill containment. In 1990, a double-walled 2,500-gallon UST was installed west of Building 1044. A drain in the pump house (Building 1044) directed fluids to the UST until the drain was removed from service in 2006. Prior to the installation of the UST, the drain outfall was in the vicinity of the contaminant detention area (Tetra Tech 2009).

Several fuel spills have historically occurred at FSA1, resulting in soil and groundwater contamination. In 1989, 3,000 gallons of JP-5 spilled at the RP/JP facility due to an inoperative AST overflow protection device. In 1991, approximately 100 gallons of JP-5 fuel spilled onto the surface at the loading area and then was washed into the perimeter drain trench, which had open valves that directed the fuel into the detention area. In 2006, as a new waste fill container for the 2,500 gallon-UST was being installed, a leaking pipe flange was observed that showed signs of fuel leakage into the surrounding soils. The tank was properly closed in 2009 (Tetra Tech 2009).

From 2007 to 2009, site assessment activities were conducted to evaluate the potential soil and groundwater contamination associated with the UST. Petroleum-impacted soils containing total petroleum hydrocarbons (TPH), ethylbenzene, xylenes, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene exceeding SCTLs were found in areas west and south of Building 1044. Soil contamination was generally limited to the smear zone and no free product was observed (Tetra Tech 2009). A groundwater plume, limited to the area of the former UST

and loading area, corresponded to the area where soil exceeding leachability SCTLs was confirmed by the site assessment (Tetra Tech 2009).

The site assessment recommended NFA for soils due to disruptions that excavation would cause to facility operations, and because the SCTL leachability exceedances were limited to the smear zone in the area of groundwater contamination (Tetra Tech 2009). The site assessment recommended MNA for the groundwater impacts, and LTM sampling began at FSA1 in 2010. From 2010 through 2015, groundwater at FSA1 was sampled on a semi-annual schedule, which was changed to an annual schedule in 2016.

LTM results indicated increasing PAH concentrations at FSA1, so a supplemental DPT investigation was performed in 2013 to 2015. The DPT supplemental investigation discovered free product south of FSA1-MW0002 (DPT location DPT1004). Additionally, the DPT work found petroleum soil contamination in the vicinity of FSA1-MW0001 and FSA1-MW0002 and beneath the loading area structure west of Facility 1044 at concentrations exceeding leachability SCTLs. Corresponding groundwater samples at these locations contained COCs exceeding NADCs. This residual soil contamination below the water table was concluded to be acting as a continuing source for the groundwater contamination present at FSA1. A Free Product Recovery IM, which included limited excavation, was proposed in the vicinity of DPT1004 (Jacobs-CORE 2016).

In summer 2017, the Free Product Recovery IM was performed, which included the construction of a recovery trench with a sump to remove potential free product near DPT location DPT1004, disposal of excavated soils from the recovery trench construction, and vacuum extraction of groundwater from the recovery trench and sump. Concentrations of TPH in previous soil samples were evaluated and used to maximize the effectiveness of the trench location for the IM. The trench location was placed within the TPH source area (defined as TPH concentrations greater than 10,000 mg/kg). A total of 34.05 tons of soil were excavated from the trench area and transported off-site for proper disposal. Approximately 4,421 gallons of groundwater were removed and disposed of at the CCSFS Trident Pretreatment Facility (Geosyntec 2018a).

In October 2017 and March 2018, performance monitoring sampling was conducted to evaluate the effectiveness of the IM. Groundwater results indicated that TPH concentrations increased in monitoring well FSA1-MW0001, which is located upgradient from the IM trench, while the concentrations of TPH decreased, yet remained above the GCTL, in monitoring well FSA1-MW0002, which is located adjacent/downgradient from the IM trench. After the IM, TPH concentrations also decreased to below the GCTL in monitoring well FSA1-MW0021, which is located downgradient of the trench. Some increases in COC concentrations and seasonal fluctuations were also observed during the second performance monitoring event. Following the performance monitoring, FSA1 was moved back into the IA LTM Program on a semi-annual sampling schedule (Geosyntec 2018a). LTM sampling resumed at FSA1 in September 2018.

Building 1044 and its associated piping and containment areas were demolished in April 2020 prior to a supplemental DPT assessment at FSA1. The area was leveled using clean fill and covered with grass. During the May 2020 sampling event, monitoring wells FSA1-MW0012 and FSA1-MW0022 were found damaged, likely from the demolition activities. These monitoring wells were replaced prior to the November 2020 sampling event. The sampling schedule was adjusted to an annual frequency following the November 2020 sampling event.

A historical review was completed in January 2023 to determine the extent of vertical delineation at the site. During a site assessment in 2007, DPT samples collected around the area of monitoring wells FSA1-MW0001, FSA1-MW0002, and FSA1-MW0025 were below GCTLs at an interval between 18 ft bls and 22 ft bls. Additional DPT groundwater assessments were completed in 2014, 2016, and 2017. Some groundwater samples collected between 18 ft bls and 22 ft bls around the same area of the site and downgradient monitoring wells FSA1-MW0021 and FSA1-MW0027 exceeded GCTLs for isopropylbenzene and TPH; however, the groundwater samples between 26 ft bls and 30 ft bls were below GCTLs. A summary of the current and historical DPT analytical results along with a figure and cross-section from 2018 are presented in **Appendix O**.

## 15.2 FIELD ACTIVITIES

Groundwater sampling was conducted at FSA1 in November 2021 and May 2022. Groundwater levels were measured at 18 monitoring wells. Groundwater samples were collected from nine monitoring wells in November 2021 and 10 monitoring wells in May 2022. Monitoring wells FSA1-MW0012R and FSA1-MW0014 were added back into the sampling schedule in 2021 to verify upgradient delineation following the 2020 DPT assessment around the former building 1044 footprint. Monitoring well FSA1-MW0028 was installed in November 2021, in accordance with recommendations from the 2019-2020 IA LTM Report, to verify downgradient delineation in the intermediate zone. Monitoring well construction details are presented in the well installation report (HydroGeoLogic 2021). Monitoring well FSA1-MW0017A was added back into the sampling schedule in 2022 to verify shallow horizontal delineation downgradient of FSA1-MW0001.

The following table shows the network of wells used for groundwater level measurements and sampling at FSA1.

Well ID	Screen Interval (ft bls)	Analysis
FSA1-MW0001	2-12	WL + select VOC, select PAHs, and TPH
FSA1-MW0002	2-12	WL + select VOC, select PAHs, and TPH
FSA1-MW0004	2-12	WL Only
FSA1-MW0012R	3-13	WL + select VOC, select PAHs, and TPH
FSA1-MW0014	2-12	WL + select VOC, select PAHs, and TPH
FSA1-MW0015	3-13	WL Only
FSA1-MW0016A	3-13	WL Only

Well ID	Screen Interval (ft bls)	Analysis
FSA1-MW0017A <sup>a</sup>	3-13	WL + select VOC, select PAHs, and TPH
FSA1-MW0019	2-12	WL Only
FSA1-MW0020	1-11	WL Only
FSA1-MW0021	2-12	WL + select VOC, select PAHs, and TPH
FSA1-MW0022R	3-13	WL + select VOC, select PAHs, and TPH
FSA1-MW0023	2-12	WL + select VOC, select PAHs, and TPH
FSA1-MW0024	2-12	WL Only
FSA1-MW0025	15-25	WL Only
FSA1-MW0026	15-25	WL Only
FSA1-MW0027	15-25	WL + select VOC, select PAHs, and TPH
FSA1-MW0028	15-25	WL + select VOC, select PAHs, and TPH

ID = identification

MW = monitoring well

Select PAHs = 1-methylnaphthalene, 2-methylnaphthalene, naphthalene analysis by Method 8270

Select VOC = isopropylbenzene analysis by Method 8260

TPH = monitoring well sampled for TPH by FL-PRO Method

WL = water level measurement

<sup>a</sup> monitoring well sampled in May 2022, but not in November 2021

The groundwater samples were analyzed for select VOCs by Method 8260, select PAHs by Method 8270, and TPH by FL-PRO (Florida Petroleum Range Organics). The following table shows the COCs for FSA1 with their respective GCTLs and NADCs.

COC	GCTL (µg/L)	NADC (µg/L)
Isopropylbenzene	0.8	8
1-Methylnaphthalene	28	280
2-Methylnaphthalene	28	280
Naphthalene	14	140
TPH	5,000	50,000

### 15.3 WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

Groundwater levels collected during the 2021 and 2022 sampling events were used to calculate groundwater elevations presented in **Table 15-1**. Groundwater elevations were used to determine the contours and flow direction for the shallow aquifer zone (1 ft bls to 13 ft bls) in 2021 and 2022, and the intermediate aquifer zone (15 ft bls to 25 ft bls) in 2022. The groundwater flow directions were generally to the west. The historical groundwater flow direction at FSA1 is to the west-northwest. The groundwater flow contours and directions are shown on **Figure 15-1** through **Figure 15-3**.

### 15.4 ANALYTICAL RESULTS

Groundwater at FSA1 was analyzed for select VOCs, select PAHs, and TPH in 2021 and 2022. A summary of the analytical results is presented in **Table 15-2**. Analytical results are depicted on **Figure 15-4**.



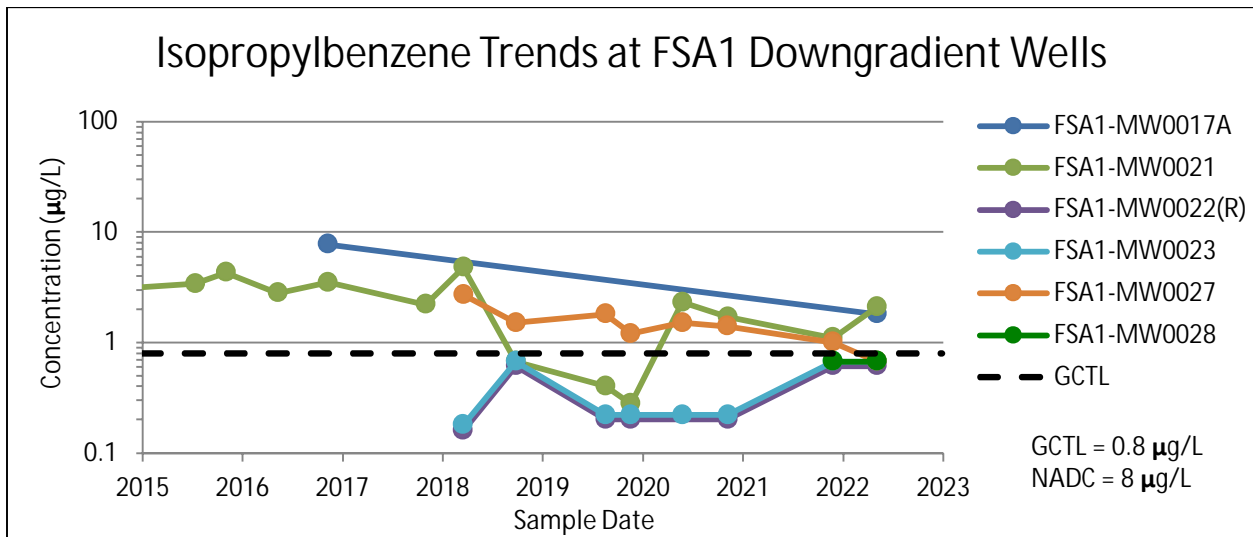
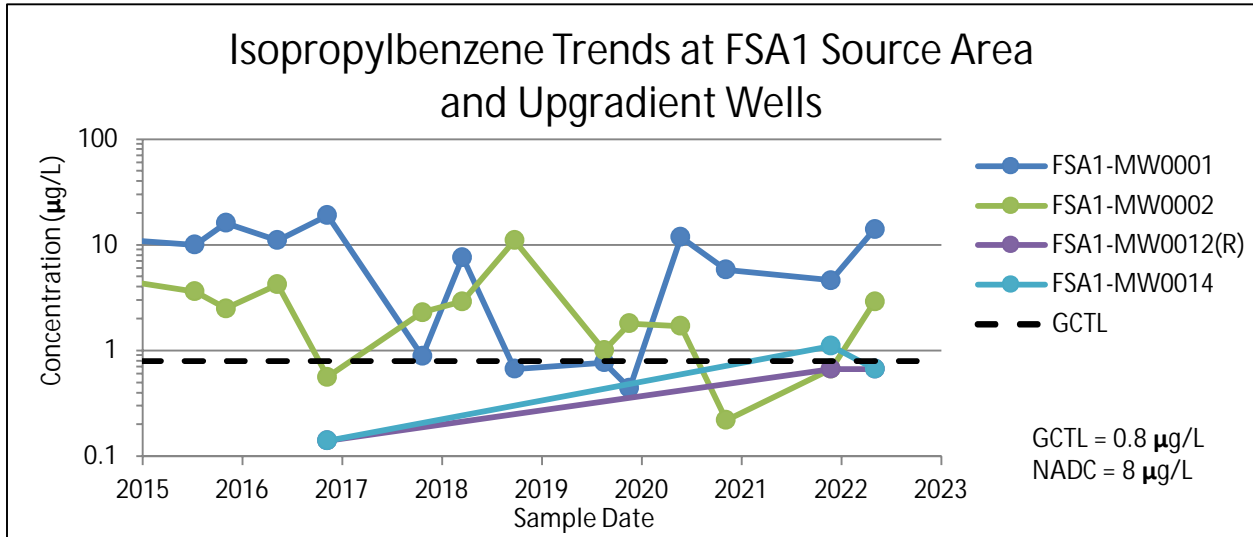
Analytical results for each COC present at FSA1 are discussed below:

- Isopropylbenzene
  - In November 2021, isopropylbenzene was detected at concentrations above the GCTL in monitoring wells FSA1-MW0001 (4.6 µg/L), FSA1-MW0014 (1.1 µg/L), FSA1-MW0021 (1.1 µg/L), and FSA1-MW0027 (1.0 µg/L).
  - In May 2022, isopropylbenzene was detected at concentrations above the GCTL in monitoring wells FSA1-MW0002 (2.9 µg/L), FSA1-MW0017A (1.8 µg/L), and FSA1-MW0021 (2.1 µg/L). The isopropylbenzene concentration in monitoring well FSA1-MW0001 (14 µg/L) exceeded both the GCTL and the NADC.
- 1-Methylnaphthalene and 2-Methylnaphthalene
  - In May 2022, 1-methylnaphthalene (33 µg/L) and 2-methylnaphthalene (34 µg/L) were detected above the GCTLs at FSA1-MW0001.
- Naphthalene
  - No concentrations of naphthalene were detected above the GCTL during the 2021 and 2022 sampling events.
- TPH
  - No concentrations of TPH were detected above the GCTL during the 2021 and 2022 sampling events.

### **15.5 TREND ANALYSIS**

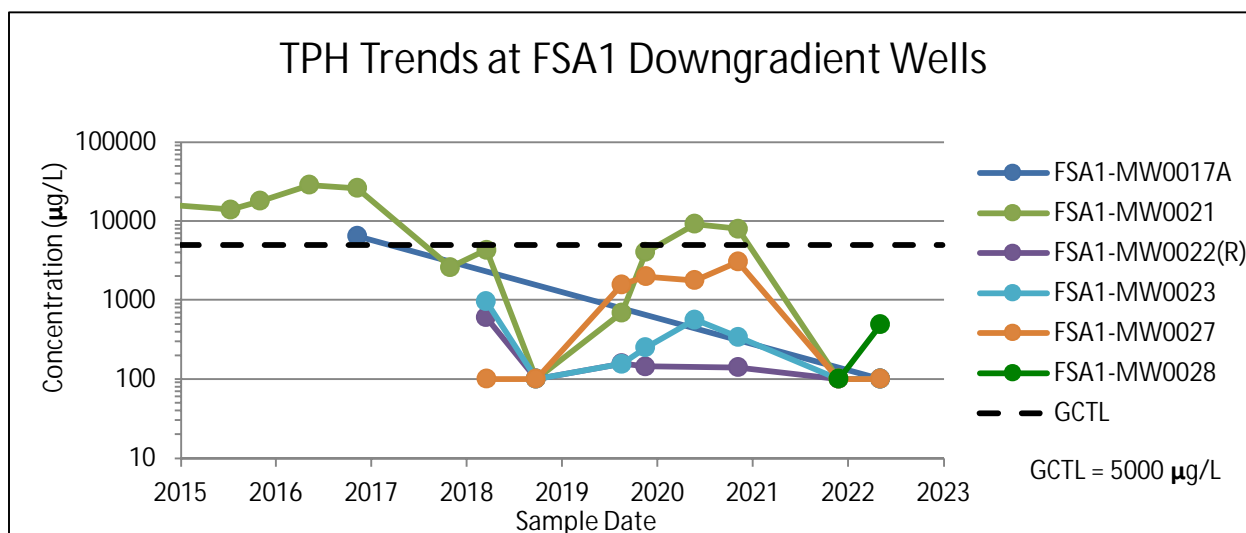
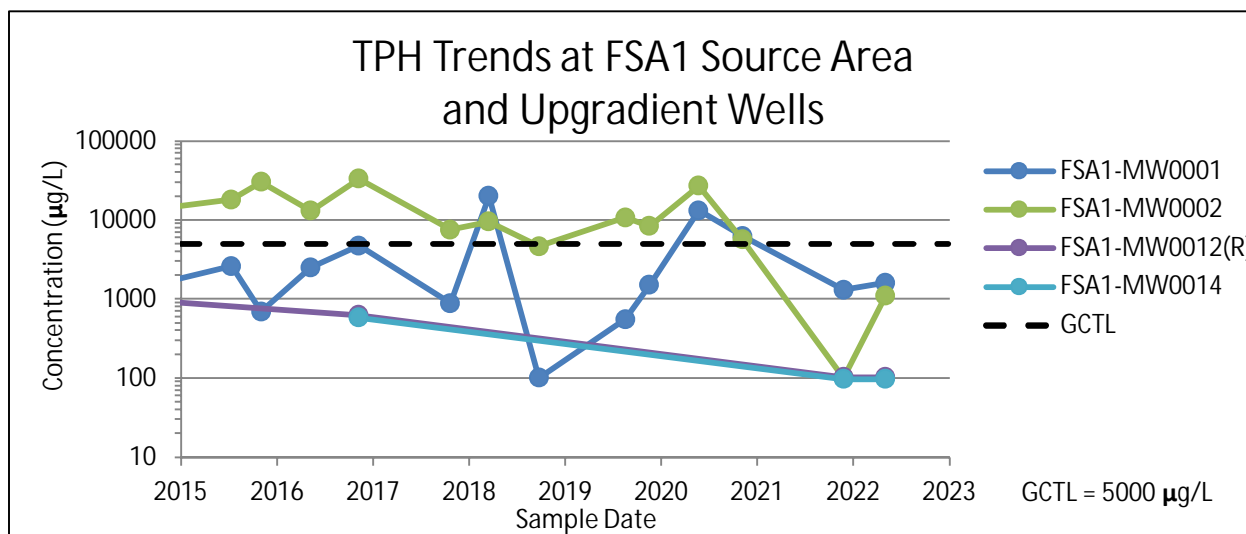
Isopropylbenzene concentrations in monitoring wells FSA1-MW0001, FSA1-MW0002, and FSA1-MW0021 have been recently fluctuating above and below the GCTL, and increased above NADC levels at FSA1-MW0001 in 2022.

The following trend charts show the isopropylbenzene concentration trends since 2015.



PAH concentrations have been decreasing at FSA1-MW0001, but have exceeded GCTLs in 2018 and 2022. TPH concentrations have been consistently detected at the sampled monitoring wells; however, the TPH concentrations were below the GCTL in 2021 and 2022.

The following trend charts show the TPH concentration trends since 2015.



## 15.6 CONCLUSION AND RECOMMENDATION

Isopropylbenzene concentrations remain above GCTL at four monitoring wells downgradient of the former Building 1044 area. Monitoring well FSA1-MW0001 exceeded the isopropylbenzene NADC and had select PAH GCTL exceedances in May 2022. Naphthalene and TPH concentrations have been below the GCTLs since 2019 and 2021, respectively.

Annual LTM sampling is recommended to continue. Naphthalene and TPH are recommended to be removed from the site COCs based on the past two or more consecutive events below GCTLs. Groundwater levels are recommended to be measured in 18 monitoring wells and groundwater samples collected at 10 monitoring wells for isopropylbenzene and select PAHs (1-methylnaphthalene and 2-methylnaphthalene).

The following table shows the recommended monitoring wells for water level collections and groundwater sampling for the next sampling event at FSA1 scheduled for November 2023.

<b>Well ID</b>	<b>Screen Interval (ft bls)</b>	<b>Analysis</b>
FSA1-MW0001	2-12	WL + Isopropylbenzene and select PAHs
FSA1-MW0002	2-12	WL + Isopropylbenzene and select PAHs
FSA1-MW0004	2-12	WL Only
FSA1-MW0012R	3-13	WL + Isopropylbenzene and select PAHs
FSA1-MW0014	2-12	WL + Isopropylbenzene and select PAHs
FSA1-MW0015	3-13	WL Only
FSA1-MW0016A	3-13	WL Only
FSA1-MW0017A	3-13	WL + Isopropylbenzene and select PAHs
FSA1-MW0019	2-12	WL Only
FSA1-MW0020	1-11	WL Only
FSA1-MW0021	2-12	WL + Isopropylbenzene and select PAHs
FSA1-MW0022R	3-13	WL + Isopropylbenzene and select PAHs
FSA1-MW0023	2-12	WL + Isopropylbenzene and select PAHs
FSA1-MW0024	2-12	WL Only
FSA1-MW0025	15-25	WL Only
FSA1-MW0026	15-25	WL Only
FSA1-MW0027	15-25	WL + Isopropylbenzene and select PAHs
FSA1-MW0028	15-25	WL + Isopropylbenzene and select PAHs

ID = identification

Isopropylbenzene = isopropylbenzene analysis by Method 8260

MW = monitoring well

Select PAHs = 1-methylnaphthalene and 2-methylnaphthalene analysis by Method 8270

WL = water level measurement

**Table 15-1**  
**Fuel Storage Area #1 Underground Storage Tank (Building 1044) - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>	FSA1-MW0001		FSA1-MW0002		FSA1-MW0004	
<b>Screen Interval (ft bls):</b>	2 - 12		2 - 12		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	5.35		4.59		5.48	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
August 2013	4.48	0.87	3.91	0.68	4.60	0.88
November 2013	5.14	0.21	4.52	0.07	5.04	0.44
May 2014	5.20	0.15	4.63	-0.04	5.32	0.16
November 2014	4.28	1.07	3.53	1.06	4.44	1.04
July 2015	5.67	-0.32	5.14	-0.55	5.68	-0.20
November 2015	4.43	0.92	3.77	0.82	4.53	0.95
May 2016	4.63	0.72	4.20	0.39	4.82	0.66
November 2017	2.99	2.36	2.56	2.03	2.72	2.76
March 2018	4.83	0.52	4.24	0.35	4.89	0.59
September 2018	5.20	0.15	5.23	-0.64	5.30	0.18
August 2019	3.63	1.72	3.03	1.56	3.59	1.89
November 2019	3.38	1.97	2.78	1.81	3.25	2.23
May 2020	4.63	0.72	3.88	0.71	4.72	0.76
November 2020	3.90	1.45	3.23	1.36	3.98	1.50
November 2021	4.03	1.32	3.35	1.24	4.10	1.38
May 2022	4.82	0.53	4.19	0.40	4.93	0.55

<b>SHALLOW WELL ID:</b>	FSA1-MW0012		FSA1-MW0012R		FSA1-MW0014	
<b>Screen Interval (ft bls):</b>	3 - 13		3 - 13		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	5.81		5.77		6.04	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
August 2013	4.81	1.00	--	--	4.86	1.18
November 2013	5.33	0.48	--	--	5.53	0.51
May 2014	5.51	0.30	--	--	5.70	0.34
November 2014	4.74	1.07	--	--	4.86	1.18
July 2015	5.85	-0.04	--	--	5.97	0.07
November 2015	4.84	0.97	--	--	4.96	1.08
May 2016	5.06	0.75	--	--	5.13	0.91
November 2017	2.98	2.83	--	--	2.48	3.56
March 2018	5.12	0.69	--	--	5.14	0.90
September 2018	5.40	0.41	--	--	5.30	0.74
August 2019	3.78	2.03	--	--	3.80	2.24
November 2019	3.43	2.38	--	--	3.29	2.75
May 2020	Abandoned		Not Installed		5.07	0.97
November 2020	--	--	4.20	1.57	4.29	1.75
November 2021	--	--	4.32	1.45	4.50	1.54
May 2022	--	--	5.04	0.73	5.13	0.91

<b>SHALLOW WELL ID:</b>	FSA1-MW0015		FSA1-MW0016A		FSA1-MW0017A	
<b>Screen Interval (ft bls):</b>	3 - 13		3 - 13		3 - 13	
<b>TOC Elevation (ft NAVD88):</b>	4.32		5.60		5.46	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
August 2013	3.71	0.61	5.09	0.51	5.04	0.42
November 2013	3.99	0.33	5.29	0.31	5.13	0.33
May 2014	4.31	0.01	5.71	-0.11	5.55	-0.09
November 2014	3.37	0.95	4.75	0.85	4.58	0.88
July 2015	4.62	-0.30	6.06	-0.46	6.04	-0.58
November 2015	3.52	0.80	4.87	0.73	4.67	0.79
May 2016	3.87	0.45	5.16	0.44	5.11	0.35
November 2017	2.38	1.94	3.63	1.97	3.70	1.76
March 2018	3.98	0.34	5.36	0.24	5.31	0.15
September 2018	5.45	-1.13	5.80	-0.20	5.80	-0.34
August 2019	2.90	1.42	3.89	1.71	4.20	1.26
November 2019	2.59	1.73	3.90	1.70	3.93	1.53
May 2020	3.58	0.74	5.01	0.59	4.86	0.60
November 2020	3.04	1.28	4.33	1.27	4.28	1.18
November 2021	3.17	1.15	4.48	1.12	4.40	1.06
May 2022	4.00	0.32	5.49	0.11	5.43	0.03

**Table 15-1**  
**Fuel Storage Area #1 Underground Storage Tank (Building 1044) - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>SHALLOW WELL ID:</b>	FSA1-MW0019		FSA1-MW0020		FSA1-MW0021	
<b>Screen Interval (ft bls):</b>	2 - 12		1 - 11		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	7.49		4.68		4.30	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
August 2013	7.15	0.34	4.19	0.49	3.85	0.45
November 2013	7.21	0.28	4.34	0.34	3.97	0.33
May 2014	7.63	-0.14	4.78	-0.10	4.42	-0.12
November 2014	6.74	0.75	3.82	0.86	3.41	0.89
July 2015	8.13	-0.64	5.18	-0.50	4.91	-0.61
November 2015	6.76	0.73	3.91	0.77	3.56	0.74
May 2016	7.16	0.33	4.27	0.41	3.89	0.41
November 2017	6.94	0.55	2.81	1.87	2.45	1.85
March 2018	7.43	0.06	4.45	0.23	4.11	0.19
September 2018	7.80	-0.31	5.74	-1.06	5.70	-1.40
August 2019	6.31	1.18	3.29	1.39	2.74	1.56
November 2019	6.01	1.48	3.05	1.63	2.68	1.62
May 2020	6.97	0.52	4.10	0.58	3.72	0.58
November 2020	6.38	1.11	3.49	1.19	3.05	1.25
November 2021	6.45	1.04	3.63	1.05	3.03	1.27
May 2022	7.55	-0.06	4.57	0.11	4.19	0.11

<b>SHALLOW WELL ID:</b>	FSA1-MW0022		FSA1-MW0022R		FSA1-MW0023	
<b>Screen Interval (ft bls):</b>	2 - 12		3 - 13		2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	5.97		5.73		5.32	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
March 2018	6.05	-0.08	--	--	5.26	0.06
September 2018	6.25	-0.28	--	--	5.42	-0.10
August 2019	4.23	1.74	--	--	3.68	1.64
November 2019	4.39	1.58	--	--	3.61	1.71
May 2020	Abandoned		Not Installed		4.78	0.54
November 2020	--	--	4.65	1.08	3.96	1.36
November 2021	--	--	4.59	1.14	3.85	1.47
May 2022	--	--	5.83	-0.10	5.05	0.27

<b>SHALLOW WELL ID:</b>	FSA1-MW0024	
<b>Screen Interval (ft bls):</b>	2 - 12	
<b>TOC Elevation (ft NAVD88):</b>	5.36	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
March 2018	5.51	-0.15
September 2018	4.80	0.56
August 2019	3.10	2.26
November 2019	2.70	2.66
May 2020	4.35	1.01
November 2020	3.61	1.75
November 2021	3.72	1.64
May 2022	4.48	0.88

<b>INTERMEDIATE WELL ID:</b>	FSA1-MW0025		FSA1-MW0026		FSA1-MW0027	
<b>Screen Interval (ft bls):</b>	15 - 25		15 - 25		15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	4.40		5.66		5.97	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
March 2018	4.30	0.10	5.77	-0.11	6.12	-0.15
September 2018	4.55	-0.15	6.00	-0.34	6.31	-0.34
August 2019	3.85	0.55	4.40	1.26	4.68	1.29
November 2019	2.64	1.76	4.16	1.50	4.50	1.47
May 2020	3.78	0.62	5.20	0.46	5.53	0.44
November 2020	3.15	1.25	4.52	1.14	4.85	1.12
November 2021	3.20	1.20	4.59	1.07	4.85	1.12
May 2022	4.20	0.20	5.75	-0.09	6.15	-0.18

<b>INTERMEDIATE WELL ID:</b>	FSA1-MW0028	
<b>Screen Interval (ft bls):</b>	15 - 25	
<b>TOC Elevation (ft NAVD88):</b>	5.67	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
November 2021	4.62	1.05
May 2022	5.95	-0.28

**Notes:**

- bls = below land surface
- BTOC = below top of casing
- FSA1 = Fuel Storage Area #1 Underground Storage Tank (Building 1044)
- ft = feet
- MW = monitoring well
- NAVD88 = North American Vertical Datum of 1988
- TOC = top of casing

**Table 15-2**  
**Fuel Storage Area #1 Underground Storage Tank (Building 1044) - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5,000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-MW0001	1/23/2008	2 - 12	116	131	250	NA	15.9	40.6	NA	9,040
	10/22/2009	2 - 12	140	190	320	NA	0.52 U	14	NA	3,200
	5/18/2010	2 - 12	130	140	310	NA	0.066 U	30	54	3,600
	11/2/2010	2 - 12	100	120	14	NA	0.21 U	8.08	39	3,500 J
	5/3/2011	2 - 12	48.7	49.3	103	NA	0.21 U	1.42	23.1	1,450
	10/31/2011	2 - 12	38.4	8.52	32.5	NA	0.21 U	0.37 I	8.03	11,800
	6/26/2012	2 - 12	52.3	45.6	102	NA	0.21 U	0.40 I	14.1	
	11/27/2012	2 - 12	30.1	28.7	53.1	NA	0.21 U	0.35 I	14	4,270
	8/15/2013	2 - 12	28	20	53	130	0.71 U	0.69 U	14	4,800
	11/5/2013	2 - 12	62	54	140	130	0.71 U	0.69 U	12	3,400
	5/14/2014	2 - 12	80	63	160	130	0.71 U	0.69 U	12	1,200
	7/13/2015	2 - 12	23	1.8	30	91	0.71 U	0.69 U	10	2,600
	11/3/2015	2 - 12	56	12	84	97	0.71 U	0.69 U	16	690
	5/10/2016	2 - 12	41	14	63	59	0.71 U	0.69 U	11	2,500
	11/9/2016	2 - 12	16	7.3	34	NA	0.16 U	0.24 U	19	4,700
	10/23/2017	2 - 12	1.6	0.75	3.4	NA	0.16 U	0.24 U	0.88 I	880
	3/19/2018	2 - 12	40	33	62	NA	0.32 U	0.48 U	7.6	20,000
	9/27/2018	2 - 12	0.047 U	0.044 U	0.057 I	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	8/21/2019	2 - 12	0.79 I	0.49 I	2.0	4.6 I	0.31 U	0.36 U	0.77 I	550
	11/21/2019	2 - 12	4.4	3.0	7.0	8.0	0.31 U	0.36 U	0.44 I	1,500 J
5/27/2020	2 - 12	16.9	16.5	14.4	NA	0.31 U	0.36 U	11.8	13,100	
11/9/2020	2 - 12	17.6	15.1	12.2	NA	0.31 U	0.36 U	5.8	6,210	
11/30/2021	2 - 12	3.4	3.0	2.9	NA	NA	NA	4.6	1,300	
5/9/2022	2 - 12	33	34	14	NA	NA	NA	14	1,600	
FSA1-MW0002	1/23/2008	2 - 12	0.25 U	0.25 U	0.25 U	NA	0.20 U	0.20 U	NA	346
	10/22/2009	2 - 12	14	12	20	NA	0.52 U	0.10 U	NA	3,900 J
	5/18/2010	2 - 12	12	9.0	16	NA	0.066 U	0.52 U	3.3	13,000
	11/2/2010	2 - 12	17	15	43	NA	0.21 U	0.21 U	3.75	39,000
	5/3/2011	2 - 12	16.9	4.97	20.9	NA	0.21 U	0.38 I	3.54	36,500
	10/31/2011	2 - 12	1.7	0.638	2.37	NA	0.21 U	0.21 U	0.81 I	15,400
	6/26/2012	2 - 12	5.3	3.09	11.8	NA	0.21 U	0.21 U	2.2	
	11/27/2012	2 - 12	15.5	7.53	48.7	NA	0.21 U	0.21 U	3.6	19,100
	8/15/2013	2 - 12	16	11	51	110	0.71 U	0.69 U	3.2	54,000
	11/5/2013	2 - 12	13	9.2	50	50	0.71 U	0.69 U	3.3	22,000
5/14/2014	2 - 12	13	22	41	45	0.71 U	0.69 U	5.3	12,000	

**Table 15-2**  
**Fuel Storage Area #1 Underground Storage Tank (Building 1044) - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5,000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-MW0002 (continued)	7/13/2015	2 - 12	20	11	53	74	0.71 U	0.69 U	3.6	18,000
	11/3/2015	2 - 12	5.8	3.6	40	40	0.71 U	0.69 U	2.5	30,000
	5/10/2016	2 - 12	17	7.1	39	44	0.71 U	0.69 U	4.2	13,000
	11/9/2016	2 - 12	1.1	0.53	3.8	NA	0.64 U	0.96 U	0.56 U	33,000
	10/23/2017	2 - 12	1.5	0.77	6.4	NA	0.16 U	0.24 U	2.3	7,500
	3/19/2018	2 - 12	15	9.1	18	NA	0.32 U	0.48 U	2.9	9,500
	9/27/2018	2 - 12	29	28	53	78	0.71 U	0.69 U	11	4,600
	8/21/2019	2 - 12	0.33 U	0.33 U	0.33 U	1.0 U	0.31 U	0.36 U	0.22 U	10,700
	11/21/2019	2 - 12	2.6	1.1	1.3	1.1 I	0.31 U	0.36 U	1.8	8270 J
	5/27/2020	2 - 12	1.6 U	1.6 U	1.6 U	NA	0.31 U	0.36 U	1.7	27,000
	11/9/2020	2 - 12	0.32 U	0.32 U	0.32 U	NA	0.31 U	0.36 U	0.22 U	5,610
	11/30/2021	2 - 12	0.050 U	0.050 U	0.13	NA	NA	NA	0.67 U	100 U
	5/9/2022	2 - 12	0.50	0.28	1.6	NA	NA	NA	2.9	1,100
FSA1-MW0012	5/23/2007	3 - 13	0.96 U	0.96 U	0.96 U	NA	0.5 U	0.5 U	NA	4,110
	11/8/2016	3 - 13	0.20 U	0.20 U	0.19 U	NA	NA	NA	0.14 U	600 U
FSA1-MW0012R	11/30/2021	3 - 13	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
	5/9/2022	3 - 13	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
FSA1-MW0014	11/8/2016	2 - 12	0.20 U	0.20 U	0.19 U	NA	NA	NA	0.14 U	600 U
	11/30/2021	2 - 12	0.050 U	0.050 U	0.23	NA	NA	NA	1.1	100 U
	5/9/2022	2 - 12	0.074 I	0.057 I	0.080 I	NA	NA	NA	0.67 U	100 U
FSA1-MW0017A	11/9/2016	3 - 13	0.20 U	0.20 U	0.19 U	NA	NA	NA	7.7	6,500
	5/9/2022	3 - 13	0.050 U	0.050 U	0.20	NA	NA	NA	1.8	100 U
FSA1-MW0021	8/15/2013	2 - 12	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	11/5/2013	2 - 12	0.047 U	0.080 I	0.78	1.4	0.71 U	0.69 U	0.84 I	1,300
	5/14/2014	2 - 12	5.9	3.1	62	57	0.71 U	0.69 U	2.9	18,000
	7/13/2015	2 - 12	16	6.7	32	37	0.71 U	0.69 U	3.4	14,000
	11/3/2015	2 - 12	20	9.2	52	77	0.71 U	0.69 U	4.3	18,000
	5/10/2016	2 - 12	22	22	69	42	0.71 U	0.69 U	2.8	29,000
	11/9/2016	2 - 12	5.0	1.4	15	NA	0.48 U	0.72 U	3.5	26,000
	11/2/2017	2 - 12	3.6	0.39	3.7	4.0	0.71 U	0.69 U	2.2	2,600
	3/20/2018	2 - 12	12	4.1	15	18	0.71 U	0.69 U	4.8	4,300
	9/27/2018	2 - 12	0.047 U	0.044 U	0.13	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	8/21/2019	2 - 12	0.33 U	0.33 U	0.33 U	1.0 U	0.31 U	0.36 U	0.40 I	689
	11/21/2019	2 - 12	0.36 U	0.36 U	0.36 U	1.0 U	0.31 U	0.36 U	0.28 I	4,050 J
	5/27/2020	2 - 12	1.2	0.49 I	2.0	NA	0.31 U	0.36 U	2.3	9,200
	11/9/2020	2 - 12	0.32 U	0.32 U	0.46 I	NA	0.31 U	0.36 U	1.7	7,990
	11/30/2021	2 - 12	0.050 U	0.050 U	0.091 I	NA	NA	NA	1.1	100 U
5/9/2022	2 - 12	0.050 U	0.050 U	0.11	NA	NA	NA	2.1	100 U	



**Table 15-2**  
**Fuel Storage Area #1 Underground Storage Tank (Building 1044) - Long Term Monitoring (LTM)**  
**Groundwater Sampling Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5,000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-MW0022	3/19/2018	2 - 12	0.20 U	0.20 U	0.19 U	NA	0.16 U	0.24 U	0.18 U	600 U
	9/27/2018	2 - 12	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	8/21/2019	2 - 12	0.33 U	0.33 U	0.33 U	1.0 U	0.31 U	0.36 U	0.22 U	<b>157 I</b>
	11/21/2019	2 - 12	0.32 U	0.32 U	0.32 U	1.0 U	0.31 U	0.36 U	0.22 U	<b>144 IJ</b>
FSA1-MW0022R	11/9/2020	3 - 13	0.32 U	0.32 U	0.32 U	NA	0.31 U	0.36 U	0.22 U	140 U
	11/30/2021	3 - 13	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
	5/9/2022	3 - 13	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
FSA1-MW0023	3/19/2018	2 - 12	0.20 U	0.20 U	<b>0.25</b>	NA	0.16 U	0.24 U	0.18 U	<b>970</b>
	9/27/2018	2 - 12	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	8/21/2019	2 - 12	0.32 U	0.32 U	0.32 U	1.0 U	0.31 U	0.36 U	0.22 U	<b>156 I</b>
	11/21/2019	2 - 12	0.33 U	0.33 U	0.33 U	1.0 U	0.31 U	0.36 U	0.22 U	<b>249 IJ</b>
	5/27/2020	2 - 12	0.33 U	0.33 U	0.33 U	NA	0.31 U	0.36 U	0.22 U	<b>565</b>
	11/9/2020	2 - 12	0.33 U	0.33 U	0.33 U	NA	0.31 U	0.36 U	0.22 U	<b>340</b>
	11/30/2021	2 - 12	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
	5/9/2022	2 - 12	0.050 U	0.050 U	<b>0.11</b>	NA	NA	NA	0.67 U	100 U
FSA1-MW0027	3/20/2018	14.5 - 24.5	<b>0.091 I</b>	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	<b>2.7</b>	100 U
	9/27/2018	14.5 - 24.5	0.047 U	0.044 U	<b>0.15</b>	0.82 U	0.71 U	0.69 U	<b>1.5</b>	100 U
	8/21/2019	14.5 - 24.5	0.33 U	0.33 U	0.33 U	1.0 U	0.31 U	0.36 U	<b>1.8</b>	<b>1,570 V</b>
	11/21/2019	14.5 - 24.5	0.32 U	0.32 U	0.32 U	1.0 U	0.31 U	0.36 U	<b>1.2</b>	<b>1,990 J</b>
	5/27/2020	14.5 - 24.5	0.33 U	0.33 U	0.33 U	NA	0.31 U	0.36 U	<b>1.5</b>	<b>1,780</b>
	11/9/2020	14.5 - 24.5	0.32 U	0.32 U	0.32 U	NA	0.31 U	0.36 U	<b>1.4</b>	<b>3,040</b>
	11/30/2021	14.5 - 24.5	0.050 U	0.050 U	<b>0.24</b>	NA	NA	NA	<b>1.0</b>	100 U
	5/9/2022	14.5 - 24.5	0.050 U	0.050 U	<b>0.080 I</b>	NA	NA	NA	0.67 U	100 U
FSA1-MW0028	11/30/2021	15 - 25	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	100 U
	5/9/2022	15 - 25	0.050 U	0.050 U	0.050 U	NA	NA	NA	0.67 U	<b>490 I</b>

Notes:

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

ft bls = feet below land surface

FSA1 = Fuel Storage Area #1 Underground Storage Tank (Building 1044)

MW = monitoring well

NA = Not Analyzed

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

**Highlighted cell** indicates an exceedance of FDEP NADCs

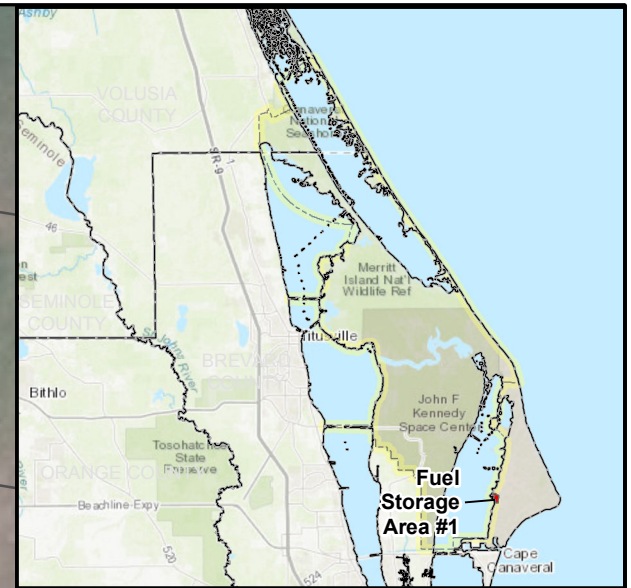
I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

J = Estimated value

U = Analyte not detected

V = Analyte found in associated method blank

The numeric value presented for non-detects is the sample-specific reporting detection limit

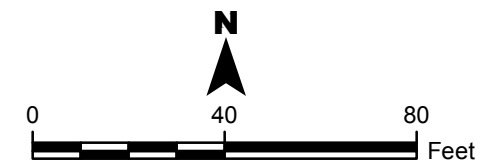


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- Legend**
- ◆ Shallow Monitoring Well (1-13 ft bls)
  - ◆ Intermediate Monitoring Well (15-25 ft bls)
  - Destroyed Monitoring Well
  - Building

**Notes:**

- (2-12) = Monitoring well screen interval in feet below land surface
- ft bls = feet below land surface
- PRL = Potential Release Location
- Aerial Source: FDOT 2018



**FIGURE 15**  
**Site Map**

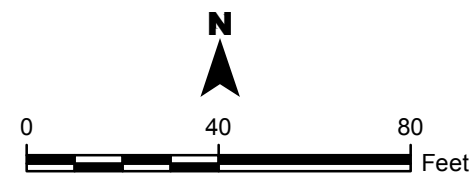
2022 - Industrial Area Long Term Monitoring  
 Fuel Storage Area #1 UST Building 1044 (FSA1)  
 PRL 157  
 NASA Kennedy Space Center, Florida



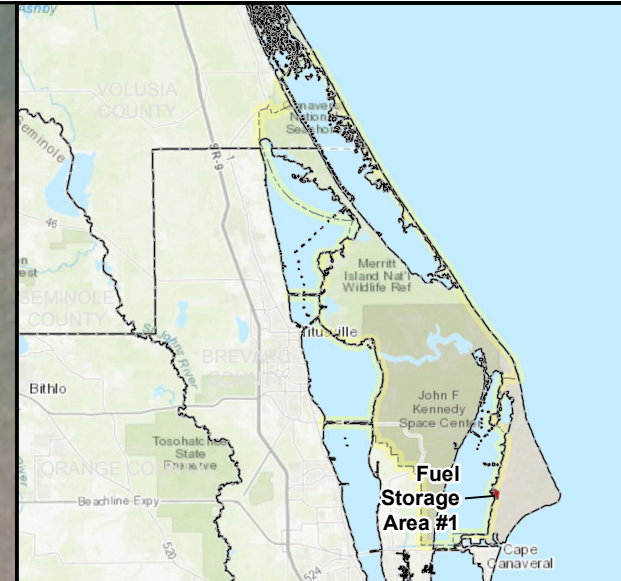
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- Legend**
- Shallow Monitoring Well (1-13 ft bls)
  - Intermediate Monitoring Well (15-25 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - Building
  - (1.45) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 30, 2021
  - \* = Not used in contouring
  - Groundwater Contour Interval = 0.20 ft
  - ft bls = feet below land surface
  - PRL = Potential Release Location
  - Aerial Source: FDOT 2018



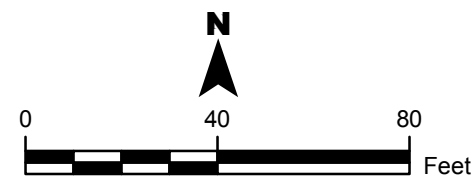
**FIGURE 15-1**  
**Shallow Zone Groundwater Elevation Map**  
**November 2021**  
 2022 - Industrial Area Long Term Monitoring  
 Fuel Storage Area #1 UST Building 1044 (FSA1)  
 PRL 157  
 NASA Kennedy Space Center, Florida



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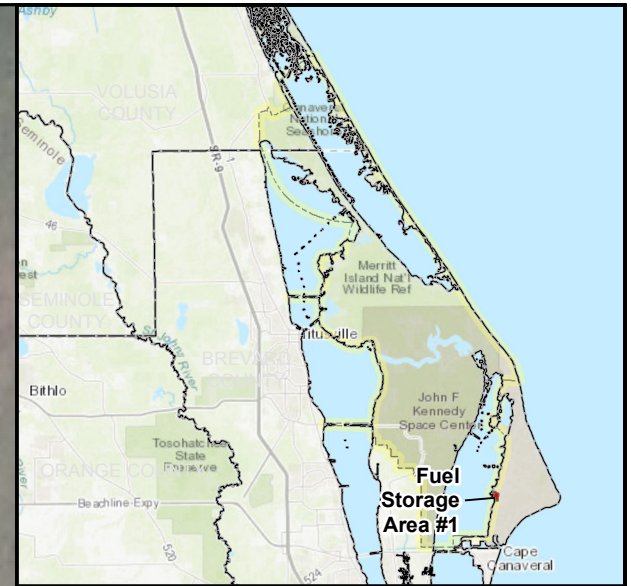
- Legend**
- ◆ Intermediate Monitoring Well (15-25 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - ← Approximate Direction of Groundwater Flow
  - (0.20) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on November 30, 2021
  - Groundwater Contour Interval = 0.03 ft
  - ft bls = feet below land surface
  - PRL = Potential Release Location
  - Aerial image FDOT 2018



**FIGURE 15-2**  
**Intermediate Zone Groundwater Elevation Map - November 2021**

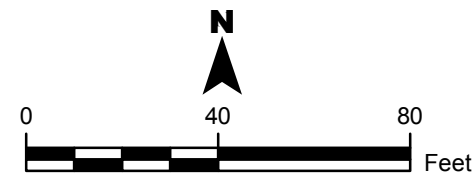
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 PRL 157  
 NASA Kennedy Space Center, Florida



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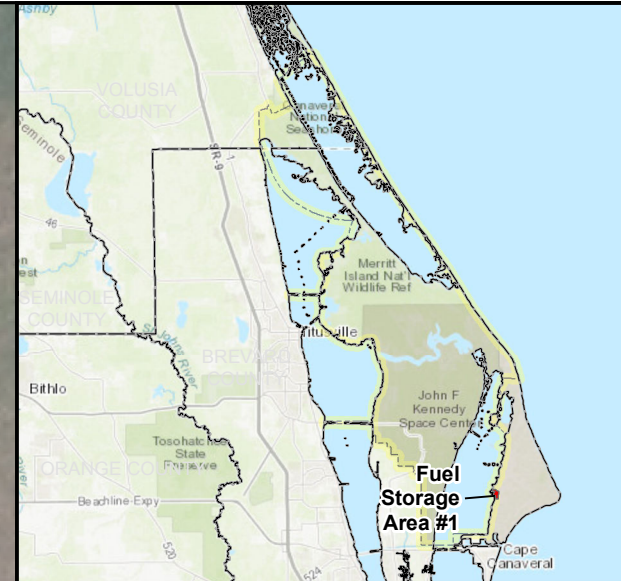
- Legend**
- Shallow Monitoring Well (1-13 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (0.91) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on May 9, 2022
  - Groundwater Contour Interval = 0.20 ft
  - ft bls = feet below land surface
  - PRL = Potential Release Location
  - Aerial image FDOT 2018



**FIGURE 15-3**  
**Shallow Zone Groundwater Elevation Map - May 2022**

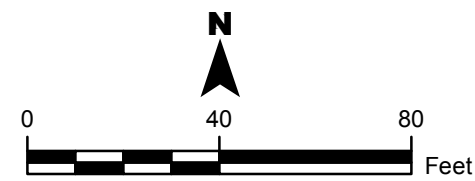
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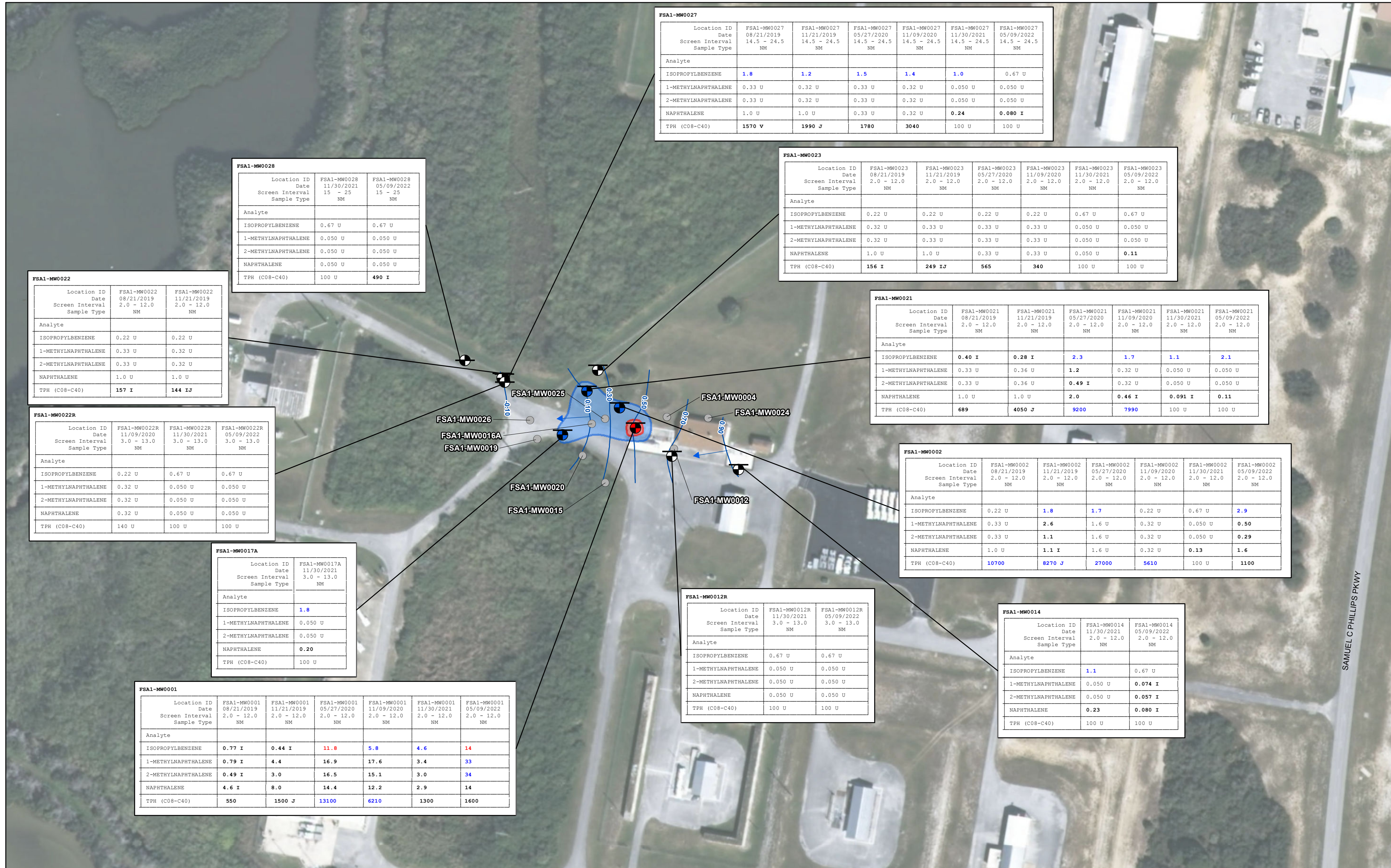
- Legend**
- ◆ Intermediate Monitoring Well (15-25 ft bls)
  - Groundwater Contour (NAVD88 ft)
  - Approximate Direction of Groundwater Flow
  - (0.20) Groundwater Elevation Contour (NAVD88 ft)

- Notes:**
- Vertical Datum is NAVD88 (US Foot)
  - Monitoring Wells Were Gauged on May 9, 2022
  - Groundwater Contour Interval = 0.10 ft
  - ft bls = feet below land surface
  - PRL = Potential Release Location
  - Aerial image FDOT 2018



**FIGURE 15-4**  
**Intermediate Zone Groundwater Elevation Map - May 2022**

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 PRL 157  
 NASA Kennedy Space Center, Florida

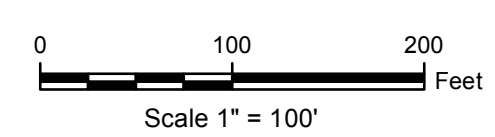


- Legend**
- Intermediate LTM Well, Sample Results Below GCTL
  - Shallow LTM Well, Sample Results Exceed NADC
  - Shallow LTM Well, Sample Results Exceed GCTL
  - Shallow LTM Well, Sample Results Below Screen
  - Non-LTM Well, No Sample Results
  - Shallow Groundwater Elevation Contours - May2022
  - Direction of Groundwater Flow
  - Approximate Extent of Multiple Contaminants Greater Than GCTLs from Monitoring Well Sampling
  - Approximate Extent of Isopropylbenzene Greater Than NADCs from Monitoring Well Sampling

**Notes:**

1. LTM = Long Term Monitoring
2. MW = Monitoring Well
3. NM = Normal Sample
4. PRL = Potential Release Location
5. All results and screening criteria presented in µg/L.
6. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation Limit (PQL).
7. J = Estimated Concentration.
8. U = Result was below the laboratory MDL.
9. V = Analyte found in associated method blank.
10. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777, F.A.C.
11. FDEP NADCs = Natural Attenuation Default Concentration, Chapter 62-777, F.A.C.
12. **Bolded** results indicate the presence of an analyte at the specified concentration.
13. **Blue** font indicates an exceedance of FDEP GCTLs.
14. **Red** font indicates an exceedance of FDEP NADCs.
15. Aerial Source: FDOT 2018.
16. Depth is presented in feet below land surface.
17. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL	NADC
ISOPROPYLBENZENE	<b>0.8</b>	<b>8</b>
1-METHYL NAPHTHALENE	<b>28</b>	<b>280</b>
2-METHYL NAPHTHALENE	<b>28</b>	<b>280</b>
NAPHTHALENE	<b>14</b>	<b>140</b>
TPH (C08-C40)	<b>5000</b>	<b>500000</b>



**FIGURE 15-5**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Fuel Storage Area #1 UST Building 1044 (FSA1)  
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 NASA Kennedy Space Center, Florida

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## 16. CONCLUSIONS AND RECOMMENDATIONS

The facilities included in the NASA IA LTM program have shown overall stable or decreasing trends in COC concentrations.

It is recommended that the LTM sampling program continue at the LTM sites included in this report until COCs have decreased below the GCTLs for two consecutive sampling events. Conclusions and recommendations from the 2021-2022 IA LTM monitoring program are summarized in the following sections.

**Table 16-1** details the recommendations and changes that were proposed for the IA LTM program during the June 2023 KSCRT meeting. **Table 16-2** details the proposed IA LTM program schedule for 2023-2024.

### 16.1 RANSOM ROAD LANDFILL

VC persists at concentrations above the GCTL in monitoring wells RRLF-MW0033, RRLF-MW0038I, and RRLF-MW0040I. VC concentrations were also detected above the GCTL at DPT locations RRLF-DPT0022, RRLF-DPT0023, and RRLF-DPT0024.

A new downgradient stick-up monitoring well, RRLF-MW0043, is recommended at the location of RRLF-DPT0024 to serve as a horizontal point of compliance well. The recommended screen interval for RRLF-MW0043 is 15 ft bls to 25 ft bls to capture the aquifer conditions within and below the four ft screen interval of RRLF-DPT0024, which slightly exceeded the VC GCTL.

The biennial sampling frequency in alternating wet/dry seasons is recommended to continue at monitoring wells RRLF-MW0033, RRLF-MW0038I, RRLF-MW0039I, RRLF-MW0040I, and new monitoring well RRLF-MW0043 for VC analysis. Groundwater level data are recommended to be collected from 16 monitoring wells. A historical review is recommended to determine the location of RRLF-MW0015. The next sampling event is scheduled for November 2024.

### 16.2 ORSINO STORAGE YARD

A letter report detailing the ORSY site history and September 2021 sampling activities was submitted to FDEP on July 10, 2023. Groundwater COC concentrations have remained below GCTLs for two consecutive sampling events in November 2020 and September 2021; therefore, long-term groundwater monitoring at ORSY is recommended to discontinue. The LUC for soil will remain in place at the site.

### 16.3 BUILDING M7-0505 TREATMENT TANK AREA

COC concentrations at M505 exceeded GCTLs in three of the eight monitoring wells sampled in May 2022. There have been no analyte detections exceeding NADCs since the AS system

shutdown in 2015, and the overall COC concentrations in the monitoring well network continue to show a decreasing or stable trend except for a small increase in cis-1,2-DCE and VC at M505-MW0055.

AECOM recommends adding downgradient monitoring well M505-MW0029 to the sampling network because of the recent increases in COC concentrations at monitoring well M505-MW0055. Biennial LTM sampling is recommended to continue with groundwater level measurements at 35 monitoring wells and samples collected from nine monitoring wells for select VOCs (TCE, cis-1,2-DCE, and VC). The next sampling event is scheduled for November 2024.

#### **16.4 HYPERGOL MAINTENANCE FACILITY HAZARDOUS WASTE SOUTH STAGING AREA**

The updated TOC elevations confirm a south to southeast groundwater flow direction, similar to historical trends. TCFM concentrations at HMF South have shown a decreasing trend since 2015, and for the second consecutive sampling event, concentrations were below the GCTL in September 2021. TCFM concentrations continue to be non-detect at the downgradient monitoring well HMF-MW0006IR, and have historically been below GCTLs at the remaining HMF South monitoring wells. Therefore, long-term groundwater monitoring at HMF South is recommended to discontinue. The LUC for groundwater is recommended to be removed, and a Site Rehabilitation Completion Report is recommended to be completed for NFA without controls.

With FDEP agreement during the April 2023 KSCRT meeting (Appendix A), the HMF South monitoring well network was abandoned in May 2023 (HydroGeoLogic 2023) to support construction activities at the site.

#### **16.5 OPERATIONS AND CHECKOUT BUILDING**

VC concentrations in monitoring wells O\_C-MW0005I and O\_C-MW0007I exceed the GCTL. Biennial sampling in alternating wet/dry seasons is recommended to continue at O&C with downgradient monitoring well O\_C-MW0006I added for VC analysis by Method 8260. Groundwater samples are recommended to be collected at three monitoring wells and groundwater levels measured at five wells. The next sampling event at O&C is scheduled for November 2024.

#### **16.6 VERTICAL PROCESSING FACILITY**

TCE concentrations have persisted above the GCTL in three monitoring wells, and VC concentrations exceeded the GCTL in two monitoring wells; therefore, LTM is recommended to continue at VPF.

A new flush-mount shallow monitoring well, screened 3 ft bls to 13 ft bls, is recommended to be installed adjacent to VPF-MW0023 to verify horizontal delineation in the shallow zone

downgradient of VPF-MW0022. Monitoring well VPF-MW0010I is recommended to be added into the sampling schedule to verify horizontal delineation in the intermediate zone downgradient of VPF-MW0018I. Monitoring well VPF-MW0008D is recommended to be added into the sampling schedule to verify vertical delineation around VPF-MW0008I.

The biennial sampling schedule is recommended to continue with 35 groundwater level measurements and eight monitoring wells sampled for select VOCs (TCE, cis-1,2-DCE, and VC). The next sampling event at VPF is scheduled for November 2024.

### **16.7 ENVIRONMENTAL HEALTH FACILITY**

VC concentrations dropped below the GCTL at monitoring well EHF-MW0001 for the first event since assessment began in 2004; however, low level concentrations of VC remain above the GCTL at monitoring well EHF-MW0004. VC concentrations were also analyzed above the GCTL at DPT locations EHF-DPT0002, EHF-DPT0004, EHF-DPT0005, and EHF-DPT0006.

A new upgradient flush-mount monitoring well, EHF-MW0009, is recommended to be installed at the location of EHF-DPT0005 to serve as a horizontal point of compliance well. The screen interval for EHF-MW0009 will be 15 ft bls to 25 ft bls to capture the aquifer conditions across both the intervals of EHF-DPT0005 that exceeded the VC GCTL. VC concentrations at each step-out location were found to be less than EHF-DPT0002, suggesting that the low level contamination plume is centered around EHF-DPT0002 and EHF-MW0004.

The biennial sampling frequency is recommended to continue at monitoring wells EHF-MW0001, EHF-MW0004, EHF-MW0005, and new monitoring well EHF-MW0009 for VC analysis. Groundwater levels are recommended to be measured at seven wells. The next sampling event at EHF is scheduled for November 2024.

### **16.8 KENNEDY ATHLETIC, RECREATION, AND SOCIAL PARK I**

Total lead concentrations at monitoring well KP1-MW0022 were slightly elevated in September 2021, but were not detected in May 2022. Monitoring wells KP1-MW0003 and KP1-MW0035 are recommended to be removed from the sampling schedule because concentrations of total lead in these two monitoring wells have been below the GCTL for the last two consecutive sampling events. The 5-year LTM frequency is recommended to be accelerated to May 2023 at LOC 9 with 16 monitoring wells used for groundwater level measurements and a groundwater sample collected from KP1-MW0022. Pending continued analytical data below the GCTL in May 2023, long-term groundwater monitoring at KARS Park 1 LOC 9 is recommended to discontinue and the LUC is recommended to be removed.

### **16.9 ENGINEERING DEVELOPMENT LABORATORY**

The southern boundary at EDL has been horizontally delineated south of EDL-MW0004 by DPT sampling in January 2023; however, concentrations of VC at select EDL monitoring wells

remain slightly above the GCTL. The biennial LTM frequency is recommended to continue at monitoring wells EDL-MW0004 and EDL-MW0006R for VC analysis. Groundwater level measurements are recommended to continue at four wells. The next sampling event at EDL is scheduled for November 2024.

#### **16.10 LAUNCH EQUIPMENT TEST FACILITY**

VC concentrations continue to exceed the GCTL at monitoring well LETF-MW0001; therefore, the biennial sampling frequency is recommended to continue at LETF. However, with the consecutive non-detect and low-level VC concentrations at the remaining sampled monitoring wells, it is recommended that the sampling scope be reduced to two monitoring wells (LETF-MW0001 and downgradient LETF-PSB-MW0001) for VC analysis. Groundwater levels are recommended to continue to be measured at 14 monitoring wells. The next sampling event at LETF is scheduled for May 2023.

#### **16.11 MOBIL SERVICE STATION**

The analytes at monitoring wells CGO-MW0006 and CGO-MW0019 were below GCTLs in May 2022. MTBE and 1,2,4-TMB concentrations at monitoring well CGO-MW0018 remain above GCTLs, but are continuing to decrease.

Eight historically clean monitoring wells are recommended to be abandoned. During assessment and early LTM activities, these eight monitoring wells were installed before the plume was determined to be isolated in the intermediate zone at this site. The eight monitoring wells proposed for abandonment, located around the perimeter of the site, are screened above or below the monitored plume, and not used for plume delineation.

The biennial LTM sampling frequency is recommended to continue at MOBIL with monitoring wells CGO-MW0005, CGO-MW0023, and CGO-MW0024 added into the sampling program to verify downgradient VOC concentrations. Six monitoring wells will be analyzed for select VOCs (benzene, 1,2,4-TMB, xylenes, and MTBE), and monitoring well CGO-MW0006 will also be analyzed for select PAHs (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene). Groundwater levels are recommended to continue to be measured at nine monitoring wells. The next sampling event is scheduled for November 2024.

#### **16.12 GENERAL SERVICES ADMINISTRATION SEIZED PROPERTY**

Concentrations of select COCs exceeded GCTLs in nine monitoring wells sampled in November 2021 and in five monitoring wells in November 2022. VC concentrations exceeded the NADC at monitoring well GSSP-MW0020 in 2021 and 2022, but continue to show an overall declining trend along with geotechnical parameters indicative of favorable conditions for reductive dechlorination (analyzed in 2019).

Site COCs are recommended to be reduced to VC only for each sampled well and retain naphthalene analysis at monitoring wells GSSP-MW0024R, GSSP-MW0035 and GSSP-MW0053. Select VOC concentrations, other than VC, have not exceeded GCTLs in the past four annual sampling events.

The annual LTM sampling frequency is recommended to continue with an expanded sampling event every five years. The next sampling event, scheduled for November 2023, will include water level measurements at 33 monitoring wells and groundwater samples from 14 monitoring wells. The next expanded sampling event is scheduled for November 2024.

### **16.13 SPACE STATION PROCESSING FACILITY**

Ammonia concentrations continue to exceed the GCTL at monitoring well SSPF-MW0004, and exceed both the GCTL and two times the KSC background mean ammonia concentration at monitoring wells SSPF-MW0006, SSPF-MW0014 and SSPF-MW0016. Biennial sampling in alternating wet/dry seasons is recommended to continue at SSPF. Groundwater levels are recommended to be collected at 15 monitoring wells and five groundwater samples will be analyzed for ammonia. The next sampling event at SSPF is scheduled for November 2024.

### **16.14 FUEL STORAGE AREA #1 UNDERGROUND STORAGE TANK (BUILDING 1044)**

Isopropylbenzene concentrations remain above GCTL at four monitoring wells downgradient of the former Building 1044 area. Monitoring well FSA1-MW0001 exceeded the isopropylbenzene NADC and had select PAH GCTL exceedances in May 2022. Naphthalene and TPH concentrations have been below the GCTLs since 2019 and 2021, respectively.

Annual LTM sampling is recommended to continue. Naphthalene and TPH are recommended to be removed from the site COCs following two or more consecutive events below GCTLs. Groundwater levels are recommended to be measured in 18 monitoring wells and groundwater samples collected at 10 monitoring wells for isopropylbenzene and select PAHs (1-methylnaphthalene and 2-methylnaphthalene). The next sampling event at FSA1 is scheduled for November 2023.

**Table 16-1  
Industrial Area - Long Term Monitoring  
IA LTM Recommendations**

<b>Site</b>	<b>Recommendations for the NASA KSC IA LTM</b>	<b>Sampling Frequency</b>	<b>Next Sampling Event(s)</b>
<b>RRLF</b> (SWMU 003)	Install downgradient horizontal compliance well at the location of RRLF-DPT0024 with a screen interval of 15-25 ft bls. Sample five monitoring wells for VC and measure water levels at 16 monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>ORSY</b> (SWMU 004)	Groundwater MNA sampling at ORSY is recommended to discontinue. The land use control for soil will remain in place at the site.	NA	NA
<b>M505</b> (SWMU 039)	Add monitoring well M505-MW0029 into the sampling schedule. Sample nine monitoring wells for select VOCs (TCE, cis-1,2-DCE, and VC) and measure water levels at 35 monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>HMF South</b> (SWMU 070)	Groundwater MNA sampling at HMF South is recommended to discontinue. The LUC for groundwater is recommended to be removed, and a Site Rehabilitation Completion Report is recommended to be completed for NFA without controls.	NA	NA
<b>O&amp;C</b> (SWMU 076)	Add monitoring well O_C-MW0006I into the sampling and gauging schedule. Sample three monitoring wells for VC and measure water levels at five monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>VPF</b> (SWMU 077)	Install shallow monitoring well adjacent to VPF-MW0023, and add monitoring wells VPF-MW0008D and VPF-MW0010I into the sampling schedule. Sample nine monitoring wells for select VOCs (TCE, cis-1,2-DCE, and VC) and measure water levels at 35 monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>EHF</b> (SWMU 079)	Install upgradient horizontal compliance well at the location of EHF-DPT0005 with a screen interval of 15-25 ft bls. Sample four monitoring wells for VC and measure water levels at seven monitoring wells.	Biennial Wet Season	November 2024

**Table 16-1  
Industrial Area - Long Term Monitoring  
IA LTM Recommendations**

Site	Recommendations for the NASA KSC IA LTM	Sampling Frequency	Next Sampling Event(s)
<b>KP1 LOC 9</b> (SWMU 084)	Monitoring wells KP1-MW0003 and KP1-MW0035 are recommended to be removed from the sampling schedule. because concentrations of total lead in these two monitoring wells have been below the GCTL for the last two consecutive sampling events. The 5-year LTM frequency is recommended to be accelerated to May 2023 at LOC 9 with 16 monitoring wells used for groundwater level measurements and a groundwater sample collected from KP1-MW0022. Pending continued analytical data below the GCTL in May 2023, groundwater MNA sampling at KARS Park 1 LOC 9 is recommended to discontinue and the LUC is recommended to be removed.	5-Year (accelerated May 2023 event due to COCs <GCTLs)	May 2023
<b>EDL</b> (SWMU 085)	Sample monitoring wells EDL-MW0004 and EDL-MW0006R for VC and measure water levels at four monitoring wells.	Biennial Wet Season	November 2024
<b>LETF</b> (SWMU 091)	The LTM sampling network is recommended to be reduced to two monitoring wells (LETF-MW0001 and downgradient LETF-PSB-MW0001I) for VC analysis. Groundwater levels should continue to be measured at 14 monitoring wells.	Biennial Alternating Wet/Dry	May 2023
<b>MOBIL</b> (SWMU 093)	Abandon eight historically clean perimeter monitoring wells. Add monitoring wells CGO-MW0005, CGO-MW0023, and CGO-MW0024 to the sampling schedule. Sample five monitoring wells for select VOCs (benzene, 1,2,4-TMB, xylenes, and MTBE), and monitoring well CGO-MW0006 for select VOCs and select PAHs (1-methylnaphthalene, 2-methylnaphthalene and naphthalene). Groundwater levels should continue to be measured at nine monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>GSSP</b> (SWMU 095)	The annual LTM sampling frequency is recommended to continue with an expanded sampling event every five years. The next sampling event will include water level measurements at 33 monitoring wells and groundwater samples from 14 monitoring wells. Site COCs are recommended to be reduced to VC only by Method 8260 for each sampled well and retain naphthalene analysis by Method 8270 at monitoring wells GSSP-MW0024R, GSSP-MW0035, and GSSP-MW0053.	Annual Wet Season	November 2023 and November 2024 (expanded event)

**Table 16-1  
Industrial Area - Long Term Monitoring  
IA LTM Recommendations**

<b>Site</b>	<b>Recommendations for the NASA KSC IA LTM</b>	<b>Sampling Frequency</b>	<b>Next Sampling Event(s)</b>
<b>SSPF</b> (SWMU 098)	Sample five monitoring wells for ammonia and measure water levels at 15 monitoring wells.	Biennial Alternating Wet/Dry	November 2024
<b>FSA1</b> (PRL 157)	Discontinue analyzing for naphthalene and TPH. Sample 10 monitoring wells for isopropylbenzene and select PAHs (1-methylnaphthalene and 2-methylnaphthalene), and measure water levels at 18 monitoring wells.	Annual Alternating Wet/Dry	November 2023 and May 2024

Notes:

- CGO = Citgo Service Station
- COC = contaminant of concern
- DCE = dichloroethene
- EDL = Engineering Development Laboratory
- EHF = Environmental Health Facility
- FSA1 = Fuel Storage Area #1 Underground Storage Tank (Building 1044)
- ft bls = feet below land surface
- GCTL = Groundwater Cleanup Target Level
- GSSP = General Services Administration Seized Property
- HMF = Hypergol Maintenance Facility South
- IA = Industrial Area
- KP1 = Kennedy, Athletic, Recreation, and Social Park 1
- KSC = Kennedy Space Center
- LETF = Launch Equipment Test Facility
- LOC = location of concern
- LTM = long-term monitoring
- M505 = Building M7-0505 Treatment Tank Area
- MNA = monitored natural attenuation
- MOBIL = Mobil Service Station
- MTBE = methyl tert-butyl ether
- MW = monitoring well
- NA = not applicable
- NASA = National Aeronautics and Space Administration
- O&C = Operations and Checkout Building
- ORSY = Orsino Storage Yard
- PAH = polynuclear aromatic hydrocarbon
- PRL = Potential Release Location
- RRLF = Ransom Road Landfill
- SSPF = Space Station Processing Facility
- SWMU = Solid Waste Management Unit
- TCE = trichloroethene
- TMB = trimethylbenzene
- TPH = total petroleum hydrocarbons
- VC = vinyl chloride
- VOC = volatile organic compound
- VPF = Vertical Processing Facility



**Table 16-2  
Industrial Area - Long Term Monitoring  
2023/2024+ Program Monitoring Schedule**

Site	Monitoring Wells for Groundwater Level Measurements		Monitoring Wells for Groundwater Samples	Sample Analysis	May 2023	November 2023	May 2024	November 2024	Other Date	Water Levels	Wells Sampled	Sample Frequency
<b>RRLF</b> (SWMU 003)	MW0012 MW0015 MW0029 MW0030 MW0031 MW0033 MW0034 MW0036	MW0037 MW0038S MW0038I MW0039S MW0039I MW0040I MW0042I MW0043*	MW0033 MW0038I MW0039I MW0040I MW0043*	VC Only by Method 8260B				X		16	5	Biennial Alternating Wet/Dry
<b>M505</b> (SWMU 039)	MW0003S MW0007S MW0007I MW0008S MW0009S MW0009I MW0012I MW0013 MW0014 MW0017 MW0020 MW0022 MW0024 MW0025 MW0026 MW0027 MW0028 MW0029	MW0030 MW0031 MW0032 MW0033 MW0035 MW0039 MW0042 MW0045 MW0046 MW0049 MW0050 MW0051 MW0054 MW0055 MW0057 MW0058 MW0059	MW0013 MW0029 MW0032 MW0033 MW0039 MW0049 MW0051 MW0055 MW0059	Select VOCs by Method 8260B				X		35	9	Biennial Alternating Wet/Dry
<b>O&amp;C</b> (SWMU 076)	MW0003I MW0004I MW0005I	MW0006I MW0007I	MW0005I MW0006I MW0007I	VC Only by Method 8260B				X		5	3	Biennial Alternating Wet/Dry
<b>VPF</b> (SWMU 077)	IW0001S IW0002I IW0002S IW0003I IW0003S IW0004I IW0004S IW0005S IW0006S IW0007I IW0008D IW0008I IW0009I IW0010I IW0011I IW0012I IW0013I IW0014I	IW0015I IW0016I IW0017I IW0018I MW0020 MW0021 MW0022 MW0023 MW0024 MW0025 MW0026 MW0027 MW0028 MW0029 MW0030 MW0031 MW0032*	IW0008I IW0008D IW0010I IW0018I MW0021 MW0022 MW0025 MW0027 MW0032*	Select VOCs by Method 8260B				X		35	9	Biennial Alternating Wet/Dry

**Table 16-2  
Industrial Area - Long Term Monitoring  
2023/2024+ Program Monitoring Schedule**

Site	Monitoring Wells for Groundwater Level Measurements		Monitoring Wells for Groundwater Samples		Sample Analysis	May 2023	November 2023	May 2024	November 2024	Other Date	Water Levels	Wells Sampled	Sample Frequency
<b>EHF</b> (SWMU 079)	MW0001 MW0003 MW0004 MW0005	MW0006 MW0007 MW0009*	MW0001 MW0004 MW0005 MW0009*		VC Only by Method 8260B				X		7	4	Biennial Wet Season
<b>KARS Park 1 LOC7</b> (SWMU 084)	MW0011 MW0012 MW0013	MW0031 MW0032	MW0013 MW0032		Arsenic by Method 6020A					Nov 2025	5	2	5-Year
<b>KARS Park 1 LOC9</b> (SWMU 084)	MW0001 MW0003 MW0004 MW0005 MW0015 MW0016 MW0017 MW0019	MW0022 MW0023 MW0024 MW0027 MW0028 MW0035 MW0036 MW0037	MW0022		Lead by Method 6010C	X					16	1	5-Year
<b>EDL</b> (SWMU 085)	MW0004 MW0005 MW006R	MW0007	MW0004 MW0006R		VC Only by Method 8260B				X		4	2	Biennial Wet Season
<b>LETF</b> (SWMU 091)	MW0001 MW0002 MW0003 MW0004 MW0005 MW0006 MW0007	MW0008 MW0009 MW0010 MW0011 PSB-MW0001I PSB-MW0002I PSB-MW0003I	MW0001 PSB-MW0001I		VC Only by Method 8260B	X					14	2	Biennial Alternating Wet/Dry
<b>MOBIL</b> (SWMU 093)	MW0005 MW0006 MW0007 MW0014 MW0015 MW0018	MW0019 MW0023 MW0024	MW0006  MW0005 MW0018 MW0019	MW0023 MW0024	Select VOCs (Method 8260B) and Select PAHs (Method 8270D)  Select VOCs by Method 8260B				X		9	6	Biennial Alternating Wet/Dry

**Table 16-2  
Industrial Area - Long Term Monitoring  
2023/2024+ Program Monitoring Schedule**

Site	Monitoring Wells for Groundwater Level Measurements		Monitoring Wells for Groundwater Samples		Sample Analysis	May 2023	November 2023	May 2024	November 2024	Other Date	Water Levels	Wells Sampled	Sample Frequency	
<b>GSSP</b> (SWMU 095)	MW0006	MW0047	MW0024R		VC Only (Method 8260B) and Select PAHs (Method 8270D)								Annual Wet Season	
	MW0007	MW0049	MW0035											
	MW0008	MW0053	MW0053		VC Only by Method 8260B		X		X		33	14		
	MW0009	MW0054	MW0013	MW0059										
	MW0013	MW0055	MW0019	MW0060										
	MW0014	MW0058	MW0020	MW0061										
	MW0019	MW0059	MW0034	MW0062										
	MW0020	MW0060	MW0036	MW0063										
	MW0021	MW0061	MW0044R		VC Only by Method 8260B (Expanded Event)									
	MW0022	MW0062	MW0014	MW0027										
	MW0023	MW0063	MW0021	MW0039										
	MW0024R		MW0022	MW0042		Expanded Five Year Sampling Event (Nov 2024)								
	MW0026		MW0023	MW0043R										
	MW0027		MW0026											
	MW0034		MW0019	MW0059	MEE by Method RSK 175 (Expanded Event)							33		23
	MW0035		MW0020	MW0062										
	MW0036		MW0053											
MW0039		MW0020	MW0062	Dhc Analysis (Expanded Event)										
MW0042		MW0053												
MW0043R		MW0019	MW0059	Total Organic Carbon by Method SM5310 (Expanded Event)										
MW0044R		MW0020	MW0062											
MW0045		MW0053												
<b>SSPF</b> (SWMU 098)	MW0001	MW0013	MW0004		Ammonia by Method 350.1								Biennial Alternating Wet/Dry	
	MW0002	MW0014	MW0006											
	MW0003	MW0015	MW0013											
	MW0004	MW0016	MW0014											
	MW0005	MW0017	MW0016							X		15		5
	MW0006	MW0018												
	MW0007	MW0020												
	MW0010													

**Table 16-2  
Industrial Area - Long Term Monitoring  
2023/2024+ Program Monitoring Schedule**

Site	Monitoring Wells for Groundwater Level Measurements		Monitoring Wells for Groundwater Samples		Sample Analysis	May 2023	November 2023	May 2024	November 2024	Other Date	Water Levels	Wells Sampled	Sample Frequency
FSA1 (PRL 157)	MW0001	MW0020	MW0001	MW0028	Select VOCs (Method 8260B) and Select PAHs (Method 8270D)						18	10	Annual Alternating Wet/Dry
	MW0002	MW0021	MW0002										
	MW0004	MW0022R	MW0012R										
	MW0012R	MW0023	MW0014										
	MW0014	MW0024	MW0017A			X	X						
	MW0015	MW0025	MW0021										
	MW0016A	MW0026	MW0022R										
	MW0017A	MW0027	MW0023										
	MW0019	MW0028	MW0027										

**Note:**

- \* indicates proposed monitoring well
- Dhc = dehalococcoides
- EDL = Engineering Development Laboratory
- EHF = Environmental Health Facility
- FSA1 = Fuel Storage Area #1 Underground Storage Tank (Building 1044)
- GSSP = General Services Administration Seized Property
- HMF = Hypergol Maintenance Facility South
- KP1 = Kennedy, Athletic, Recreation, and Social Park 1
- LETF = Launch Equipment Test Facility
- M505 = Building M7-0505 Treatment Tank Area
- MEE = methane, ethane, and ethene
- MOBIL = Mobil Service Station
- MW = monitoring well
- O&C = Operations and Checkout Building
- ORSY = Orsino Storage Yard
- PAH = polynuclear aromatic hydrocarbon
- PRL = Potential Release Location
- RRLF = Ransom Road Landfill
- SSPF = Space Station Processing Facility
- SWMU = Solid Waste Management Unit
- VC = vinyl chloride
- VOC = volatile organic compound
- VPF = Vertical Processing Facility

	May 2023	November 2023	May 2024	November 2024
<b>Total water levels to be collected</b>	30	51	18	159
<b>Total wells to be sampled</b>	3	24	10	66

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## **APPENDIX A**

### **KENNEDY SPACE CENTER REMEDIATION TEAM MEETING MINUTES**

**Revision 1 Meeting Minutes for March 8<sup>th</sup> & 9<sup>th</sup>, 2022**

Attendees:

- |                               |                              |
|-------------------------------|------------------------------|
| 1. Bruce Moore/FDEP           | 10. Debbie Wilson/Tetra Tech |
| 2. Ryan O’Meara/NASA          | 11. Jennifer Joyal/AECOM     |
| 3. Deda Johansen/NASA         | 12. Randy Sillan/AECOM       |
| 4. Anne Chrest/NASA           | 13. Linnea King Clark/AECOM  |
| 5. Natasha Darre/NASA         | 14. Chris Marshall/AECOM     |
| 6. Michelle Moore/NEMCON      | 15. Richard Smith/HGL        |
| 7. Mark Speranza/Tetra Tech   | 16. Scott Starr/HGL          |
| 8. Mark Jonnet/Tetra Tech     | 17. Carol Cady/HGL           |
| 9. Sarah Dampousse/Tetra Tech |                              |

**2203-M01 Michelle Moore/NEMCON**

**Meeting Minutes and Miscellaneous Items**

Team consensus was reached that Revision 1 of the meeting minutes and action/decision items for the January 2022 Team meeting will become final. Team members acknowledged and did not object to the fact that these meeting minutes may become public as part of a final report at a later date **(2203-D01)**.

Open action items were reviewed and updated. No action items were closed at that time.

**Results: Decision Item 2203-D01**

**2203-M02 Bruce Moore /FDEP**

**FDEP Program Update, March 2022**

**Goal:** The objective is to summarize any changes at the Florida Department of Environmental Protection (FDEP) and provide pertinent news since the last Kennedy Space Center (KSC) Remediation Team (KSCRT) meeting.

**Discussion:** Bruce Moore provided a quick update on the program.

As an update to partners, FDEP has two staff vacancies: one for a professional engineer and another for a professional geologist as a

NASA informed the Team that the updates to these documents are a lower priority.

**Results: Decision Item 2203-D36**

**2203-M09 Chris Marshall/AECOM**

**Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022**

**Goal:** The purpose is to present activities and data associated with six IA LTM sites: Orsino Storage Yard (ORSY) (SWMU 004); Hypergol Maintenance Facility Hazardous Waste South Staging Area (HMF South) (SWMU 070); Kennedy Athletic, Recreation, and Social Park 1 (KARS Park 1) (SWMU 084); Launch Equipment Test Facility (LETF) (SWMU 091); General Services Administration Seized Property (GSSP) (SWMU 095); Fuel Storage Area #1 (FSA1) Underground Storage Tank (UST) (Potential Release Location [PRL] 157).

**Discussion:**

Field efforts summarized in the ADP include LTM sampling from September 2021 through November 2021. The objective of the ADP is to evaluate the groundwater quality based on current data and trends to determine if modifications to the sampling schedule and/or additional measures are warranted.

The remaining contaminants of concern (COCs) at ORSY are 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene. Results for both were below the respective groundwater cleanup target levels (GCTLs), which is 70 µg/L for both, for at least the second consecutive event. The Team reached consensus to discontinue MNA of groundwater at the Orsino Storage Yard (SWMU 004) (**2203-D37**).

FDEP inquired if NASA will seek closure for this site? NASA responded they will not because soil concerns are still present here. This site was included as part of the KSCRT's action item for historical review of the IA LTM sites, and NASA has provided additional information to FDEP under separate cover. Based upon historical records review (including past direct push groundwater

sampling results) and monitoring well (MW) results, NASA is recommending the discontinuance of MNA at the site.

FDEP requested a brief letter report with the findings to support discontinuing the MNA at this site for groundwater. NASA confirmed it would provide this **(2203-A05)**.

Trichlorofluoromethane is the COC at HMF South. Two MWs were sampled in 2021: IW0004I and MW0006R. MW0006R was intended to be downgradient from the single well with remaining exceedances for TCFM IW0004I) but appears to have been upgradient based on concurrent water level measurements. The 2021 results for both wells were below the GCTL of 2,100 µg/L. Based upon a review, AECOM suspects that there may be some error in MW elevation survey data. The Team reached consensus to conduct a relative TOC elevation survey and collect water levels from 11 wells to verify groundwater flow at HMF South (SWMU 070) **(2203-D38)**.

KARS Park I has two locations of concern (LOC) in LTM, but only LOC 9 was sampled in 2021. The COC is lead. Lead results exceeded its GCTL of 15 µg/L in one of the three wells sampled. The Team reached consensus to continue LTM at KARS Park I (SWMU 084) on a 5-year interval at monitoring wells KP1-MW0003, KP1-MW0022, and KP1-MW0035 with 16 water level measurements **(2203-D39)**.

The Team reached consensus to re-develop and sample KP1-MW0022 in May 2022 to confirm lead concentration at KARS Park I (SWMU 084) **(2203-D40)**.

NASA added if we confirm the lead concentration, we are aware we will need a downgradient well for this location. FDEP inquired if there is a wet/dry seasonality to this sampling program? AECOM responded that the sampling interval is stated as every 5 years without specifying wet or dry season. NASA stated that we have seasonal data prior to going to the 5-year plan. FDEP responded that it isn't necessary to provide it at this time; let's wait for the May 2022 sample result.

FDEP observed that the lead concentration increased up 5-fold. AECOM responded that this may be influence of water level.

Vinyl chloride (VC) is the COC at LETF. VC was above its GCTL (1 µg/L) in one of six MWs sampled in 2021. The Team reached consensus to continue biennial sampling frequency at the LETF (SWMU 091) **(2203-D41)**.

The Team reached consensus to reduce sampling scope to two monitoring wells (LETF-MW0001 and LETF-PSB-MW0001I) and collect 14 water level measurements in May 2023 at the LETF (SWMU 091) **(2203-D42)**. FDEP noted that MW001I0 is preferable to MW0007 as a downgradient well based on groundwater flow direction.

At GSSP, VC is the only of the volatile organic compound COCs that remains in concentrations above its GCTL (1 µg/L). In 2021, VC results exceeded the GCTL in 9 of 14 samples, one of which also exceeded the natural attenuation default concentration of 100 µg/L. Naphthalene is also a site COC and monitored in a subset of 3 wells. It was detected below its GCTL of 14 µg/L in one sample in 2021.

The Team reached consensus to continue annual LTM sampling of 14 monitoring wells for select VOCs (tetrachloroethene [PCE], trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-DCE, and VC), and three monitoring wells for naphthalene, and collect 33 water level measurements in November 2022 at the GSSP (SWMU 095) **(2203-D43)**.

The COCs for FSA1 and their respective GCTLs are: benzene (1 µg/L), ethylbenzene (30 µg/L), isopropylbenzene (0.8 µg/L), 1-methylnaphthalene (28 µg/L), 2-methylnaphthalene (28 µg/L), naphthalene (14 µg/L), and total petroleum hydrocarbons [TPH] (5,000 µg/L). In 2021, nine MWs were sampled for those compounds. A new downgradient well, MW0028, was included in the sampling event. Isopropylbenzene was the only analyte detected above its GCTL, with exceedances in four samples.

The Team reached consensus to continue annual LTM sampling with addition of FSA-MW0017A to the existing monitoring network for a total of 10 wells. Samples will be analyzed for select VOCs (benzene, ethylbenzene, and isopropylbenzene), select PAHs (naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene), and TPH. Water level measurements will be collected from 18 wells.

The next sampling event will be in May 2022 for FSA1, alternating wet and dry seasons (PRL 157) **(2203-D44)**.

Slide 56 of the advanced data package (ADP) outlines the upcoming sampling schedule for reference.

**Results: Decision Item 2203 D37 through D44  
Action Item 2203-A05**

**2203-M09 Anne Chrest/NASA**

**CAMP Deliverables Look-Ahead and Document Requirements,  
March 2022**

**Goal:** This is a new recurring topic. The purpose is to present a deliverables look-ahead and review document requirements.

**Discussion:**

Specific comments related to CAMP documents and submittal dates were noted by NASA for incorporation into the CAMP schedule. A quick review of the CAMP was given by NASA, noting that there were a few revisions to the version that was sent earlier in March. For clarity, active sites and closed sites are now on separate tabs. Summary information for the 57 PFAS Locations of Concern/Areas of Potential Concern is presented on one tab, with a cross-reference to assigned Solid Waste Management (SWMU) or Potential Release Location (PRL) numbers where appropriate.

General note: While all KSCRT members are provided PDF versions of each set of KSCRT meeting minutes, some members requested that the minutes be uploaded to the Remediation Information System (RIS). This will be done. The NASA RPMs should also upload any final ADPs to the RIS Document Management System for the records as well.

FDEP inquired if the CAMP document being presented is the document sent around March 1? NASA confirmed that it was, but that it was revised since then. For PRL 237, there were two errors on dates (inadvertently switched), but will send this after the meeting **(2203-A06)**.

NASA inquired if FDEP needs an update monthly; is there a required frequency for review? FDEP stated there is not a set frequency for CAMP submittals, but noted they find it useful to talk



March 2022 Decision Items Rev 1		Decision
Decision No.	Minutes Reference	
2203-D35	2203-M07	<b><u>Launch Complexes 39A (SWMU 008) and 39B (SWM U009) Groundwater Remediation Update, March 2022:</u></b> The Team reached consensus to complete Hot Spot 2 evaluation pending data assessment.
2203-D36	2203-M08	<b><u>Firex Water Tank (FWT) Site (SWMU 069) Confirmatory Sampling Results and Path Forward, March 2022:</u></b> The Team reached consensus to update the LUCIP and Statement of Basis to remove arsenic as a site COC from the Firex Water Tank (SWMU 069).
2203-D37	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to discontinue MNA of groundwater at the Orsino Storage Yard (SWMU 004).
2203-D38	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to conduct a relative TOC elevation survey and collect water levels from 11 wells to verify groundwater flow at HMF South (SWMU 070).
2203-D39	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to continue LTM at KARS Park I (SWMU 084) on a 5-year interval at monitoring wells KP1-MW0003, KP1-MW0022, and KP1-MW0035 with 16 water level measurements.
2203-D40	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to re-develop and sample KP1-MW0022 in May 2022 to confirm lead concentration at KARS Park I (SWMU 084).
2203-D41	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to continue biennial sampling frequency at the LETF (SWMU 091).
2203-D42	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to reduce sampling scope to two monitoring wells (LETF-MW0001 and LETF-PSB-MW0001I), and collect 14 water level measurements in May 2023 at the LETF (SWMU 091).
2203-D43	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to continue annual LTM sampling of 14 monitoring wells for select VOCs (tetrachloroethene [PCE], trichloroethene [TCE], cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-DCE, and VC), and three monitoring wells for naphthalene, and collect 33 water level measurements in November 2022 at the GSSP (SWMU 095).
2203-D44	2203-M09	<b><u>Industrial Area (IA) Long-Term Monitoring (LTM) Update, March 2022:</u></b> The Team reached consensus to continue annual LTM sampling with addition of FSA-MW0017A to the existing monitoring network for a total of 10 wells. Samples will be analyzed for select VOCs (benzene, ethylbenzene, and isopropylbenzene), select PAHs (naphthalene, 1-methyl-naphthalene, and 2-methyl-naphthalene), and TPH. Water level measurements will be collected from 18 wells. The next sampling event will be in May 2022 for FSA1, alternating wet and dry seasons (PRL 157).

**Revision 1 Meeting Minutes for the KSCRT Meeting - April 5<sup>th</sup>, 2023**

Attendees:

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1. Evan Miller/FDEP           | 11. Sarah Damphousse/Tetra Tech |
| 2. Jason French/FDEP          | 12. Jennifer Gootee/AECOM       |
| 3. Ryan O’Meara/NASA          | 13. Chad Lee/AECOM              |
| 4. Deda Johansen/NASA         | 14. Chris Marshall/AECOM        |
| 5. Natasha Darre/NASA         | 15. Greg Kusel/AECOM            |
| 6. Anne Chrest/NASA           | 16. Richard Smith/HGL           |
| 7. Michelle Moore/NEMCON      | 17. Jason Bublitz/HGL           |
| 8. Mark Jonnet/Tetra Tech     | 18. Robert Lynch/HGL            |
| 9. Mark Speranza/Tetra Tech   |                                 |
| 10. Andrew Walters/Tetra Tech |                                 |

**2304-M01 Michelle Moore/NEMCON**

**Meeting Minutes and Miscellaneous Items**

**Objective:**

Test team consensus on February 2023 KSCRT meeting minutes and review open action items.

**Discussion:**

Team consensus was reached that Revision 1 of the February 2023 KSCRT meeting minutes and action items are final. Team members are aware that meeting minutes and decision/action items may become public as part of a report at a later date **(2304-D01)**.

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

**C-5 Electrical Substation (SWMU #066) Groundwater Monitoring Report and Long-Term Monitoring Work Plan:**

The Florida Department of Environmental Protection (FDEP) requested the team construct an east/west cross-section of the plume to show vertical delineation of the site and put data points on the figure. A figure like this already exists and was developed during the site characterization. NASA will send this figure to FDEP.

The figure was included in the C-5 Electrical Substation Groundwater Monitoring Report that was sent to FDEP on January 23, 2023 **(2210-A02)**.

completed for the site and identified four LOCs. Confirmation sampling (CS) results were presented in May 2022 and Team consensus was obtained for no further action for soil and groundwater at LOCs 3 and LOC 4, perform an IM for arsenic-impacted soil exceeding the industrial Soil Cleanup Target Levels (iSCTL), develop land use controls for arsenic and iron impacts above the residential SCTL at LOC 1 and LOC 2, and install one monitoring well at LOC 1 following soil IM activities at LOC 1.

Based upon CS results, it is recommended that arsenic-impacted soil exceeding the FDEP (iSCTL) from 0 to 0.5 feet below land surface (810 square feet) at LOC 1 be excavated and disposed of off-site at an approved landfill.

Team consensus was reached on the Interim Measure excavation boundary (bounded by sample locations below iSCTL: SB0026, SB0029, SB0018, SB0020, SB0031, SB0030, SB0048, SB0047, SB0046, SB0045, SB0043, SB0003, SB0042) **(2304-D12)**.

FDEP inquired where the groundwater sample was going to be taken from; where was the highest soil contamination detected at on the site? HGL responded that the highest detection was at SB0001. FDEP stated that groundwater sampling anywhere in that vicinity would be acceptable.

**Results: Decision Items 2304-D12**

2304-M06 Greg Kusel/AECOM

**Hypergol Maintenance Facility (HMF) South (SWMU #070)  
Groundwater No Further Action (NFA) Request, April 2023**

**Objective:** The HMF South area is soon to be re-developed. The purpose of this briefing is to summarize the site's remediation history, present the recent efforts to verify recent groundwater flow direction, and seek consensus on the path forward.

**Discussion:**

The 1999 Confirmation Sampling Report for HMF South identified polychlorinated biphenyls (PCBs) > Industrial Soil Cleanup Targets Levels (SCTLs); and aluminum, trichlorofluoromethane (TCFM) and other volatile organic compounds (VOCs) > Groundwater Cleanup Target Levels (GCTLs). The Resource Conservation and

Recovery Act (RCRA) Facility Investigation (RFI) conducted from 1999 through 2002 delineated soil and groundwater for identified contaminants of concern (COCs) and recommended an interim measure (IM) for soil. A Corrective Measures Study (CMS) recommended an Interim Measure (IM) for soil removal, which was completed in December 2003. An additional CMS for groundwater in February 2004 recommended monitored natural attenuation (MNA) for aluminum and vinyl chloride (VC), and utilization of air sparging (AS) to treat TCFM; documented in August 2004 Statement of Basis (SB).

The AS system was installed in September 2005 and expanded in 2007 and 2012. The system operated through March 2013, and again for five months in 2014. In September 2006, No Further Action (NFA) for aluminum in groundwater was attained. In October 2010, NFA was granted for VC in groundwater (Tetra Tech, October 2011 ADP). The 2016 sampling frequency changed to biennially for TCFM, following ten years of data consistently exceeding GCTLs in one well (HMF-NLP-IW0004I).

Two consecutive sampling events were below GCTLs at IW0004I (2020 and 2021). Continued decreasing TCFM concentrations were observed following air sparge (AS) system shut-down. MW0006IR was picked up in 2021 based on its downgradient location.

In November 2022, groundwater elevation measurements were collected from 10 monitoring wells (MWs). Relative top of casing (TOC) survey was completed at 10 MWs.

Updated 2021 and 2022 groundwater flow maps confirmed groundwater flow is consistent with the historical flow direction, so MW0006IR is representative of downgradient conditions. TCFM concentrations were less than GCTL for two consecutive sampling events in November 2020 and September 2021. Recommend discontinuing monitored natural attenuation (MNA) of groundwater and abandoning site monitoring wells.

NASA added that they want to get the wells abandoned by July 2023 for support of an upcoming construction project. FDEP inquired if TCFM was the only contaminant in these wells? NASA confirmed that was correct; other site COCs were sampled for and obtained NFA consensus previously. FDEP inquired if there were only the

two wells sampled. NASA noted that was true for the most recent sampling events. Other wells were previously dropped from the monitoring program (IW003I and IW005I) since results were below the GCTL for years following the air sparge system remedy. NASA added that, given the impending construction, if a concern arises after the wells are abandoned, they are willing to go back and install post-construction. FDEP inquired if the pond there was clay-lined? NASA stated they did not believe it was clay-lined; it likely has a sandy bottom.

Team consensus was reached for No Further Action for groundwater at HMF South and to abandon all site monitoring wells (2304-D13).

**Results: Decision Items 2304-D13**

2304-M07 KSCRT

**Miscellaneous Discussion**

AECOM

1. Industrial Area LTM (Chris Marshall) (45 min)
2. Q6 Interim Measure (Chad Lee) (30 min)
3. South Repeater ADP and Potential pilot study IMWP (Megan Garcia) (1 hour)
4. VAB LTM (Chad Lee) (1 hour)

HGL

1. CRHEA RAE (Megan or Cindy) (1 hour total)
2. GSRV West SWMU #036 - IMWP

Tetra Tech

1. CCB SWMU #030 - Annual Performance Monitoring Update (Andrew Walters) (45 min)

2023 Meeting Dates (continues to be hybrid option in 2023)

June 8<sup>th</sup> and 9<sup>th</sup>

August 3<sup>rd</sup> and 4<sup>th</sup>

October 5<sup>th</sup> and 6<sup>th</sup>

November 30<sup>th</sup> and December 1<sup>st</sup>

April 2023 Decision Items Rev 1		Decision
Decision No.	Minutes Reference	
2304-D01	2304-M01	<b>Meeting Minutes and Miscellaneous Items:</b> Test team consensus was reached that Revision 1 of the February 2023 KSCRT meeting minutes and action items are final. Team members are aware that meeting minutes and decision/action items may become public as part of a report at a later date.
2304-D02	2304-M02	<b>CRHEA Groundwater Monitoring Update:</b> Team consensus was reached continue annual sampling as follows: <ul style="list-style-type: none"> <li>•Sample 15 wells for VOCs. That includes Hot Spot 1: MW0025, MW0027, MW0029, MW0047, MW0048, and MW0058; Hot Spot 2: MW0031, MW0032, and MW0042; Northern Area: MW0017I, MW0019I, and MW0034; and down gradient: MW0035, MW0039, and MW0041.</li> <li>•Sample 4 wells for 1,4-dioxane within HS1: MW0025 and downgradient: MW0035, MW0039, and MW0041.</li> <li>•Sample 3 wells for TRPH within HS1 at MW0044, MW0047, and MW0056.</li> <li>•Sample 1 well for sodium within HS1 at MW0047 and eliminate MW0044 since last 2 consecutive events were less than GCTL.</li> <li>•Sample 6 wells for TDS (biennial) within HS1 at MW0025, MW0043, MW0044, MW0056, MW0057, and MW0058.</li> <li>•Collect depth to water measurements from 48 site-wide monitoring wells. Abandon monitoring well IW0004S if obstruction at 2 to 3 ft. btoc cannot be repaired, and abandon IW0014I and IW0015I due to obstructions at 17.2 and 5 ft. btoc, respectively.</li> <li>•Make one final attempt to locate IW0016I, IW0018I, and IW0020I. Determine viability and properly abandon any wells that are located but cannot be repaired.</li> <li>•Generate Mann-Kendall statistics for all applicable wells (that meet the criteria for using Mann-Kendall)</li> </ul>
2304-D03	2304-M02	<b>CRHEA Groundwater Monitoring Update:</b> Team consensus was reached to sample 10 monitoring wells for PFAS: IW0001S, IW0002S, IW0004I, IW0009S, IW0013S, IW0017I, IW0019I, MW0024, MW0025, and MW0030
2304-D04	2304-M02	<b>CRHEA Groundwater Monitoring Update:</b> Team consensus was reached to conduct sub slab soil gas sampling event for CVOCs in June and December 2023, to evaluate if there are changes in sub slab soil gas in the four vapor probes due to previous interim measure activities or plume movement.
2304-D05	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Team consensus was reached to conduct annual water level measurements at 55 monitoring wells in 2023 (Slide 22).
2304-D06	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Test consensus to discontinue monitoring for VOCs at 18 monitoring wells and one surface water location due to at least two consecutive events in which site VOC concentrations were below GCTLs.
2304-D07	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Test consensus to discontinue monitoring for polychlorinated biphenyls (PCBs) at 20 monitoring wells and one surface water location due to at least two consecutive events in which PCB concentrations were below GCTLs.
2304-D08	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Test consensus to perform annual monitoring at 12 monitoring wells; samples from four to be analyzed for VOCs and PCBs, one for PCBs, and seven for VOCs.
2304-D09	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Test consensus to continue annual UIC monitoring at GSRY-MW0049 for sulfate, iron, manganese, and sodium, and at GSRY-MW0050, and GSRY-MW0066 for sulfate, iron, sodium, and TDS.
2304-D10	2304-M03	<b>GSA Reclamation Yard (GSR) 2022 Groundwater Monitoring Results:</b> Team consensus was reached to perform annual UIC groundwater monitoring at GSRY-MW0067 for iron, and at GSRY-MW0071 and GSRY-MW0073 for iron and TDS.
2304-D11	2304-M04	<b>CCB SWMU #089 - MW21 Area Groundwater IMWP:</b> Team consensus was reached on the Interim Measure Work Plan (IMWP) design for in situ reductive dechlorination injection treatment of the high concentration plume (HCP)/ Hot Spot (HS) / Source Zone (SZ) at the MW21 Area and to proceed with the develop of an Implementation Work Plan to plan and facilitate the Interim Measure.
2304-D12	2304-M05	<b>Corrosion Atmospheric Exposure Facility (PRL 239) Interim Measure (IM) Work Plan:</b> Team consensus was reached on the Interim Measure excavation boundary (bounded by sample locations below iSCTL: SB0026, SB0029, SB0018, SB0020, SB0031, SB0030, SB0048, SB0047, SB0046, SB0045, SB0043, SB0003, SB0042).
2304-D13	2304-M06	<b>Hypergol Maintenance Facility (HMF) South (SWMU #070) Groundwater No Further Action (NFA) Request:</b> Team consensus was reached for No Further Action for groundwater at HMF South and to abandon all site monitoring wells.

## **APPENDIX B**

### **DAILY FIELD ACTIVITY LOGS**

**SEPTEMBER 2021 GROUNDWATER SAMPLING EVENT**

**DRY SEASON**

**ORSY, HMF, and KP1**



9/16/21 NASA KSC - IA LTM <sup>GK</sup> <sup>DS</sup>

Groundwater sampling at KARS and ORSY  
vehicles: AECOM F-150's # 275, 405

personnel: Greg Kusel + Dustin Slater

Equipment: DTW meter, In Situ Aquatroll,  
Geo pump, backup Hach 2100p, Ipad.

PPE: Level D + Nitrile gloves

0800 GK + DS Meet at KARS park #1

- go over SOW

- organize + cal equipment

- Safety meeting.

0830 Begin to locate and gauge wells.

- depths on gauging sheet.

1027 Collect KPI-MW0022-003.5-20210916

1048 Collect KPI-MW0035-003.0-20210916

1109 Collect KPI-MW0003-003.5-20210916

1115 Move to the ORSY site.

1135 Begin locating and gauging wells.

1213 Collect ORSY-~~EXC~~-MW0031-022.5-<sup>2021</sup>0916

1235 Collect ORSY-EXC-MW0001I-~~022.5~~-<sup>2021</sup>0916

1255 Drop off IDW at the CCF.

Drum ID: 222843

pallet ID: 222842

1300 crew offsite.

1340 GK dropped off samples at ENCO.

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9/16/21 GK

9/22/21 Well Sampling - IA LTM  
HMF South

BF/DS

0700 Brittany Follett arrives at depot to pick up

Sample cooler

0710 BF departs depot for KSC

0800 BF arrives on-site to meet Dustin Slater

Vehicles: Ford F-150 #905 and #275

Equipment: (2) AquaTrolls, (2) iPads, (2) geopumps

(2) DTW meters, tubing

SOW: Open 7 wells and collect DTW measurements

Collect groundwater samples for 2 wells

Weather: 80°F H: 88°F L: 73°F Partly Cloudy

Humidity: 65% Pressure: 29.9" Hg

H+S meeting: Biologicals, Weather

0810 Begin opening wells

- HMF-MW0007I under water

0910 Begin Sampling HMF-NLP-IW0004I

Sample collected @ 0937

0950 Move to HMF-MW0006 IR

Sample collected @ 1019

1025 Move to CCF to ~~sample~~ dump purge water and

Sample IDW drum @

- Sample collected @ 1045 80% full pH 7.29

1050 DS depart site for depot

1150 DS arrives at depot and drops <sup>Sample</sup> cooler off.

Hypergol Maintenance Facility South							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
HMF-NLP-IW0001I	35	40					
HMF-NLP-IW0002I	37	42					
HMF-NLP-IW0003I	35.5	40.5					
HMF-NLP-IW0004I	35	40	x				
HMF-MW0005I	35	40					
HMF-MW0006IR	35	40	x				
HMF-MW0007I	35	40					

Orsino Storage Yard 9/16/2021							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
ORSY-DRM-MW0001I	20	25		4.33	24.65	2	1145
ORSY-EXC-MW0001I	20	25	x	3.38	23.95	2	1146 Sample @ 1235
ORSY-EXC-MW0002I	20	25		7.21	27.55	1	1140
ORSY-EXC-MW0003I	20	25	x	6.72	27.58	1	1148 Sample @ 1213
ORSY-EXC-MW0004I	20	30		3.98	24.40	1	1143

KARS Park 1 9/16/2021							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
MW0001 0918	2	12		4.58	14.70	1	hard to get to
MW0003 0833	2	12	x	2.01	11.82	1	Sample @ 1109
MW0004 0924	2	12		4.25	14.73	1	
MW0005 0921	2	12		4.53	obstruction	1	hard to get to
MW0015 0830	2	12		2.03	11.03	1	
MW0016 0847	2	12		2.78	11.19	1	
MW0017 0855	2	12		2.51	10.76	1	
MW0019 0947	2	12		2.29	11.98	1	
MW0022 0958	2	12	x	2.63	obstruction	1	Sample @ 1027 obstruction at 3.42ft tubing placed 3.5. maybe a root.
MW0023 0903	2	12		3.70	13.47	1	
MW0024 0950	2	12		2.15	11.95	1	
MW0027 0908	2	12		4.43	11.97	1	
MW0028 0955	2	12		2.97	11.93	2	
MW0035 0945	2	12	x	1.88	11.62	1	Sample @ 1048
MW0036 0942	2	12		1.92	11.63	1	
MW0037 0927	2	12		4.49	14.69	1	

Hypergol Maintenance Facility South							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
HMF-NLP-IW0001I	35	40		0.73 0852			
HMF-NLP-IW0002I	37	42		3.55 0859			
HMF-NLP-IW0003I	35.5	40.5		5.10 0851			
HMF-NLP-IW0004I	35	40	x	3.08 0849			037.5 @ 0937
HMF-MW0005I	35	40		2.43 0849			
HMF-MW0006IR	35	40	x	4.08 0850			037.5 @ 1019
HMF-MW0007I	35	40		Under water			Under water

TDW @ 1045 pH=7.29

Orsino Storage Yard							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
ORSY-DRM-MW0001I	20	25					
ORSY-EXC-MW0001I	20	25	x				
ORSY-EXC-MW0002I	20	25					
ORSY-EXC-MW0003I	20	25	x				
ORSY-EXC-MW0004I	20	30					

KARS Park 1							
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
MW0001	2	12					
MW0003	2	12	x				
MW0004	2	12					
MW0005	2	12					
MW0015	2	12					
MW0016	2	12					
MW0017	2	12					
MW0019	2	12					
MW0022	2	12	x				
MW0023	2	12					
MW0024	2	12					
MW0027	2	12					
MW0028	2	12					
MW0035	2	12	x				
MW0036	2	12					
MW0037	2	12					



# Calibration Report

Instrument Aqua TROLL 600  
 Serial Number 606696  
 Created 9/16/2021

Sensor **RDO**  


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 Serial Number 658928  
 Last Calibrated 6/23/2021

## Calibration Details

Slope 1.047443  
 Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.06 mg/L  
 Pre Measurement 99.92 %Sat  
 Post Measurement 100.00 %Sat  
 Temperature 22.71 °C  
 Barometric Pressure 992.79 mbar

Sensor **Conductivity**  


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 Serial Number 672308  
 Last Calibrated 9/16/2021

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
 Cell Constant 0.857  
 Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,992.7 µS/cm  
 Specific Conductivity 8,508.6 µS/cm

## Post Measurement

Actual Conductivity 8,455.2 µS/cm  
 Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	9/16/2021

### Calibration Details

#### Calibration Point 1

pH of Buffer	6.98 pH
pH mV	-9.4 mV
Temperature	27.98 °C

#### Pre Measurement

pH	6.96 pH
pH mV	-9.4 mV

#### Post Measurement

pH	6.98 pH
pH mV	-9.5 mV

#### Slope and Offset 1

Slope	-59.75 mV/pH
Offset	-10.6 mV

#### ORP

ORP Solution	Quick-Cal
Offset	66.0 mV
Temperature	27.98 °C
Pre Measurement	216.8 mV
Post Measurement	219.0 mV

Sensor	Turbidity
Serial Number	780942
Last Calibrated	6/23/2021

### Calibration Details

Slope	1.173604
Offset	-0.02 NTU

#### Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

#### Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	<b>Barometric Pressure</b>
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Serial Number	606696
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
 Serial Number 606696  
 Created 9/22/2021

Sensor **RDO**  


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 Serial Number 658928  
 Last Calibrated 6/23/2021

## Calibration Details

Slope 1.047443  
 Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.06 mg/L  
 Pre Measurement 99.92 %Sat  
 Post Measurement 100.00 %Sat  
 Temperature 22.71 °C  
 Barometric Pressure 992.79 mbar

Sensor **Conductivity**  


---

 Serial Number 672308  
 Last Calibrated 9/22/2021

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
 Cell Constant 0.807  
 Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,052.5 µS/cm  
 Specific Conductivity 8,172.5 µS/cm

## Post Measurement

Actual Conductivity 7,882.5 µS/cm  
 Specific Conductivity 8,000.0 µS/cm



Sensor	pH/ORP
Serial Number	704529
Last Calibrated	9/22/2021

### Calibration Details

#### Calibration Point 1

pH of Buffer	7.00 pH
pH mV	-11.4 mV
Temperature	24.23 °C

#### Pre Measurement

pH	7.00 pH
pH mV	-11.5 mV

#### Post Measurement

pH	7.00 pH
pH mV	-11.4 mV

#### Slope and Offset 1

Slope	-59.01 mV/pH
Offset	-11.4 mV

#### ORP

ORP Solution	Quick-Cal
Offset	69.5 mV
Temperature	24.23 °C
Pre Measurement	224.0 mV
Post Measurement	224.7 mV

Sensor	Turbidity
Serial Number	780942
Last Calibrated	6/23/2021

### Calibration Details

Slope	1.173604
Offset	-0.02 NTU

#### Calibration Point 1

Pre Measurement	0.00 NTU
Post Measurement	0.00 NTU

#### Calibration Point 2

Pre Measurement	123.02 NTU
Post Measurement	126.00 NTU

Sensor	<b>Barometric Pressure</b>
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Serial Number	606696
Last Calibrated	Factory Defaults

**NOVEMBER 2021 GROUNDWATER SAMPLING EVENT**

**WET SEASON**

**LETF, GSSP, and FSA1**

11/22/21 NASA KSC-IA LTM

GK<sup>DS</sup>

project # 60610905

vehicles: AECOM F-150's # 275, 905

personnel: Greg Kusel + Dustin Slater

Equipment: DTW meters, In situ Aquatrols,  
Geopumps, backup Hack 2100P, I pads.

PPE: Level D + Nitrite gloves.

0645 GK + DS at AECOM depot

0730 GK + DS leave depot for KSC

0830 onsite at GSSP

- go over SOW + safety meeting

0850 Begin water level collection

1000 Utility pole installation along Kennedy  
pkwy has silt fence up along  
corridor. NO driving access to  
wells west of it, continue on foot.

1035 Complete water level collection. Trails  
back to west wells very overgrown  
and flooded. Begin calibrating  
equipment. Need more batteries for  
Aquatrols. DS to buy batteries.

1110 GK complete calibration. Heavy rain  
at the site. waiting inside truck  
and organize samples.

1140 DS onsite again. Finish calibrating  
second aquatroll and distribute samples.

pg. 1 of 3

11/22/21 NASA KSC - IA LTM

GK DS

1200 Begin Sampling select wells at GSSP.

1450 Continue to sample GSSP wells, load cart to sample MW 34, 35, 36.

GSSP DTW's and Sample times

Well ID	DTW	Sample Time	Well ID	DTW	Sample Time	Well ID	DTW	Sample Time
MW 6	3.24	x	MW 24R	0.27	1726	MW 47	1.47	x
MW 7	3.24	x	MW 26	1.55	x	MW 49	2.42	x
MW 8	0.65	x	MW 27	1.59	x	MW 53	1.93	1650
MW 9	1.47	x	MW 34	4.18	1650	MW 54	1.78	x
MW 13	0.83	1440	MW 35	4.10	1620	MW 55	2.21	x
MW 14	0.69	x	MW 36	4.23	1550	MW 58	2.28	x
MW 19	1.88	1541	MW 39	4.74	x	MW 59	2.45	1400
MW 20	1.91	1617	MW 42	3.76	x	MW 60	2.70	1316
MW 21	1.60	x	MW 43R	2.18	x	MW 61	2.89	1244
MW 22	0.44	x	MW 44R	2.44	1233	MW 62	1.65	1423
MW 23	0.44	x	MW 45	3.28	x	MW 63	1.74	1505

(11/23/21) LETF DTW's and Sample times

Well ID	DTW	Sample Time	Well ID	DTW	Sample Time	Well ID	DTW	Sample Time
MW 1	5.45	1010	MW 6	2.62	x	MW 11	4.56	x
MW 2	5.34	1135	MW 7	5.28	1050	PSB-MW1I	4.75	1055
MW 3	5.27	x	MW 8	5.03	x	PSB-MW2I	2.66	1016
MW 4	5.48	x	MW 9	5.31	x	PSB-MW3I	3.11	x
MW 5	5.55	1130	MW 10	5.48	x			

pg. 2 of 3

11/23/21 NASA KSC - IA LTM

GK DS

0600 GK at AECOM to load truck

0615 GK leaves depot for KSC

0740 GK at ORSY to take photos and DS at CCF to unload IDW water into previously used IA LTM Drum.

0800 GK + DS onsite at LETF. sign in at the office. Safety meeting.

0825 Begin collecting water levels.

0900 Finished collecting water levels. Begin calibrating equipment.

0930 Begin sampling select wells at LETF. GK inside LETF, DS outside area.

1150 GK + DS complete sampling at LETF. Sign out of LETF office.

1200 GK + DS leave IA LTM area to sample LES (VAB Area) and a monitor well north of VAB for PFAS.

1500 GK + DS at the CCF to unload IDW - will sample drum next week after sampling FSA 1.

1515 GK + DS offsite.

11/23/21

GK

pg. 3 of 3

11/30/21 NASA KSC - IA LTM GK DS

project # 60610905

Vehicles: AECOM F-150's # 275, 405

Personnel: Greg Kusel, Dustin Slater

Equipment: 2 DTW meters, 2 HACH turbidimeters,  
2 Aquatrolls, 2 J pads, 2 Geopumps

PPE: Level D and nitrile gloves.

0645 GK at AECOM to load Equipment.

0700 GK leaves AECOM Depot for KSC.

0800 GK + DS at FSA1

- Check in at office, Safety meeting

0820 Calibrate equipment

0845 Begin opening wells

0900 Begin gauging water levels.

0925 Begin sampling select monitor wells.

1200 Sampling at FSA1 complete

1210 Drive to CCF to pour out IDW  
and sample IDW drum.

Drum # 222843

Shell # 222842

Drum capacity: 80% full

pH: 7.09

1300 GK + DS offsite, DS to drop off  
samples at ENCO.

~~11/30/21 GK~~

1 of 2

11/30/21 NASA KSC - IA LTM GK DS

FSA1			DTW's and Sample times			
Well ID	DTW	Sample time	Well ID	DTW	Sample time	
MW 1	4.03	1052	MW 20	3.63		x
MW 2	3.35	1119	MW 21	3.03		1150
MW 4	4.10	x	MW 22R	4.59		1110
MW 12R	4.32	1027	MW 23	3.85		1159
MW 14	4.50	0950	MW 24	3.72		x
MW 15	3.17	x	MW 25	3.20		x
MW 16A	4.48	x	MW 26	4.59		x
MW 17A	4.40	x	MW 27	4.85		1035
MW 19	6.45	x	MW 28	4.62		0950

All DTW measurements in Feet below top  
of casing.

~~11/30/21 GK~~

2 of 2

# General Services Administration Seized Property

11/22/21

Well Gauging November 2021

Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes
GSSP-MW0006	5	15		3.29		1	0929 Stick up
GSSP-MW0007	25	35		3.24		1	0928 Stick up
GSSP-MW0008	5	15		0.65		1	0915
GSSP-MW0009	25	35		1.47		1	0914
1440 GSSP-MW00013	5	15	x	0.83		1	0926
GSSP-MW00014	25	35		0.69		1	0927
GSSP-MW00019	15	25	x	1.88		1	0933
GSSP-MW00020	25	35	x	1.91		1	0932
GSSP-MW00021	40	50		1.60		1	0931
GSSP-MW00022	15	25		0.44		1	0935
GSSP-MW00023	25	35		0.44		1	0934
GSSP-MW00024R	15	25	x	0.27		1	1005
GSSP-MW00026	5	15		1.55		1	0943
GSSP-MW00027	5	15		1.59		1	0944
1650 GSSP-MW00034	5	15	x	4.18		1	1020 Stick up
1620 GSSP-MW00035	15	25	x	4.10		1	1021
1550 GSSP-MW00036	30	40	x	4.23		1	1022
GSSP-MW00039	25	35		4.74		1	<del>1023</del> 1025 ↓
GSSP-MW00042	30	40		3.76		1	1012 Stick up
GSSP-MW00043R	5	15		2.18		1	0918
GSSP-MW00044R	25	35	x	2.44		1	0917
GSSP-MW00045	15	25		3.28		1	0930 Stick up
GSSP-MW00047	15	25		1.47		1	0916
GSSP-MW00049	55	60		2.42		1	0919
GSSP-MW00053	15	25	x	1.83		1	0948
GSSP-MW00054	25	35		1.78		1	0949
GSSP-MW00055	5	15		2.21		1	0951 Cracked pad (double with 53)
GSSP-MW00058	10	15		2.28		1	0921
1490 GSSP-MW00059	16	21	x	2.45		1	0920
1316 GSSP-MW00060	10	15	x	2.70		1	0922
1244 GSSP-MW00061	16	21	x	2.89		1	0923
GSSP-MW00062	10	15	x	1.65		1	0925
GSSP-MW00063	16	21	x	1.74		1	0924

1745 offsite

Fuel Storage Area #1								11/30/21
Well Gauging November 2021								
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes	
FSA1-MW0001	2	12	x	4.03		3/4	0906	
FSA1-MW0002	2	12	x	3.35		3/4	0905	
FSA1-MW0004	2	12		4.10		2	0910	
FSA1-MW0012R	3	13	x	4.32		1	0907	
FSA1-MW0014	2	12	x	4.50		2	0908	
FSA1-MW0015	3	13		3.17		2	0922	
FSA1-MW0016A	3	13		4.48		2	0912	
FSA1-MW0017A	3	13		4.40		2	0913	
FSA1-MW0019	2	12		6.45		2	0918	
FSA1-MW0020	1	11		3.63		2	0921	
FSA1-MW0021	2	12	x	3.03		1	0919	
FSA1-MW0022R	2	12	x	4.59		1	0916	
FSA1-MW0023	2	12	x	3.85		1	0920	
FSA1-MW0024	2	12		3.72		1	0909	
FSA1-MW0025	15	25		3.20		1	0911	
FSA1-MW0026	15	25		4.59		1	<del>0914</del> 0914	
FSA1-MW0027	15	25	x	4.85		1	0915	
FSA1-MW0028	15	25	x	4.62		1	0917	

Launch Equipment Testing Facility								11/23/21
Well Gauging November 2021								
Well ID	Screen Interval		Sampling	DTW (ft)	DTB (ft)	Well Dia. (in)	Notes	
LETf-MW0001	22.5	27.5	x	5.45		1	0830	
LETf-MW0002	22.5	27.5	x	5.34		1	0834	
LETf-MW0003	22.5	27.5		5.27		1	0826	
LETf-MW0004	33.5	38.5		5.48	37.77	1	0829	
LETf-MW0005	22.5	27.5	x	5.55		1	0850	
LETf-MW0006	33.5	38.5		2.62		1	0842	
LETf-MW0007	33.5	38.5	x	5.28		1	0827	
LETf-MW0008	22.5	27.5		5.03		1	0832	
LETf-MW0009	22.5	27.5		5.31		1	0833	
LETf-MW0010	22.5	27.5		5.48		1	0831	
LETf-MW0011	22.5	27.5		4.56		1	0848	
LETf-PSB-MW0001I	22	27	x	4.75		1	0847	
LETf-PSB-MW0002I	22	27	x	2.66		1	0843	
LETf-PSB-MW0003I	20	25		3.11		1	<del>0834</del> 0841	



# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 808878  
Created 11/22/2021

## Sensor Conductivity

Serial Number 803640  
Last Calibrated 11/22/2021

### Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.971  
Reference Temperature 25.00 °C

### Pre Measurement

Actual Conductivity 1,456.8 µS/cm  
Specific Conductivity 1,454.1 µS/cm

### Post Measurement

Actual Conductivity 1,415.6 µS/cm  
Specific Conductivity 1,413.0 µS/cm

## Sensor RDO

Serial Number 849125  
Last Calibrated Factory Defaults

## Sensor pH/ORP

Serial Number 778862  
Last Calibrated 11/22/2021

### Calibration Details

#### Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 157.4 mV  
Temperature 25.70 °C

#### Pre Measurement

pH 3.97 pH  
pH mV 157.4 mV

#### Post Measurement

pH 4.00 pH  
pH mV 157.8 mV

#### Calibration Point 2

pH of Buffer 7.00 pH  
pH mV -13.2 mV

Temperature 25.26 °C

Pre Measurement

pH 6.85 pH  
pH mV -13.2 mV

Post Measurement

pH 7.00 pH  
pH mV -13.3 mV

Calibration Point 3

pH of Buffer 10.00 pH  
pH mV -178.7 mV  
Temperature 25.04 °C

Pre Measurement

pH 9.64 pH  
pH mV -178.8 mV

Post Measurement

pH 10.00 pH  
pH mV -178.7 mV

Slope and Offset 1

Slope -56.89 mV/pH  
Offset -13.2 mV

Slope and Offset 2

Slope -55.14 mV/pH  
Offset -13.2 mV

ORP

ORP Solution ORP Standard  
Offset -139.4 mV  
Temperature 32.64 °C  
Pre Measurement 163.9 mV  
Post Measurement 100.0 mV

**Sensor Turbidity**

Serial Number 804275  
Last Calibrated 7/15/2021

Calibration Details

Slope 1  
Offset -1.73 NTU

Calibration Point 1

Pre Measurement 1.10 NTU  
Post Measurement 0.00 NTU

**Sensor Barometric Pressure**

Serial Number	808878
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 808878  
Created 11/23/2021

## Sensor Conductivity

Serial Number 803640  
Last Calibrated 11/23/2021

### Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 1.046  
Reference Temperature 25.00 °C

### Pre Measurement

Actual Conductivity 1,135.6  $\mu\text{S}/\text{cm}$   
Specific Conductivity 1,329.7  $\mu\text{S}/\text{cm}$

### Post Measurement

Actual Conductivity 1,206.8  $\mu\text{S}/\text{cm}$   
Specific Conductivity 1,413.0  $\mu\text{S}/\text{cm}$

## Sensor RDO

Serial Number 849125  
Last Calibrated Factory Defaults

## Sensor pH/ORP

Serial Number 778862  
Last Calibrated 11/23/2021

### Calibration Details

#### Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 146.1 mV  
Temperature 17.34 °C

#### Pre Measurement

pH 4.12 pH  
pH mV 146.2 mV

#### Post Measurement

pH 4.00 pH  
pH mV 142.3 mV

#### Calibration Point 2

pH of Buffer 7.02 pH  
pH mV -19.5 mV

Temperature 17.41 °C

Pre Measurement

pH 7.13 pH  
pH mV -20.1 mV

Post Measurement

pH 7.02 pH  
pH mV -19.0 mV

Calibration Point 3

pH of Buffer 10.08 pH  
pH mV -187.2 mV  
Temperature 17.32 °C

Pre Measurement

pH 10.25 pH  
pH mV -187.1 mV

Post Measurement

pH 10.08 pH  
pH mV -182.4 mV

Slope and Offset 1

Slope -54.84 mV/pH  
Offset -18.4 mV

Slope and Offset 2

Slope -54.79 mV/pH  
Offset -18.4 mV

ORP

ORP Solution	ORP Standard
Offset	26.5 mV
Temperature	17.41 °C
Pre Measurement	208.2 mV
Post Measurement	229.0 mV

**Sensor Turbidity**

Serial Number 804275  
Last Calibrated 7/15/2021

Calibration Details

Slope 1  
Offset -1.73 NTU

Calibration Point 1

Pre Measurement 1.10 NTU  
Post Measurement 0.00 NTU

**Sensor Barometric Pressure**

Serial Number	808878
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 808878  
Created 11/30/2021

## Sensor Conductivity

Serial Number 803640  
Last Calibrated 11/30/2021

### Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.96  
Reference Temperature 25.00 °C

### Pre Measurement

Actual Conductivity 1,318.3 µS/cm  
Specific Conductivity 1,538.5 µS/cm

### Post Measurement

Actual Conductivity 1,210.8 µS/cm  
Specific Conductivity 1,413.0 µS/cm

## Sensor RDO

Serial Number 849125  
Last Calibrated 11/30/2021

### Calibration Details

Slope 1.059108  
Offset 0.00 mg/L

### Calibration point 100%

Concentration 9.37 mg/L  
Pre Measurement 94.17 %Sat  
Post Measurement 100.00 %Sat  
Temperature 19.26 °C  
Barometric Pressure 1,087.5 mbar

## Sensor pH/ORP

Serial Number 778862  
Last Calibrated 11/30/2021

### Calibration Details

### Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 135.7 mV  
Temperature 15.48 °C

Pre Measurement

pH 4.17 pH  
pH mV 135.8 mV

Post Measurement

pH 4.00 pH  
pH mV 131.3 mV

Calibration Point 2

pH of Buffer 7.02 pH  
pH mV -29.0 mV  
Temperature 15.84 °C

Pre Measurement

pH 7.20 pH  
pH mV -29.2 mV

Post Measurement

pH 7.02 pH  
pH mV -28.2 mV

Calibration Point 3

pH of Buffer 10.08 pH  
pH mV -197.8 mV  
Temperature 16.10 °C

Pre Measurement

pH 10.30 pH  
pH mV -198.3 mV

Post Measurement

pH 10.08 pH  
pH mV -191.9 mV

Slope and Offset 1

Slope -54.54 mV/pH  
Offset -28.0 mV

Slope and Offset 2

Slope -55.14 mV/pH  
Offset -27.9 mV

ORP

ORP Solution ZoBell's  
Offset 28.4 mV  
Temperature 18.52 °C  
Pre Measurement 236.0 mV  
Post Measurement 237.6 mV

**Sensor**                      **Turbidity**  
Serial Number              804275



Last Calibrated 7/15/2021

Calibration Details

Slope 1  
Offset -1.73 NTU

Calibration Point 1

Pre Measurement 1.10 NTU  
Post Measurement 0.00 NTU

Sensor	Barometric Pressure
Serial Number	808878
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 11/22/2021

Sensor	RDO
Serial Number	658928
Last Calibrated	6/23/2021

## Calibration Details

Slope 1.047443  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.06 mg/L  
Pre Measurement 99.92 %Sat  
Post Measurement 100.00 %Sat  
Temperature 22.71 °C  
Barometric Pressure 992.79 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	11/22/2021

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.947  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 992.65 µS/cm  
Specific Conductivity 1,004.4 µS/cm

## Post Measurement

Actual Conductivity 1,396.4 µS/cm  
Specific Conductivity 1,413.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	11/22/2021

## Calibration Details

## Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 156.7 mV  
Temperature 24.11 °C

Pre Measurement

pH 4.05 pH  
pH mV 156.5 mV

Post Measurement

pH 4.00 pH  
pH mV 156.3 mV

Calibration Point 2

pH of Buffer 7.00 pH  
pH mV -10.4 mV  
Temperature 24.19 °C

Pre Measurement

pH 6.88 pH  
pH mV -10.2 mV

Post Measurement

pH 7.00 pH  
pH mV -10.4 mV

Calibration Point 3

pH of Buffer 10.00 pH  
pH mV -184.9 mV  
Temperature 24.03 °C

Pre Measurement

pH 9.84 pH  
pH mV -184.5 mV

Post Measurement

pH 10.00 pH  
pH mV -184.3 mV

Slope and Offset 1

Slope -55.7 mV/pH  
Offset -10.4 mV

Slope and Offset 2

Slope -58.17 mV/pH  
Offset -10.4 mV

ORP

ORP Solution ZoBell's  
Offset 25.6 mV  
Temperature 24.75 °C  
Pre Measurement 266.7 mV  
Post Measurement 229.4 mV

**Sensor**                      **Turbidity**  
Serial Number              780942

Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

Sensor	Barometric Pressure
Serial Number	606696
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 11/23/2021

Sensor	RDO
Serial Number	658928
Last Calibrated	6/23/2021

## Calibration Details

Slope 1.047443  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.06 mg/L  
Pre Measurement 99.92 %Sat  
Post Measurement 100.00 %Sat  
Temperature 22.71 °C  
Barometric Pressure 992.79 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	11/23/2021

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.937  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 1,274.5 µS/cm  
Specific Conductivity 1,428.5 µS/cm

## Post Measurement

Actual Conductivity 1,260.7 µS/cm  
Specific Conductivity 1,413.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	11/23/2021

## Calibration Details

## Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 154.6 mV  
Temperature 18.65 °C

Pre Measurement

pH 3.99 pH  
pH mV 154.6 mV

Post Measurement

pH 4.00 pH  
pH mV 151.3 mV

Calibration Point 2

pH of Buffer 7.02 pH  
pH mV -13.4 mV  
Temperature 17.61 °C

Pre Measurement

pH 7.06 pH  
pH mV -13.4 mV

Post Measurement

pH 7.02 pH  
pH mV -13.1 mV

Calibration Point 3

pH of Buffer 10.04 pH  
pH mV -184.4 mV  
Temperature 19.19 °C

Pre Measurement

pH 10.06 pH  
pH mV -185.1 mV

Post Measurement

pH 10.04 pH  
pH mV -180.8 mV

Slope and Offset 1

Slope -55.62 mV/pH  
Offset -12.3 mV

Slope and Offset 2

Slope -56.63 mV/pH  
Offset -12.2 mV

ORP

ORP Solution ZoBell's  
Offset 25.6 mV  
Temperature 24.75 °C  
Pre Measurement 266.7 mV  
Post Measurement 229.4 mV

**Sensor**                      **Turbidity**  
Serial Number              780942

Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

Sensor	Barometric Pressure
Serial Number	606696
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 11/30/2021

**Sensor RDO**  
Serial Number 658928  
Last Calibrated 11/30/2021

## Calibration Details

Slope 1.033445  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 9.74 mg/L  
Pre Measurement 101.59 %Sat  
Post Measurement 100.00 %Sat  
Temperature 15.54 °C  
Barometric Pressure 1,022.8 mbar

**Sensor Conductivity**  
Serial Number 672308  
Last Calibrated 11/30/2021

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.842  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 1,140.8 µS/cm  
Specific Conductivity 1,394.8 µS/cm

## Post Measurement

Actual Conductivity 1,155.6 µS/cm  
Specific Conductivity 1,413.0 µS/cm

**Sensor pH/ORP**  
Serial Number 704529  
Last Calibrated 11/30/2021

## Calibration Details

## Calibration Point 1

pH of Buffer 4.00 pH  
pH mV 151.6 mV  
Temperature 14.74 °C



Pre Measurement

pH 4.02 pH  
pH mV 151.6 mV

Post Measurement

pH 4.00 pH  
pH mV 146.4 mV

Calibration Point 2

pH of Buffer 7.06 pH  
pH mV -13.2 mV  
Temperature 14.09 °C

Pre Measurement

pH 7.03 pH  
pH mV -13.0 mV

Post Measurement

pH 7.06 pH  
pH mV -12.7 mV

Calibration Point 3

pH of Buffer 10.08 pH  
pH mV -186.0 mV  
Temperature 14.87 °C

Pre Measurement

pH 10.16 pH  
pH mV -186.3 mV

Post Measurement

pH 10.08 pH  
pH mV -179.7 mV

Slope and Offset 1

Slope -53.84 mV/pH  
Offset -10.0 mV

Slope and Offset 2

Slope -57.22 mV/pH  
Offset -9.8 mV

ORP

ORP Solution ZoBell's  
Offset 21.2 mV  
Temperature 15.32 °C  
Pre Measurement 240.6 mV  
Post Measurement 241.8 mV

**Sensor**                      **Turbidity**  
Serial Number              780942

Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

Sensor	Barometric Pressure
Serial Number	606696
Last Calibrated	Factory Defaults

**MAY 2022 GROUNDWATER SAMPLING EVENT**

**DRY SEASON**

**RRLE, M505, O&C, VPF,  
KP1 LOC9, SSPF, CGO, and  
FSA1**

5/9/22 NASA KSC - IA LTM

GK DS

Project # 60610905

Vehicles: AECOM F-150<sup>s</sup> # 905, 275

Personnel: Greg Kusel and Dustin Slater

Equipment: 2 DTW meters, 2 aquaroll

2 Ipads, 2 geopumps

PPE: Level D + Nitrile gloves

0750 GK + DS onsite for EOR/ELSA training at K6-0791.

0830 GK + DS at FSA-1. Check in at office.

0845 open wells and calibrate equipment.

1000 Begin sampling the select monitoring wells.

1300 End sampling at FSA-1. Check out with the office. Drive to Q.C.

1320 open and gauge monitoring wells.

1350 Begin sampling select monitoring wells. MW 7I was turbid at beginning of purge, but cleared up.

1440 DS drives to CCF to set up IDW drum while GK samples MW 7I.

1515 GK at CCF to unload IDW. organize coolers to be dropped off at ENCO.

1540 GK + DS offsite.

~~5/9/22~~

~~GK~~

pg. 1 of 4

5/10/22 NASA KSC - IA LTM

GK DS

0800 GK + DS at KARS Park 1, safety tailgate meeting. Drive to MW 22.

0830 Begin development at MW 22.

Start: light brownish tan, turbid

End: Clear. purged 10 gal. pumped at one gpm.

0900 GK + DS drive to RRLF.

0915 GK calls KSC Security to open gate at E Ave and Ransom Rd.

- Calibrate equipment while waiting.

1000 GK + DS at RRLF. begin to locate and open monitoring wells.

1100 Begin sampling select monitoring wells.

1230 Done sampling RRLF. Drive to SSPE.

1250 Begin opening monitoring wells at SSPE.

1340 Drive to Badging office to add SSPE access to our badges.

1420 Finish gauging SSPE monitoring wells.

1440 Begin sampling select monitoring wells.

1620 GK + DS finished sampling SSPE, and offsite of KSC.

~~5/10/22~~  
~~GK~~

pg. 2 of 4

5/11/22 NASA KSC - IA LTM GK DS

- 0800 GK + DS onsite at the CCF.  
Safety meeting and unload IDW water.
- 0830 Drive to M505 - open wells.
- 0940 Begin gauging monitoring wells.
- 1020 Begin Sampling Select wells.
- 1250 complete sampling at M505.  
Drive to CGO.
- 1255 open monitoring wells at CGO.
- 1300 Begin gauging monitoring wells.
- 1310 Begin Sampling Select wells.
- 1400 Complete sampling at CGO.  
- Drive to CCF.
- 1415 unload IDW into drum at CCF.
- 1430 GK + DS OFFSITE. GK to drop  
Samples off at ENCO.

~~5/11/22  
GK~~

pg. 3 of 4

5/12/22 NASA KSC - IA LTM GK DS

- 0730 DS onsite, begin Calibration and  
purging MW22 at KARS Park 1.
- 0745 GK onsite - safety tailgate
- 0758 Sample MW22
- 0805 Drive to VPE.
- 0830 GK calibrate equipment and both  
open monitoring wells.
- 0930 Begin gauging monitoring wells.
- 1015 Begin Sampling Select wells.
- 1250 Drive to CCF, unload IDW into  
Drums. Begin to purge water  
from both drums into 5 gal bucket.
- 1315 Collect IDW Sample. pH = 7.14  
Clamshell: 220 930  
Drum # 222332  
pH: 7.08  
% Full: 80%
- Drum # 222333  
pH: 7.16  
% Full: 25%
- 1330 Calibrate out equipment.
- 1350 GK + DS OFFSITE. GK to drop  
Samples off at ENCO.

~~5/12/22  
GK~~

pg. 4 of 4

IA LTM Water Levels  
May 2022

Well ID	Date	Top of Casing (ft)	Depth to Water (ft BTOC)	GWE (ft NAVD88)	Comments
CGO-MW0005	5/11/2022		3.49		
CGO-MW0006	5/11/2022	8.7	5.5	3.2	
CGO-MW0007	5/11/2022		3.62		
CGO-MW0014	5/11/2022		4.58		
CGO-MW0015	5/11/2022		3.64		
CGO-MW0018	5/11/2022		3.39		
CGO-MW0019	5/11/2022		2.84		
CGO-MW0023	5/11/2022	6.75	3.57	3.18	
CGO-MW0024	5/11/2022		3.54		
FSA1-MW0001	5/9/2022		4.82		
FSA1-MW0002	5/9/2022		4.19		
FSA1-MW0004	5/9/2022		4.93		
FSA1-MW0012R	5/9/2022		5.04		
FSA1-MW0014	5/9/2022		5.13		
FSA1-MW0015	5/9/2022		4		
FSA1-MW0016A	5/9/2022		5.49		
FSA1-MW0017A	5/9/2022		5.43		
FSA1-MW0019	5/9/2022		7.55		
FSA1-MW0020	5/9/2022		4.57		
FSA1-MW0021	5/9/2022	4.3	4.19	0.11	
FSA1-MW0022R	5/9/2022		5.83		
FSA1-MW0023	5/9/2022	5.32	5.05	0.27	
FSA1-MW0024	5/9/2022	5.36	4.48	0.88	
FSA1-MW0025	5/9/2022	4.4	4.2	0.2	
FSA1-MW0026	5/9/2022	5.66	5.75	-0.09	
FSA1-MW0027	5/9/2022	5.97	6.15	-0.18	
FSA1-MW0028	5/9/2022	5.67	5.95	-0.28	
KP1-MW0022	5/12/2022		3.38		

IA LTM Water Levels  
May 2022

Well ID	Date	Top of Casing (ft)	Depth to Water (ft BTOC)	GWE (ft NAVD88)	Comments
M505-MW0003S	5/11/2022		6.56		
M505-MW0007I	5/11/2022	2.11	6.59	-4.48	
M505-MW0007S	5/11/2022		5.9		
M505-MW0008S	5/11/2022		6.38		
M505-MW0009I	5/11/2022	2.11	6.84	-4.73	9IS
M505-MW0009S	5/11/2022	2.11	6.8	-4.69	
M505-MW0012I	5/11/2022	2.11	6.25	-4.14	
M505-MW0013	5/11/2022	2.11	6.82	-4.71	
M505-MW0014	5/11/2022		6.97		
M505-MW0017	5/11/2022	9.3	6.96	2.34	
M505-MW0020	5/11/2022	9.45	6.58	2.87	
M505-MW0022	5/11/2022	9.28	6.98	2.3	
M505-MW0024	5/11/2022		6.41		
M505-MW0025	5/11/2022		8.52		
M505-MW0026	5/11/2022		8.51		
M505-MW0027	5/11/2022		7.27		
M505-MW0028	5/11/2022		3.49		
M505-MW0029	5/11/2022		5.26		
M505-MW0030	5/11/2022		8.1		
M505-MW0031	5/11/2022		8.6		
M505-MW0032	5/11/2022		8.78		
M505-MW0033	5/11/2022		8.7		
M505-MW0035	5/11/2022		4.69		
M505-MW0039	5/11/2022		5.88		
M505-MW0042	5/11/2022		6.67		
M505-MW0045	5/11/2022		6.5		
M505-MW0046	5/11/2022		6.48		
M505-MW0049	5/11/2022		8.2		
M505-MW0050	5/11/2022		8.7		
M505-MW0051	5/11/2022		7.77		
M505-MW0054	5/11/2022		8.3		

IA LTM Water Levels  
May 2022

Well ID	Date	Top of Casing (ft)	Depth to Water (ft BTOC)	GWE (ft NAVD88)	Comments
M505-MW0055	5/11/2022		7.72		
M505-MW0057	5/11/2022		4.73		
M505-MW0058	5/11/2022		3.61		
M505-MW0059	5/11/2022		4.74		
O_C-MW0003I	5/9/2022		7.58		
O_C-MW0004I	5/9/2022		6.88		
O_C-MW0005I	5/9/2022		7.88		
O_C-MW0007I	5/9/2022	5.95	4.76	1.19	
RRLF-MW0012	5/10/2022		2.1		
RRLF-MW0029	5/10/2022		4.4		
RRLF-MW0030	5/10/2022		4.48		
RRLF-MW0031	5/10/2022		4.52		Loose cap
RRLF-MW0033	5/10/2022		4.81		
RRLF-MW0034	5/10/2022		4.89		
RRLF-MW0036	5/10/2022		5.3		
RRLF-MW0037	5/10/2022		5.12		
RRLF-MW0038I	5/10/2022	5.07	5.34	-0.27	
RRLF-MW0038S	5/10/2022		5		
RRLF-MW0039I	5/10/2022	4.61	4.8	-0.19	
RRLF-MW0039S	5/10/2022		4.92		
RRLF-MW0040I	5/10/2022	4.61	5.3	-0.69	
RRLF-MW0042I	5/10/2022	3.99	5.03	-1.04	
SSPF-MW0001	5/10/2022	11.17	9.8	1.37	
SSPF-MW0002	5/10/2022	11.08	9.71	1.37	
SSPF-MW0003	5/10/2022	10.51	8.43	2.08	
SSPF-MW0004	5/10/2022	9.71	8.38	1.33	
SSPF-MW0005	5/10/2022	10.55	9.28	1.27	
SSPF-MW0006	5/10/2022	10.77	9.48	1.29	
SSPF-MW0007	5/10/2022	10.79	9.47	1.32	
SSPF-MW0010	5/10/2022	10.77	9.47	1.3	
SSPF-MW0013	5/10/2022	11.02	10.04	0.98	



IA LTM Water Levels  
May 2022

Well ID	Date	Top of Casing (ft)	Depth to Water (ft BTOC)	GWE (ft NAVD88)	Comments
SSPF-MW0014	5/10/2022	7.9	6.84	1.06	
SSPF-MW0015	5/10/2022	8.01	5.4	2.61	
SSPF-MW0016	5/10/2022	8	6.49	1.51	
SSPF-MW0017	5/10/2022	4.81	4.31	0.5	
SSPF-MW0018	5/10/2022		6.39		
SSPF-MW0020	5/10/2022		6.39		
IW0001s	5/12/2022		6.46		
IW0002s	5/12/2022		3.92		
IW0002I	5/12/2022		4.35		
IW0003s	5/12/2022		3.65		
IW0003I	5/12/2022		4.61		
IW0004s	5/12/2022		5.93		
IW0004I	5/12/2022		7.48		
IW0005s	5/12/2022		3.45		
IW0006S	5/12/2022		4.28		
IW0007I	5/12/2022		2.97		
IW0008D	5/12/2022		2.1		
IW0008I	5/12/2022		2.78		
IW0009I	5/12/2022		3.5		
IW0010I	5/12/2022		2.22		
IW0011I	5/12/2022		5.03		
IW0012I	5/12/2022		6.58		
IW0013I	5/12/2022		6.13		
IW0014I	5/12/2022		5.37		
IW0015I	5/12/2022		5.21		
IW0016I	5/12/2022		6.18		
IW0017I	5/12/2022		5.25		
VPF-IW0018I	5/12/2022		4.65		
IW0019	5/12/2022		5.62		
VPF-MW0020	5/12/2022		4.59		
VPF-MW0021	5/12/2022		4.7		

IA LTM Water Levels  
May 2022

Well ID	Date	Top of Casing (ft)	Depth to Water (ft BTOC)	GWE (ft NAVD88)	Comments
VPF-MW0022	5/12/2022		6.61		
VPF-MW0023	5/12/2022		3.85		
VPF-MW0024	5/12/2022		6.5		
VPF-MW0025	5/12/2022		6.06		
VPF-MW0026	5/12/2022		5.6		
VPF-MW0027	5/12/2022		5.8		
VPF-MW0028	5/12/2022		2.63		
VPF-MW0029	5/12/2022		2.31		
VPF-MW0030	5/12/2022		2.61		
VPF-MW0031	5/12/2022	2.86	2.98	-0.12	

**Field Instrument Calibration Records**

**INSTRUMENT**

HACH 2100P # 3

Serial # 31373

**PARAMETER:** *Turbidity*

**STANDARDS:** [Specify the type(s) of standards used for calibration, the origin of the standards, the standard values, and the date the standards were prepared or purchased]

Standard A GELEX 0-10 NTU (+/- 10%)

Standard B GELEX 10-100 NTU (+/- 6.5%)

Standard C GELEX 100-1000 NTU (+/- 5%)

DATE (mm/dd/yy)	TIME (hr:min)	STD (A, B, C)	STD VALUE	INSTRUMENT RESPONSE	% DEV	CALIBRATED (YES, NO)	TYPE (INIT, CONT)	SAMPLER INITIALS
5/9/22	0915	A	5.59	5.58		NO	INITIAL	DS
"	"	B	53.1	53.0		"	"	"
"	"	C	601	601		"	"	"
5/10/22	1114	A	5.59	5.59		NO	CCV	DS
"	"	B	53.1	52.8		"	"	"
"	"	C	601	599		"	"	"
5/11/22	1023	A	5.59	5.58		NO	CCV	DS
↓	↓	B	53.1	52.9		"	↓	↓
↓	↓	C	601	600		"	↓	↓
5/12/22	0723	A	5.59	5.58		NO	CCV	DS
↓	↓	B	53.1	53.0		"	↓	↓
↓	↓	C	601	600		"	↓	↓
5/12/22	1300	A	5.59	5.59		NO	CCV	DS
↓	↓	B	53.1	52.7		"	↓	↓
↓	↓	C	601	598		"	↓	↓
		A				NO		
		B				"		
		C				"		

Boldly 'X' this box if there is qualified data on this page

Form FD9000-8 CALIBRATION LOG (FDEP SOP FT 1000-FT 1500, FD 1000-FD 4000) 11-10-05

Project/Site: KSC IALTM Date: 5/9/22 - 5/11/22 Meter # 21L102052

Temperature (Quarterly) For Date of Last Temperature Verification see in log book

Dissolved Oxygen	DEP SOP FT 1500	Initials	Date	Time	Probe Charge	Probe Gain	mg/L	Temp °C	% DO	Saturation mg/L (from chart)	Pass or Fail
<b>Acceptance Criteria: +/- 0.3mg/l</b>											
CAL	ICV	CCV	DS	5/9/22	0918		8.55	23.2°	100%	8.516	P F
CAL	ICV	CCV	DS	5/10/22	1117		8.49	23.3°	100%	8.530	P F
CAL	ICV	CCV	DS	5/11/22	1025		8.72	22.3°	100%	8.693	P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F

Specific Conductance	DEP SOP FT 1200	Initials	Date	Time	Standard µmhos/cm	Exp. Date	Lot #	Bottle #	Cell Constant	Reading µmhos/cm	Pass or Fail
<b>Acceptance Criteria: +/- 5%</b>											
CAL	ICV	CCV	DS	5/9/22	1413	6/22	2106108			1413	P F
CAL	ICV	CCV	DS	5/10/22	1413	↓	↓			1468	P F
CAL	ICV	CCV	DS	5/11/22	1413	↓	↓			1405	P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F

pH	DEP SOP FT 1100	Initials	Date	Time	Standard SU	Exp. Date	Lot #	Bottle #	Slope	Reading SU	Pass or Fail
<b>Acceptance Criteria: +/- 0.2 SU</b>											
CAL	ICV	CCV	DS	5/9/22	7.00	3/23	2108315			7.00	P F
CAL	ICV	CCV	↓	↓	4.00	10/22	2108315			7.00	P F
CAL	ICV	CCV	↓	↓	10.00	3/23	2108315			10.00	P F
CAL	ICV	CCV	DS	5/10/22	7.00	↓	↓			7.02	P F
CAL	ICV	CCV	↓	↓	4.00	↓	↓			4.01	P F
CAL	ICV	CCV	↓	↓	10.00	↓	↓			10.02	P F
CAL	ICV	CCV	DS	5/11/22	7.00	↓	↓			6.98	P F
CAL	ICV	CCV	↓	↓	4.00	↓	↓			4.02	P F
CAL	ICV	CCV	↓	↓	10.00	↓	↓			10.04	P F

Maintenance: Weekly pH Slope: \_\_\_\_\_ Specific Conductance Probe Cleaned? Yes No Dissolved Oxygen Membrane Changed: Yes No

Notes:	Initials	Date	Time	Specific Conductance	Probe Cleaned?	Lot #	Dissolved Oxygen	Membrane Changed?
OPF	DS	5/9/22	0918	238	3/26	210100633	232.0	P
	DS	5/10/22	1117	238	↓	↓	232.7	P
	DS	5/11/22	1025	238	↓	↓	234.6	P

Perform only in Calibrate Mode: CAL - Calibrate -  
 Perform only in Run Mode: ICV - Initial Calibration Verification  
 Perform only in Run Mode: CCV - Continuing Calibration Verification

Boldly 'X' this box if there is qualified data on this page

Form FD9000-8 CALIBRATION LOG (FDEP SOP FT 1000-FT 1500, FD 1000-FD 4000) 11-10-05

Project/Site: RSC IA LTM Date: 5/12/22 Meter # 212102052

Temperature (Quarterly) For Date of Last Temperature Verification see in log book

Dissolved Oxygen	DEP SOP FT 1500	Initials	Date	Time	Probe Charge	Probe Gain	mg/L	Temp °C	% DO	Saturation mg/L (from chart)	Pass or Fail
<b>Acceptance Criteria: +/- 0.3mg/l</b>											
CAL	ICV	CCV	NS	5/12/22	0725		9.47	18.3°	100%	9.409	P F
CAL	ICV	CCV	↓	↓	1307		8.47	23.2°	100%	8.546	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

Specific Conductance	DEP SOP FT 1200	Initials	Date	Time	Standard μmhos/cm	Exp. Date	Lot #	Bottle #	Cell Constant	Reading μmhos/cm	Pass or Fail
<b>Acceptance Criteria: +/- 5%</b>											
CAL	ICV	CCV	NS	5/12/22	0725	1413	Same as first page			1406	P F
CAL	ICV	CCV	↓	↓	1307	1413	↓			1401	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

pH	DEP SOP FT 1100	Initials	Date	Time	Standard SU	Exp. Date	Lot #	Bottle #	Slope	Reading SU	Pass or Fail
<b>Acceptance Criteria: +/- 0.2 SU</b>											
CAL	ICV	CCV	NS	5/12/22	0725	7.00	Same as first page			7.01	P F
CAL	ICV	CCV	↓	↓	1307	4.00	↓			4.03	P F
CAL	ICV	CCV				10.00				10.05	P F
CAL	ICV	CCV				7.00				7.01	P F
CAL	ICV	CCV				4.00				4.04	P F
CAL	ICV	CCV				10.00				10.07	P F
CAL	ICV	CCV									P F
CAL	ICV	CCV									P F

Maintenance: Weekly pH Slope: \_\_\_\_\_ Specific Conductance Probe Cleaned? Yes No Dissolved Oxygen Membrane Changed: Yes No

Notes:	Initials	Date	Time	Standard	Exp. Date	Lot #	Bottle #	Slope	Reading	Pass or Fail
	NS	5/12/22	0725	238	Same as first page				234.7	P
	↓	↓	1307	238	↓	↓			231.3	P

024

CCV  
CCV

Perform only in Calibrate Mode: CAL - Calibrate -  
 Perform only in Run Mode: ICV - Initial Calibration Verification  
 Perform only in Run Mode: CCV - Continuing Calibration Verification

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 518550  
Created 5/9/2022

## Sensor Conductivity

Serial Number 775877  
Last Calibrated 5/9/2022

### Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.958  
Reference Temperature 25.00 °C

### Pre Measurement

Actual Conductivity 7,697.1 µS/cm  
Specific Conductivity 8,027.1 µS/cm

### Post Measurement

Actual Conductivity 7,671.1 µS/cm  
Specific Conductivity 8,000.0 µS/cm

## Sensor pH/ORP

Serial Number 758735  
Last Calibrated 5/9/2022

### Calibration Details

#### Calibration Point 1

pH of Buffer 7.00 pH  
pH mV -20.6 mV  
Temperature 22.85 °C

#### Pre Measurement

pH 7.00 pH  
pH mV -20.6 mV

#### Post Measurement

pH 7.00 pH  
pH mV -20.4 mV

#### Slope and Offset 1

Slope -58.73 mV/pH  
Offset -20.6 mV

#### ORP

ORP Solution Quick-Cal  
Offset 16.0 mV

Temperature	22.85 °C
Pre Measurement	151.9 mV
Post Measurement	226.8 mV

Sensor	Turbidity
Serial Number	786838
Last Calibrated	12/8/2021

Calibration Details

Slope	12.15755
Offset	-29.32 NTU

Calibration Point 1

Pre Measurement	2.83 NTU
Post Measurement	0.00 NTU

Calibration Point 2

Pre Measurement	64.63 NTU
Post Measurement	100.00 NTU

Sensor	Barometric Pressure
Serial Number	518550
Last Calibrated	Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 5/10/2022

Sensor	RDO
Serial Number	658928
Last Calibrated	5/10/2022

## Calibration Details

Slope 1.089823  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 7.99 mg/L  
Pre Measurement 95.46 %Sat  
Post Measurement 100.00 %Sat  
Temperature 24.74 °C  
Barometric Pressure 1,060.6 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	5/10/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 1.007  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 7,481.5 µS/cm  
Specific Conductivity 7,889.2 µS/cm

## Post Measurement

Actual Conductivity 7,586.5 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	5/10/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 7.00 pH  
pH mV -22.7 mV  
Temperature 22.29 °C



Pre Measurement

pH 6.94 pH  
pH mV -23.8 mV

Post Measurement

pH 7.00 pH  
pH mV -22.5 mV

Slope and Offset 1

Slope -58.62 mV/pH  
Offset -22.7 mV

ORP

ORP Solution Quick-Cal  
Offset -68.4 mV  
Temperature 22.29 °C  
Pre Measurement 226.3 mV  
Post Measurement 227.6 mV

**Sensor Turbidity**

Serial Number 780942  
Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

**Sensor Barometric Pressure**

Serial Number 606696  
Last Calibrated Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 5/11/2022

Sensor	RDO
Serial Number	658928
Last Calibrated	5/11/2022

## Calibration Details

Slope 1.042885  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 7.77 mg/L  
Pre Measurement 104.51 %Sat  
Post Measurement 100.00 %Sat  
Temperature 26.37 °C  
Barometric Pressure 1,018.4 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	5/11/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.975  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,199.8 µS/cm  
Specific Conductivity 8,269.4 µS/cm

## Post Measurement

Actual Conductivity 7,932.6 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	5/11/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 7.00 pH  
pH mV -22.4 mV  
Temperature 24.56 °C

Pre Measurement

pH 7.00 pH  
pH mV -22.7 mV

Post Measurement

pH 7.00 pH  
pH mV -22.3 mV

Slope and Offset 1

Slope -59.07 mV/pH  
Offset -22.4 mV

ORP

ORP Solution Quick-Cal  
Offset -64.9 mV  
Temperature 24.56 °C  
Pre Measurement 216.5 mV  
Post Measurement 224.2 mV

**Sensor Turbidity**

Serial Number 780942  
Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

**Sensor Barometric Pressure**

Serial Number 606696  
Last Calibrated Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 5/12/2022

Sensor	RDO
Serial Number	658928
Last Calibrated	5/12/2022

## Calibration Details

Slope 1.041736  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.38 mg/L  
Pre Measurement 100.10 %Sat  
Post Measurement 100.00 %Sat  
Temperature 22.22 °C  
Barometric Pressure 1,015.5 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	5/12/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.999  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 7,257.5 µS/cm  
Specific Conductivity 7,801.8 µS/cm

## Post Measurement

Actual Conductivity 7,441.9 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	5/12/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 7.00 pH  
pH mV -25.3 mV  
Temperature 21.35 °C

Pre Measurement

pH 7.06 pH  
pH mV -25.6 mV

Post Measurement

pH 7.00 pH  
pH mV -25.0 mV

Slope and Offset 1

Slope -58.44 mV/pH  
Offset -25.3 mV

ORP

ORP Solution Quick-Cal  
Offset -65.0 mV  
Temperature 21.35 °C  
Pre Measurement 229.1 mV  
Post Measurement 229.0 mV

**Sensor Turbidity**

Serial Number 780942  
Last Calibrated 6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

**Sensor Barometric Pressure**

Serial Number 606696  
Last Calibrated Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 5/12/2022

Sensor	RDO
Serial Number	658928
Last Calibrated	5/12/2022

## Calibration Details

Slope 1.046236  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 7.67 mg/L  
Pre Measurement 99.79 %Sat  
Post Measurement 100.00 %Sat  
Temperature 26.75 °C  
Barometric Pressure 1,015.7 mbar

Sensor	Conductivity
Serial Number	672308
Last Calibrated	5/12/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.988  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,245.1 µS/cm  
Specific Conductivity 8,085.9 µS/cm

## Post Measurement

Actual Conductivity 8,157.6 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	704529
Last Calibrated	5/12/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 6.98 pH  
pH mV -26.8 mV  
Temperature 26.03 °C

Pre Measurement

pH 7.03 pH  
pH mV -27.7 mV

Post Measurement

pH 6.98 pH  
pH mV -26.9 mV

Slope and Offset 1

Slope -59.36 mV/pH  
Offset -28.0 mV

ORP

ORP Solution Quick-Cal  
Offset -39.4 mV  
Temperature 26.03 °C  
Pre Measurement 210.4 mV  
Post Measurement 222.0 mV

Sensor	Turbidity
Serial Number	780942
Last Calibrated	6/23/2021

Calibration Details

Slope 1.173604  
Offset -0.02 NTU

Calibration Point 1

Pre Measurement 0.00 NTU  
Post Measurement 0.00 NTU

Calibration Point 2

Pre Measurement 123.02 NTU  
Post Measurement 126.00 NTU

Sensor	Barometric Pressure
Serial Number	606696
Last Calibrated	Factory Defaults

**NOVEMBER 2022 SURVEYING EVENT**

**HMF SOUTH**



11/7/22 NASA KSC - IA LTM GK CM  
project # 60610405  
vehicles: AECOM F-150's: 903, 932  
personnel: Greg Kusel + Chris Marshall  
Equipment: Survey Kit and DTW meter.  
PPE: Level D + Nitrile gloves.  
weather: Sunny, 82°F High Temp.  
0845 GK + CM leave the AECOM depot  
1000 GK + CM onsite at HAF South.  
- tailgate meeting  
- prep equipment  
1025 locate and open wells.  
1055 break for incoming weather.  
1110 continue opening wells.  
1120 Begin collecting DTW measurements  
- measurements found on elevation paper.  
1225 prep Survey equipment and  
begin surveying select wells.  
- Survey elevations on separate log.  
1300 GK + CM offsite. Drive to ~~Headquarters~~<sup>GK</sup>  
headquarters building and calculate  
TOC elevations from relative survey.  
1400 GK + CM drive around to recon  
future DPT areas.  
1515 CM offsite. GK remains  
onsite to check sampling equipment.  
1645 GK offsite.

**NOVEMBER 2022 GROUNDWATER SAMPLING EVENT**

**WET SEASON**

**EHF, EDL, and GSSP**

11/8/22 NASA KSC - IA LTM GK DS

PROJECT # 60610.905

VEHICLES: AECOM F-150'S # 403, 275

PERSONNEL: Greg Kusel and Dustin Slater.

EQUIPMENT: 2 aquatrail 600'S, 2 DTW meters,  
2 geopumps, 2 IPADS.

PPE: Level D + Nitrile gloves.

WEATHER: Sunny and windy, high 81°F.

0730 GK onsite. organize paperwork.

0745 DS onsite. Tailgate meeting.

0755 Begin opening and gauging wells.

1015 Finished collecting water levels.

- Begin calibrating equipment.

1045 Begin sampling monitoring wells.

1530 Finished sampling wells. Drive to

CUF to pour IDW into

drum # 228463 in shell # 220341.

1630 GK + DS offsite.

~~11/8/22  
GK DS~~

11/15/22

NASA-KSC IA LTM p. 1 of 1

DS

Project # 60610905

Vehicle # 275 (Orlando F-150)

Personnel - Austin Slater

Equipment - 1 Aquatrak 600, 1 Goo pump,  
1 DTW meter, 1 iPad

PPE - Level D, Nitrile gloves

Weather: Sunny, 79°F, high 85°F.

0910 - Austin Slater onsite at EHF.

0915 - Locate & open wells

0940 - Begin gauging water levels

0955 - Calibrate equipment

1002 - Begin sampling wells with  
EHF-MW001

1200 - Head to EDL site to sample those  
wells.

1345 - Finished sampling at EDL.

Head to CCF to dump water &  
collect IDW sample.

1415 - Collect IDW-2022115 @ pH=7.67

1430 - DS offsite. Will drop samples off  
at Everfins.

\* Note: Drum approx. 40% full.

## General Services Administration Seized Property

11/8/22

Well Gauging November 2022

Well ID	Screen Interval		Sampling	Time Opened	Time Gauged	DTW (ft)	Notes
GSSP-MW0006	5	15		0807	0837	4.57	
GSSP-MW0007	25	35		0808	0838	4.52	
GSSP-MW0008	5	15		0759	0829	2.46	
GSSP-MW0009	25	35		0759	0829	2.71	
GSSP-MW00013	5	15	x	0805	0835	2.22	
GSSP-MW00014	25	35		0805	0835	2.05	
GSSP-MW00019	15	25	x	0840	0910	3.20	
GSSP-MW00020	25	35	x	0840	0910	3.23	
GSSP-MW00021	40	50		0840	0911	2.92	
GSSP-MW00022	15	25		0842	0913	1.89	
GSSP-MW00023	25	35		0842	0913	1.78	
GSSP-MW00024R	15	25	x	<del>0846</del> 0930	1000	1.55	
GSSP-MW00026	5	15		0847	0922	2.80	
GSSP-MW00027	5	15		0848	0923	2.59	
GSSP-MW00034	5	15	x	0936	1008	5.28	
GSSP-MW00035	15	25	x	0936	1008	5.23	
GSSP-MW00036	30	40	x	0936	1009	5.29	
GSSP-MW00039	25	35		0938	1011	5.81	
GSSP-MW00042	30	40		0933	1003	4.64	
GSSP-MW00043R	5	15		0755	0825	3.83	
GSSP-MW00044R	25	35	x	0756	0826	3.90	
GSSP-MW00045	15	25		0808	0938	4.57	
GSSP-MW00047	15	25		0758	0828	2.75	
GSSP-MW00049	55	60		0757	0827	3.82	
GSSP-MW00053	15	25	x	0855	0925	3.12	
GSSP-MW00054	25	35		0855	0925	3.09	
GSSP-MW00055	5	15		0857	0927	2.73	
GSSP-MW00058	10	15		0801	0931	3.68	
GSSP-MW00059	16	21	x	0801	0831	3.88	
GSSP-MW00060	10	15	x	0800	0830	4.15	
GSSP-MW00061	16	21	x	0800	0830	4.30	
GSSP-MW00062	10	15	x	0802	0833	2.99	
GSSP-MW00063	16	21	x	0802	0833	3.08	

## Environmental Health Facility

Well Gauging November 2022

Well ID	Screen Interval		Sampling	Time Opened	Time Gauged	DTW (ft)	Notes
EHF-MW0001	20	30	x	0915	0945	4.21	
EHF-MW0003	25	30		0917	0946	2.15	
EHF-MW0004	15	20	x	0918	0946	0.99	
EHF-MW0005	15	25	x	0920	0947	0.69	
EHF-MW0006	30	35		0921	0943	1.70	
EHF-MW0007	30	35		0922	0948	1.85	

## Engineering Development Laboratory

Well Gauging November 2022

Well ID	Screen Interval		Sampling	Time Opened	Time Gauged	DTW (ft)	Notes
EDL-MW0004	30	40	x	1205	1224	5.03	
EDL-MW0005	30	40		1206	1226	4.25	
EDL-MW0006R	30	40	x	1207	1227	6.45	
EDL-MW0007	30	40		1208	1229	5.38	

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 518550  
Created 11/8/2022

**Sensor RDO**  
Serial Number 960945  
Last Calibrated 11/8/2022

## Calibration Details

Slope 1.072696  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 6.89 mg/L  
Pre Measurement 93.22 %Sat  
Post Measurement 100.00 %Sat  
Temperature 31.69 °C  
Barometric Pressure 1,019.7 mbar

**Sensor Conductivity**  
Serial Number 692436  
Last Calibrated 11/8/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.883  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,613.6 µS/cm  
Specific Conductivity 8,216.1 µS/cm

## Post Measurement

Actual Conductivity 8,387.0 µS/cm  
Specific Conductivity 8,000.0 µS/cm

**Sensor Turbidity**  
Serial Number 641465  
Last Calibrated Factory Defaults

**Sensor pH/ORP**  
Serial Number 723502  
Last Calibrated 11/8/2022

## Calibration Details

Calibration Point 1

pH of Buffer 6.98 pH  
pH mV 5.3 mV  
Temperature 27.53 °C

Pre Measurement

pH 6.97 pH  
pH mV 5.2 mV

Post Measurement

pH 6.98 pH  
pH mV 5.3 mV

Slope and Offset 1

Slope -59.66 mV/pH  
Offset 4.1 mV

ORP

ORP Solution Quick-Cal  
Offset -87.7 mV  
Temperature 27.53 °C  
Pre Measurement 313.8 mV  
Post Measurement 219.7 mV

**Sensor Barometric Pressure**

Serial Number 518550  
Last Calibrated Factory Defaults



# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 11/8/2022

Sensor	RDO
Serial Number	911003
Last Calibrated	11/8/2022

## Calibration Details

Slope 1.034703  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 7.67 mg/L  
Pre Measurement 98.21 %Sat  
Post Measurement 100.00 %Sat  
Temperature 27.71 °C  
Barometric Pressure 1,021.8 mbar

Sensor	Conductivity
Serial Number	673517
Last Calibrated	11/8/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.921  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 8,831.7 µS/cm  
Specific Conductivity 8,548.9 µS/cm

## Post Measurement

Actual Conductivity 8,264.7 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	723210
Last Calibrated	11/8/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 6.98 pH  
pH mV -5.8 mV  
Temperature 26.73 °C

Pre Measurement

pH 6.74 pH  
pH mV -6.3 mV

Post Measurement

pH 6.98 pH  
pH mV -5.9 mV

Slope and Offset 1

Slope -59.5 mV/pH  
Offset -7.0 mV

ORP

ORP Solution Quick-Cal  
Offset -87.8 mV  
Temperature 26.73 °C  
Pre Measurement 254.2 mV  
Post Measurement 220.9 mV

**Sensor Turbidity**

Serial Number 759683  
Last Calibrated Factory Defaults

**Sensor Barometric Pressure**

Serial Number 606696  
Last Calibrated Factory Defaults

# Calibration Report

Instrument Aqua TROLL 600  
Serial Number 606696  
Created 11/15/2022

Sensor	RDO
Serial Number	911003
Last Calibrated	11/15/2022

## Calibration Details

Slope 1.021057  
Offset 0.00 mg/L

## Calibration point 100%

Concentration 8.14 mg/L  
Pre Measurement 101.18 %Sat  
Post Measurement 100.00 %Sat  
Temperature 25.12 °C  
Barometric Pressure 1,021.4 mbar

Sensor	Conductivity
Serial Number	673517
Last Calibrated	11/15/2022

## Calibration Details

TDS Conversion Factor (ppm) 0.65  
Cell Constant 0.936  
Reference Temperature 25.00 °C

## Pre Measurement

Actual Conductivity 7,589.4 µS/cm  
Specific Conductivity 7,869.3 µS/cm

## Post Measurement

Actual Conductivity 7,715.4 µS/cm  
Specific Conductivity 8,000.0 µS/cm

Sensor	pH/ORP
Serial Number	723210
Last Calibrated	11/15/2022

## Calibration Details

## Calibration Point 1

pH of Buffer 7.00 pH  
pH mV -7.6 mV  
Temperature 23.14 °C

Pre Measurement

pH 7.01 pH  
pH mV -7.7 mV

Post Measurement

pH 7.00 pH  
pH mV -7.6 mV

Slope and Offset 1

Slope -58.79 mV/pH  
Offset -7.6 mV

ORP

ORP Solution Quick-Cal  
Offset -70.9 mV  
Temperature 23.14 °C  
Pre Measurement 209.4 mV  
Post Measurement 226.3 mV

**Sensor Turbidity**

Serial Number 759683  
Last Calibrated Factory Defaults

**Sensor Barometric Pressure**

Serial Number 606696  
Last Calibrated Factory Defaults

**APPENDIX C**  
**GROUNDWATER SAMPLING LOGS**



# GROUNDWATER SAMPLING LOG

Event: IA LTM Sept 2021 Kennedy Athletic, Recreational, and Social Park 1  
 Site Name: Industrial Area/Kennedy Athletic Recreation and Social (KARS) Park 1 (SWMU 084)  
 Project #: 60610905

### Sample Information

Sample ID:	KP1-MW0003-003.5-20210916	Date:	9/16/2021 11:09:00 AM
Well ID:	KP1-MW0003	Location Type:	MONITORING WELL
Duplicate ID:		Sampler:	Dustin Slater
Analysis:	Lead		
Comments:			

### Water Level

Date:	9/16/2021 10:52:00 AM	Static Water Level (ft-BTOR):	2.01 FT
Top of Screen (ft-BTOR):	2	Bottom of Screen (ft-BTOR):	12
Measured Well Depth:	NE	Total Depth (ft-BTOR):	12
Is Well Dry?	No	Well Diameter (in):	1
Notes:			

### Purge Information

Begin Date and Time:	9/16/2021 10:53:00 AM	End Date and Time:	9/16/2021 11:09:00 AM
Purge Method:	Peristaltic Pump	Sample Method:	Peristaltic Pump
Notes:			

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
10:53 AM	0									
11:03 AM	0.5	0.05	0.5	28.97	607	6.26	-156.11	1.57	0.3	0.19
11:05 AM	0.6	0.05	0.1	28.93	597	6.24	-157.78	1.69	0.29	0.18
11:07 AM	0.7	0.05	0.1	28.88	585	6.21	-158.84	1.72	0.29	0.16
11:09 AM	0.8	0.05	0.1	28.86	584	6.22	-158.91	1.57	0.29	0.14



# GROUNDWATER SAMPLING LOG

Event: IA LTM Sept 2021 Kennedy Athletic, Recreational, and Social Park 1  
 Site Name: Industrial Area/Kennedy Athletic Recreation and Social (KARS) Park 1 (SWMU 084)  
 Project #: 60610905

Sample Information	
Sample ID: KP1-MW0022-003.5-20210916	Date: 9/16/2021 10:27:00 AM
Well ID: KP1-MW0022	Location Type: MONITORING WELL
Duplicate ID:	Sampler: Dustin Slater
Analysis: Lead	
Comments:	

Water Level	
Date: 9/16/2021 10:09:00 AM	Static Water Level (ft-BTOR): 2.63 FT
Top of Screen (ft-BTOR): 2	Bottom of Screen (ft-BTOR): 12
Measured Well Depth: NE	Total Depth (ft-BTOR): 12
Is Well Dry? No	Well Diameter (in): 1
Notes:	

Purge Information	
Begin Date and Time: 9/16/2021 10:10:00 AM	End Date and Time: 9/16/2021 10:26:00 AM
Purge Method: Peristaltic Pump	Sample Method: Peristaltic Pump
Notes:	

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
10:10 AM	0									
10:20 AM	0.1	0.05	0.1	29.06	2925	5.49	-138.59	17.4	1.54	0.13
10:22 AM	0.2	0.05	0.1	29.05	2925	5.49	-141.52	1.55	1.54	0.13
10:24 AM	0.3	0.05	0.1	29.01	2927	5.49	-141.9	1.65	1.54	0.12
10:26 AM	0.4	0.05	0.1	29.04	2934	5.48	-141.64	1.3	1.55	0.12



# GROUNDWATER SAMPLING LOG

Event: IA LTM Sept 2021 Kennedy Athletic, Recreational, and Social Park 1  
 Site Name: Industrial Area/Kennedy Athletic Recreation and Social (KARS) Park 1 (SWMU 084)  
 Project #: 60610905

Sample Information	
Sample ID: KP1-MW0035-003.0-20210916	Date: 9/16/2021 10:48:00 AM
Well ID: KP1-MW0035	Location Type: MONITORING WELL
Duplicate ID:	Sampler: Dustin Slater
Analysis: Lead	
Comments:	

Water Level	
Date: 9/16/2021 10:30:00 AM	Static Water Level (ft-BTOR): 1.88 FT
Top of Screen (ft-BTOR): 2	Bottom of Screen (ft-BTOR): 12
Measured Well Depth: NE	Total Depth (ft-BTOR): -9999
Is Well Dry? No	Well Diameter (in): 1
Notes:	

Purge Information	
Begin Date and Time: 9/16/2021 10:31:00 AM	End Date and Time: 9/16/2021 10:45:00 AM
Purge Method: Peristaltic Pump	Sample Method: Peristaltic Pump
Notes:	

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
10:31 AM	0									
10:41 AM	0.5	0.05	0.5	28.19	1121	6.38	-145.78	3.07	0.56	0.15
10:43 AM	0.7	0.05	0.1	28.37	1117	6.39	-149.28	1.76	0.56	0.13
10:45 AM	0.8	0.05	0.1	28.35	1120	6.39	-148.4	1.44	0.56	0.13



Event: IA LTM Sept 2021 Orsino Storage Yard  
 Site Name: Industrial Area/Orsino Storage Yard (SWMU 004)  
 Project #: 60610905

Sample Information	
Sample ID: ORSY-EXC-MW0001I-022.5-20210916	Date: 9/16/2021 12:35:00 PM
Well ID: ORSY-EXC-MW0001I	Location Type: MONITORING WELL
Duplicate ID:	Sampler: Dustin Slater
Analysis: 1,2,3-TCB,1,2,3-TCB,1,2,3-TCB,1,2,3-TCB,1,2,4-TCB	
Comments:	

Water Level	
Date: 9/16/2021 12:17:00 PM	Static Water Level (ft-BTOR): 3.38 FT
Top of Screen (ft-BTOR): 20	Bottom of Screen (ft-BTOR): 25
Measured Well Depth: NE	Total Depth (ft-BTOR): 25.3
Is Well Dry? No	Well Diameter (in): 2
Notes:	

Purge Information	
Begin Date and Time: 9/16/2021 12:18:00 PM	End Date and Time: 9/16/2021 12:34:00 PM
Purge Method: Peristaltic Pump	Sample Method: Peristaltic Pump
Notes:	

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
12:18 PM	0									
12:28 PM	0.1	0.05	0.1	27.56	170	7.54	-153.67	3.25	0.08	0.14
12:30 PM	0.2	0.05	0.1	27.48	178	7.48	-158.13	10.91	0.08	0.12
12:32 PM	0.3	0.05	0.1	27.36	180	7.48	-159.48	18.87	0.09	0.11
12:34 PM	0.4	0.05	0.1	27.38	181	7.48	-159.89	10.72	0.09	0.11



# GROUNDWATER SAMPLING LOG

Event: IA LTM Sept 2021 Orsino Storage Yard  
 Site Name: Industrial Area/Orsino Storage Yard (SWMU 004)  
 Project #: 60610905

Sample Information	
Sample ID: ORSY-EXC-MW0003I-022.5-20210916	Date: 9/16/2021 12:13:00 PM
Well ID: ORSY-EXC-MW0003I	Location Type: MONITORING WELL
Duplicate ID:	Sampler: Dustin Slater
Analysis: 1,2,3-TCB,1,2,3-TCB,1,2,3-TCB,1,2,3-TCB,1,2,4-TCB	
Comments:	

Water Level	
Date: 9/16/2021 11:54:00 AM	Static Water Level (ft-BTOR): 6.72 FT
Top of Screen (ft-BTOR): 20	Bottom of Screen (ft-BTOR): 25
Measured Well Depth: NE	Total Depth (ft-BTOR): 25
Is Well Dry? No	Well Diameter (in): 1
Notes:	

Purge Information	
Begin Date and Time: 9/16/2021 11:55:00 AM	End Date and Time: 9/16/2021 12:12:00 PM
Purge Method: Peristaltic Pump	Sample Method: Peristaltic Pump
Notes:	

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
11:56 AM	0									
12:06 PM	0.5	0.05	0.5	27.21	823	6.99	-81.18	1.91	0.41	0.33
12:08 PM	0.6	0.05	0.1	27.19	820	6.99	-85.78	1.71	0.41	0.3
12:10 PM	0.7	0.05	0.1	27.23	814	7.02	-29.26	2.75	0.4	0.71
12:12 PM	0.8	0.05	0.1	27.38	811	7.01	-43.27	1.35	0.4	0.43

Event: IA LTM Sept 2021 Hypergol Maintenance Facility South  
 Site Name: Industrial Area/Hypergol Module Facility South Hazardous Waste Staging Area (SWMU 070)  
 Project #: 60610905

Sample Information	
Sample ID: HMF-MW0006IR-037.5-20210922	Date: 9/22/2021 10:19:00 AM
Well ID: HMF-MW0006IR	Location Type: MONITORING WELL
Duplicate ID:	Sampler: Dustin Slater
Analysis: Select VOCs	
Comments:	

Water Level	
Date: 9/22/2021 9:50:00 AM	Static Water Level (ft-BTOR): 4.08 FT
Top of Screen (ft-BTOR): 35	Bottom of Screen (ft-BTOR): 40
Measured Well Depth: NE	Total Depth (ft-BTOR):
Is Well Dry? No	Well Diameter (in): 1
Notes:	

Purge Information	
Begin Date and Time: 9/22/2021 9:52:00 AM	End Date and Time: 9/22/2021 10:18:00 AM
Purge Method: Peristaltic Pump	Sample Method: Peristaltic Pump
Notes:	

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
9:52 AM	0									
10:12 AM	1	0.05	1	31.98	7987	6.43	-81.97	5.77	3.88	0.98
10:14 AM	1.1	0.05	0.1	32	8022	6.5	-87.54	4.54	3.92	0.97
10:16 AM	1.2	0.05	0.1	32.06	8058	6.51	-90.65	4.06	3.93	1.05
10:18 AM	1.3	0.05	0.1	32.11	8077	6.52	-91.65	4.65	3.98	1.02



# GROUNDWATER SAMPLING LOG

Event: IA LTM Sept 2021 Hypergol Maintenance Facility South  
 Site Name: Industrial Area/Hypergol Module Facility South Hazardous Waste Staging Area (SWMU 070)  
 Project #: 60610905

### Sample Information

Sample ID:	HMF-NLP-IW0004I-037.5-20210922	Date:	9/22/2021 9:37:00 AM
Well ID:	HMF-NLP-IW0004I	Location Type:	MONITORING WELL
Duplicate ID:		Sampler:	Dustin Slater
Analysis:	Select VOCs		
Comments:			

### Water Level

Date:	9/22/2021 9:08:00 AM	Static Water Level (ft-BTOR):	3.08 FT
Top of Screen (ft-BTOR):	35	Bottom of Screen (ft-BTOR):	40
Measured Well Depth:	40.00 ft	Total Depth (ft-BTOR):	40
Is Well Dry?	No	Well Diameter (in):	1
Notes:			

### Purge Information

Begin Date and Time:	9/22/2021 9:10:00 AM	End Date and Time:	9/22/2021 9:36:00 AM
Purge Method:	Peristaltic Pump	Sample Method:	Peristaltic Pump
Notes:			

Time	Cumulative Volume Purged (gal)	Purge Rate (gal/min)	Volume Purged (gal)	TEMPERATURE (C)	Specific conductivity (FLD) (US/CM)	pH (S.U.)	OXIDATION REDUCTION POTENTIAL (MV)	Turbidity (FLD) (NTU)	SALINITY (PSU)	DISSOLVED OXYGEN (MG/L)
9:10 AM	0									
9:30 AM	1	0.05	1	31.1	8539	6.63	-78.71	7.87	4.82	1.38
9:32 AM	1.1	0.05	0.1	32.49	8509	6.65	-55.69	7.12	4.8	1.47
9:34 AM	1.2	0.05	0.1	32.65	8397	6.65	-31.17	7.98	4.73	1.53
9:36 AM	1.3	0.05	0.1	32.56	8397	6.65	-28.41	6.54	4.73	1.5

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0013-010.0-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0013      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	0.83
Top of Screen (ft-BTOR):	5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	14:15				0.83									
11/22/2021	14:35	0.05	1	1	0.9	6.75	576.8	0.29	1.84	22.82	-247.4	0.28		
11/22/2021	14:37	0.05	0.1	1.1	0.9	6.75	579.6	0.34	2.13	22.89	-245.2	0.28		
11/22/2021	14:39	0.05	0.1	1.2	0.9	6.64	510.3	0.47	1.87	22.89	-242.9	0.25		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:15	14:39	24	1.2	6.64	510.3	0.47	1.87	22.89	-242.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0019-020.0-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0019      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.88
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	24.26	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	15:14			0	1.88									
11/22/2021	15:34	0.05	1	1	1.9	6.79	829.4	0.13	2.76	25.45	-143.9	0.41		
11/22/2021	15:36	0.05	0.1	1.1	1.9	6.75	798.2	0.09	1.78	25.41	-149.2	0.40		
11/22/2021	15:38	0.05	0.1	1.2	1.9	6.74	797.7	0.08	1.87	25.45	-150.9	0.40		
11/22/2021	15:40	0.05	0.1	1.3	1.9	6.72	797.4	0.08	1.71	25.41	-151.0	0.40		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:14	15:40	26	1.3	6.72	797.4	0.08	1.71	25.41	-151.0

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0020-030.0-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0020      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.91
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	34.23	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	15:49			0	1.91									
11/22/2021	16:09	0.05	1	1	1.97	6.74	850.5	0.06	5.72	24.92	-174.5	0.42		
11/22/2021	16:11	0.05	0.1	1.1	1.97	6.74	850.5	0.06	6.52	24.92	-175.5	0.42		
11/22/2021	16:13	0.05	0.1	1.2	1.97	6.74	850.0	0.06	3.96	24.87	-176.8	0.42		
11/22/2021	16:15	0.05	0.1	1.3	1.97	6.75	849.8	0.06	4.91	24.85	-177.1	0.42		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:49	16:15	26	1.3	6.75	849.8	0.06	4.91	24.85	-177.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0024R-020.0-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0024R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	0.27
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Select PAHs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	16:59			0	0.27									
11/22/2021	17:19	0.05	1	1	1.24	6.17	109.5	1.43	11.06	21.36	-39.8	0.05		
11/22/2021	17:21	0.05	0.1	1.1	1.24	6.16	109.5	1.42	9.46	21.31	-39.9	0.05		
11/22/2021	17:23	0.05	0.1	1.2	1.24	6.17	109.4	1.41	5.83	21.32	-39.9	0.05		
11/22/2021	17:25	0.05	0.1	1.3	1.24	6.16	109.5	1.41	7.18	21.32	-40.1	0.05		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:59	17:25	26	1.3	6.16	109.5	1.41	7.18	21.32	-40.1



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0034-010.0-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0034      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.18
Top of Screen (ft-BTOR):	5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	16:25				4.18									
11/22/2021	16:45	0.05	1	1	4.19	6.51	433.3	0.05	1.11	22.77	-161.2	0.21		
11/22/2021	16:47	0.05	0.1	1.1	4.19	6.52	440.6	0.05	0.98	22.82	-164.1	0.21		
11/22/2021	16:49	0.05	0.1	1.2	4.19	6.53	441.9	0.05	0.95	22.80	-166.6	0.22		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:25	16:49	24	1.2	6.53	441.9	0.05	0.95	22.80	-166.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0035-020.0-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0035      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.1
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Select PAHs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	15:55				4.1									
11/22/2021	16:15	0.05	1	1	4.11	7.26	844.4	0.06	4.11	22.62	-127.7	0.42		
11/22/2021	16:17	0.05	0.1	1.1	4.11	7.27	843.1	0.07	2.08	22.58	-128.2	0.42		
11/22/2021	16:19	0.05	0.1	1.2	4.11	7.26	844.0	0.06	2.43	22.59	-128.8	0.42		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:55	16:19	24	1.2	7.26	844.0	0.06	2.43	22.59	-128.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0036-035.0-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0036      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.23
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	15:25				4.23									
11/22/2021	15:45	0.05	1	1	4.24	7.33	1085.5	0.08	0.77	22.46	-111.1	0.54		
11/22/2021	15:47	0.05	0.1	1.1	4.24	7.34	1092.6	0.08	0.93	22.41	-113.2	0.55		
11/22/2021	15:49	0.05	0.1	1.2	4.24	7.34	1120.6	0.07	0.17	22.46	-115.0	0.56		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:25	15:49	24	1.2	7.34	1120.6	0.07	0.17	22.46	-115.0

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0044R-030.0-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0044R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.44
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	34.05	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	12:06			0	2.44									
11/22/2021	12:26	0.05	1	1	2.52	6.76	799.0	0.11	1.61	25.04	-148.9	0.40		
11/22/2021	12:28	0.05	0.1	1.1	2.52	6.76	790.0	0.11	1.62	24.98	-153.2	0.39		
11/22/2021	12:30	0.05	0.1	1.2	2.52	6.76	791.0	0.11	1.62	25.07	-154.9	0.39		
11/22/2021	12:32	0.05	0.1	1.3	2.52	6.76	790.9	0.10	1.58	25.09	-156.4	0.39		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:06	12:32	26	1.3	6.76	790.9	0.10	1.58	25.09	-156.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0053-020.0-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0053      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.93
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	24.12	Sample Analysis:	Select VOCs, Select PAHs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	16:25			0	1.93									
11/22/2021	16:40	0.05	0.75	0.75	1.99	6.85	887.7	0.07	18.07	25.39	-189.7	0.44		
11/22/2021	16:45	0.05	0.25	1	1.99	6.85	889.6	0.07	18.68	25.41	-186.8	0.44		
11/22/2021	16:47	0.05	0.1	1.1	1.99	6.86	887.0	0.07	19.94	25.44	-190.8	0.44		
11/22/2021	16:49	0.05	0.1	1.2	1.99	6.87	887.1	0.07	14.52	25.41	-191.4	0.44		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
16:25	16:49	24	1.2	6.87	887.1	0.07	14.52	25.41	-191.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0059-018.5-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0059      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.45
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	21	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	13:35				2.45									
11/22/2021	13:55	0.05	1	1	2.46	6.99	1121.8	0.07	1.45	25.20	-292.0	0.56		
11/22/2021	13:57	0.05	0.1	1.1	2.46	6.99	1122.5	0.07	1.03	25.23	-294.2	0.56		
11/22/2021	13:59	0.05	0.1	1.2	2.46	6.98	1128.7	0.07	1.05	25.19	-296.7	0.57		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:35	13:59	24	1.2	6.98	1128.7	0.07	1.05	25.19	-296.7

# GROUNDWATER SAMPLE LOG SHEET



**Event:** Kennedy Space Center IA LTM  
**Site Name:** Industrial Area/General Services Administration Seized Property (SWMU 95)  
**Project No:** 60610905

**Sample ID:** GSSP-MW0060-012.5-20211122      **Sampler:** Greg Kusel  
**Well ID:** GSSP-MW0060      **Well Type:** Monitoring Well  
**Remark:**

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.7
Top of Screen (ft-BTOR):	10	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	12:51				2.7									
11/22/2021	13:11	0.05	1	1	2.71	6.36	351.3	0.65	4.45	23.66	-107.1	0.12		
11/22/2021	13:13	0.05	0.1	1.1	2.71	6.35	357.5	0.68	3.4	23.73	-131.3	0.15		
11/22/2021	13:15	0.05	0.1	1.2	2.71	6.44	366.1	0.68	2.63	23.73	-152.1	0.18		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:51	13:15	24	1.2	6.44	366.1	0.68	2.63	23.73	-152.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0061-018.5-20211122      Sampler: Greg Kusel  
 Well ID: GSSP-MW0061      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.89
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	21	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	12:19				2.89									
11/22/2021	12:39	0.05	1	1	2.9	7.13	839.8	0.15	1.35	23.26	-115.9	0.42		
11/22/2021	12:41	0.05	0.1	1.1	2.9	7.14	850.5	0.13	1.45	23.20	-125.0	0.42		
11/22/2021	12:43	0.05	0.1	1.2	2.9	7.13	861.4	0.09	1.37	23.35	-130.2	0.43		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:19	12:43	24	1.2	7.13	861.4	0.09	1.37	23.35	-130.2



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0062-012.5-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0062      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.65
Top of Screen (ft-BTOR):	10	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	14.16	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	13:20			0	1.65									
11/22/2021	14:00	0.05	2	2	1.7	7.09	205.8	4.79	251.25	24.35	44.2	0.10		
11/22/2021	14:20	0.05	1	3	1.7	6.89	529.8	0.07	19.39	24.39	-189.7	0.26		
11/22/2021	14:22	0.05	0.2	3.2	1.7	6.89	543.4	0.07	19.05	24.57	-191.4	0.27		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:20	14:22	62	3.2	6.89	543.4	0.07	19.05	24.57	-191.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0063-018.5-20211122      Sampler: Dustin Slater  
 Well ID: GSSP-MW0063      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	1.74
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	19.98	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/22/2021	14:38			0	1.74									
11/22/2021	14:58	0.05	1	1	1.77	7.85	184.0	0.19	11.27	24.75	-31.5	0.09		
11/22/2021	15:00	0.05	0.1	1.1	1.77	7.86	184.7	0.18	11.00	24.76	-31.9	0.09		
11/22/2021	15:02	0.05	0.1	1.2	1.77	7.85	185.4	0.18	10.96	24.79	-31.8	0.09		
11/22/2021	15:04	0.05	0.1	1.3	1.77	7.86	186.0	0.19	10.38	24.75	-32.2	0.09		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:38	15:04	26	1.3	7.86	186.0	0.19	10.38	24.75	-32.2

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-MW0001-025.0-20211123      Sampler: Greg Kusel  
 Well ID: LETF-MW0001      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.45
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	27.5	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	9:45				5.45									
11/23/2021	10:05	0.05	1	1	5.7	6.58	2958.5	0.08	7.89	25.66	-96.2	1.56		
11/23/2021	10:07	0.05	0.1	1.1	5.7	6.57	2944.1	0.08	1.96	25.64	-96.8	1.55		
11/23/2021	10:09	0.05	0.1	1.2	5.7	6.57	2983.8	0.07	4.87	25.66	-96.8	1.57		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:45	10:09	24	1.2	6.57	2983.8	0.07	4.87	25.66	-96.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-MW0002-025.0-20211123      Sampler: Greg Kusel  
 Well ID: LETF-MW0002      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.34
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	27.5	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	11:10				5.34									
11/23/2021	11:30	0.05	1	1	5.45	6.77	1323.7	0.13	1.01	21.45	-43.9	0.67		
11/23/2021	11:32	0.05	0.1	1.1	5.45	6.77	1320.7	0.15	2.17	21.62	-44.9	0.67		
11/23/2021	11:34	0.05	0.1	1.2	5.45	6.77	1329.4	0.13	2.35	21.62	-45.9	0.67		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:10	11:34	24	1.2	6.77	1329.4	0.13	2.35	21.62	-45.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-MW0005-025.0-20211123      Sampler: Dustin Slater  
 Well ID: LETF-MW0005      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.55
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	27.5	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	11:03			0	5.55									
11/23/2021	11:23	0.05	1	1	5.78	6.53	975.6	0.07	1.92	25.37	-64.7	0.49		
11/23/2021	11:25	0.05	0.1	1.1	5.78	6.55	973.8	0.07	2.03	25.39	-66.0	0.49		
11/23/2021	11:27	0.05	0.1	1.2	5.78	6.55	977.9	0.07	1.85	25.27	-66.8	0.49		
11/23/2021	11:29	0.05	0.1	1.3	5.78	6.54	977.5	0.07	1.97	25.38	-66.8	0.49		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:03	11:29	26	1.3	6.54	977.5	0.07	1.97	25.38	-66.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-MW0007-036.0-20211123      Sampler: Greg Kusel  
 Well ID: LETF-MW0007      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.28
Top of Screen (ft-BTOR):	33.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	38.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	38.5	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	10:25				5.28									
11/23/2021	10:45	0.05	1	1	5.63	6.71	3589.8	0.23	6.66	25.81	-64.5	1.91		
11/23/2021	10:47	0.05	0.1	1.1	5.63	6.70	3596.1	0.15	2.95	25.68	-65.0	1.92		
11/23/2021	10:49	0.05	0.1	1.2	5.63	6.71	3607.2	0.09	5.87	25.74	-66.1	1.92		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:25	10:49	24	1.2	6.71	3607.2	0.09	5.87	25.74	-66.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-PSB-MW0001I-024.5-20211123      Sampler: Dustin Slater  
 Well ID: LETF-PSB-MW0001I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.75
Top of Screen (ft-BTOR):	20	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	10:28			0	4.75									
11/23/2021	10:48	0.05	1	1	5.11	6.39	2809.7	0.05	15.32	21.83	-123.4	1.48		
11/23/2021	10:50	0.05	0.1	1.1	5.11	6.39	2813.1	0.05	14.18	22.19	-124.4	1.48		
11/23/2021	10:52	0.05	0.1	1.2	5.11	6.39	2800.3	0.04	10.53	22.15	-125.2	1.47		
11/23/2021	10:54	0.05	0.1	1.3	5.11	6.39	2821.7	0.04	7.55	21.99	-124.8	1.48		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:28	10:54	26	1.3	6.39	2821.7	0.04	7.55	21.99	-124.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Launch Equipment Test Facility (SWMU 91)  
 Project No: 60610905

Sample ID: LETF-PSB-MW0002I-024.5-20211123      Sampler: Dustin Slater  
 Well ID: LETF-PSB-MW0002I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.66
Top of Screen (ft-BTOR):	20	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/23/2021	9:41			0	2.66									
11/23/2021	10:01	0.05	1	1	2.8	6.73	1052.9	0.10	24.88	23.46	-95.2	0.53		
11/23/2021	10:11	0.05	0.5	1.5	2.8	6.74	1068.4	0.09	7.02	23.18	-94.8	0.54		
11/23/2021	10:13	0.05	0.1	1.6	2.8	6.73	1079.0	0.09	16.05	23.21	-94.5	0.54		
11/23/2021	10:15	0.05	0.1	1.7	2.8	6.73	1066.1	0.09	17.51	23.32	-97.1	0.53		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:41	10:15	34	1.7	6.73	1066.1	0.09	17.51	23.32	-97.1



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0001-005.0-20211130      Sampler: Dustin Slater  
 Well ID: FSA1-MW0001      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.05
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.63	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	10:35			0	4.05									
11/30/2021	10:45	0.05	0.5	0.5	N/A	6.74	693.8	0.44	1.89	25.70	-117.2	0.34		
11/30/2021	10:47	0.05	0.1	0.6	N/A	6.76	693.5	0.38	1.95	25.78	-119.4	0.34		
11/30/2021	10:49	0.05	0.1	0.7	N/A	6.74	702.7	0.34	2.64	25.82	-120.3	0.35		
11/30/2021	10:51	0.05	0.1	0.8	N/A	6.77	695.6	0.34	1.95	25.80	-122.1	0.34		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:35	10:51	16	0.8	6.77	695.6	0.34	1.95	25.80	-122.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0002-004.5-20211130      Sampler: Dustin Slater  
 Well ID: FSA1-MW0002      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	3.35
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.73	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	11:02			0	3.35									
11/30/2021	11:12	0.05	0.5	0.5	N/A	6.72	589.4	0.22	2.30	25.06	-66.9	0.29		
11/30/2021	11:14	0.05	0.1	0.6	N/A	6.75	600.5	0.21	2.02	24.99	-69.2	0.29		
11/30/2021	11:16	0.05	0.1	0.7	N/A	6.77	599.8	0.19	1.95	25.02	-70.1	0.29		
11/30/2021	11:18	0.05	0.1	0.8	N/A	6.77	599.9	0.19	1.98	25.01	-70.9	0.29		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:02	11:18	16	0.8	6.77	599.9	0.19	1.98	25.01	-70.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0012R-005.5-20211130      Sampler: Dustin Slater  
 Well ID: FSA1-MW0012R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.32
Top of Screen (ft-BTOR):	3	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	13	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	13	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	10:00			0	4.32									
11/30/2021	10:20	0.05	1	1	4.61	7.07	421.8	0.11	2.17	26.33	-129.5	0.20		
11/30/2021	10:22	0.05	0.1	1.2	4.61	7.11	422.9	0.11	3.04	26.35	-133.8	0.21		
11/30/2021	10:24	0.05	0.1	1.3	4.61	7.08	423.2	0.11	1.95	26.34	-132.7	0.21		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:00	10:24	24	1.3	7.08	423.2	0.11	1.95	26.34	-132.7

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0014-005.5-20211130      Sampler: Dustin Slater  
 Well ID: FSA1-MW0014      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.5
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	9:25			0	4.5									
11/30/2021	9:43	0.07	1.25	1.25	4.58	7.06	365.4	0.12	17.68	26.62	-118.1	0.18		
11/30/2021	9:45	0.07	0.14	1.39	4.58	7.05	363.6	0.11	2.74	26.46	-118.2	0.18		
11/30/2021	9:47	0.07	0.14	1.53	4.58	7.04	364.4	0.11	2.29	26.46	-120.3	0.18		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:25	9:47	22	1.53	7.04	364.4	0.11	2.29	26.46	-120.3

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0021-004.0-20211130      Sampler: Greg Kusel  
 Well ID: FSA1-MW0021      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.03
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.65	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	11:25				3.03									
11/30/2021	11:45	0.05	1	1	3.63	7.01	808.7	0.40	0.16	24.43	-126.5	0.40		
11/30/2021	11:47	0.05	0.1	1.1	3.63	7.02	797.3	0.49	0.07	24.26	-126.2	0.40		
11/30/2021	11:49	0.05	0.1	1.2	3.63	7.02	793.7	0.39	0.26	24.44	-126.9	0.39		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:25	11:49	24	1.2	7.02	793.7	0.39	0.26	24.44	-126.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0022R-005.0-20211130      Sampler: Greg Kusel  
 Well ID: FSA1-MW0022R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.59
Top of Screen (ft-BTOR):	3	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	13	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12.55	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	10:45		0.1	1.2	4.59	7.28	631.9	0.47	7.21	24.47	-123.6	0.31		
11/30/2021	11:05	0.05	1	1	4.75	7.28	635.1	0.25	7.94	24.47	-126.2	0.31		
11/30/2021	11:07	0.05	0.1	1.1	4.75	7.29	631.6	0.60	6.74	24.32	-126.3	0.31		
11/30/2021	11:09	0.05	0.1	1.2	4.75	7.28	631.9	0.47	7.21	24.47	-123.6	0.31		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:45	11:09	24	1.2	7.28	631.9	0.47	7.21	24.47	-123.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0023-005.5-20211130      Sampler: Dustin Slater  
 Well ID: FSA1-MW0023      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.85
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.81	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	11:32			0	3.85									
11/30/2021	11:52	0.05	1	1	4.78	7.01	479.1	0.66	1.71	24.81	-87.2	0.23		
11/30/2021	11:54	0.05	0.1	1.1	4.78	7.02	475.3	0.65	1.73	24.80	-88.2	0.23		
11/30/2021	11:56	0.05	0.1	1.2	4.78	7.04	473.3	0.62	1.75	24.72	-87.8	0.23		
11/30/2021	11:58	0.05	0.1	1.3	4.78	7.03	473.6	0.62	1.77	24.68	-88.1	0.23		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:32	11:58	26	1.3	7.03	473.6	0.62	1.77	24.68	-88.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0027-020.0-20211130      Sampler: Greg Kusel  
 Well ID: FSA1-MW0027      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.85
Top of Screen (ft-BTOR):	14.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	24.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	23.92	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	10:10				4.85									
11/30/2021	10:30	0.05	1	1	4.92	7.32	913.5	0.09	6.71	24.78	-156.3	0.46		
11/30/2021	10:32	0.05	0.1	1.1	4.92	7.32	931.9	0.09	3.06	24.93	-155.6	0.46		
11/30/2021	10:34	0.05	0.1	1.2	4.92	7.32	919.6	0.09	3.56	24.81	-155.8	0.46		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:10	10:34	24	1.2	7.32	919.6	0.09	3.56	24.81	-155.8



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Fuel Storage Area #1 Underground Storage Tank (SWMU C057)  
 Project No: 60610905

Sample ID: FSA1-MW0028-020.0-20211130      Sampler: Greg Kusel  
 Well ID: FSA1-MW0028      Well Type: Monitoring Well  
 Remark: Well coordinates and TOC elevation TBD

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.62
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/30/2021	9:25				4.62									
11/30/2021	9:45	0.05	1	1	4.68	7.60	3416.4	0.07	3.70	24.50	-213.9	1.82		
11/30/2021	9:47	0.05	0.1	1.1	4.68	7.59	3465.2	0.08	3.50	24.50	-219.0	1.84		
11/30/2021	9:49	0.05	0.1	1.2	4.68	7.58	3470.1	0.07	1.16	24.55	-234.7	1.85		

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:25	9:49	24	1.2	7.58	3470.1	0.07	1.16	24.55	-234.7

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Ransom Road Landfill (SWMU 003)  
 Project No: 60610905

Sample ID: RRLF-MW0033-027.5-20220510      Sampler: Dustin Slater  
 Well ID: RRLF-MW0033      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.81
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	30	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	32.51	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	11:21			0	4.82								Clear	None
5/10/2022	11:41	0.05	1	1	4.89	6.76	415.1	0.86	1.38	22.4	-47.1	3.52	Clear	None
5/10/2022	11:43	0.05	0.1	1.1	4.89	6.76	419.9	0.63	1.14	22.4	-53.1	3.55	Clear	None
5/10/2022	11:45	0.05	0.1	1.2	4.89	6.75	423.3	0.5	1.08	22.4	-55.5	3.58	Clear	None
5/10/2022	11:47	0.05	0.1	1.3	4.89	6.75	426.5	0.45	0.98	22.5	-57.9	3.61	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:21	11:47	26	1.3	6.75	426.5	0.45	0.98	22.5	-57.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Ransom Road Landfill (SWMU 003)  
 Project No: 60610905

Sample ID: RRLF-MW0038I-024.5-20220510      Sampler: Greg Kusel  
 Well ID: RRLF-MW0038I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.34
Top of Screen (ft-BTOR):	22	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	29.81	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	11:20	0.05		0	5.34								Clear	None
5/10/2022	11:30	0.05	0.5	0.5	5.42	6.77	7309.4	0.14	8.28	22.63	-32.2	4.08	Clear	None
5/10/2022	11:32	0.05	0.1	0.6	5.42	6.76	7308.5	0.13	18.82	22.64	-41.6	4.08	Clear	None
5/10/2022	11:34	0.05	0.1	0.7	5.42	6.76	7288.6	0.13	11.87	22.60	-51.9	4.07	Clear	None
5/10/2022	11:36	0.05	0.1	0.8	5.42	6.76	7294.6	0.12	4.72	22.71	-58.6	4.07	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:20	11:36	16	0.8	6.76	7294.6	0.12	4.72	22.71	-58.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Ransom Road Landfill (SWMU 003)  
 Project No: 60610905

Sample ID: RRLF-MW0039I-024.5-20220510      Sampler: Greg Kusel  
 Well ID: RRLF-MW0039I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.8
Top of Screen (ft-BTOR):	22	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	29.95	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	11:50	0.5		0	4.8								Clear	None
5/10/2022	12:05	0.05	0.75	0.75	4.87	7.03	8255.8	6.33	5.84	24.05	106.2	4.65	Clear	None
5/10/2022	12:07	0.05	0.1	0.85	4.87	7.03	8260.5	6.35	3.70	24.21	107.3	4.65	Clear	None
5/10/2022	12:09	0.05	0.1	0.95	4.87	7.03	8260.8	6.33	5.69	24.38	107.8	4.65	Clear	None
5/10/2022	12:11	0.05	0.1	1.05	4.87	7.03	8264.0	6.37	5.54	24.39	109.0	4.66	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:50	12:11	21	1.05	7.03	8264.0	6.37	5.54	24.39	109.0

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Ransom Road Landfill (SWMU 003)  
 Project No: 60610905

Sample ID: RRLF-MW0040I-024.5-20220510      Sampler: Dustin Slater  
 Well ID: RRLF-MW0040I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.31
Top of Screen (ft-BTOR):	22	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	30.4	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	12:02			0	5.31								Clear	None
5/10/2022	12:22	0.05	1	1	5.36	6.85	7130	0.33	6.03	25.2	88.5	3.91	Clear	None
5/10/2022	12:24	0.05	0.1	1.1	5.36	6.78	7164	0.31	4.77	25.3	80.7	3.92	Clear	None
5/10/2022	12:26	0.05	0.1	1.2	5.36	6.74	7187	0.37	3.99	25.3	68.4	4	Clear	None
5/10/2022	12:28	0.05	0.1	1.3	5.36	6.7	7195	0.3	3.32	25.3	54	4	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:02	12:28	26	1.3	6.7	7195	0.3	3.32	25.3	54

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0013-025.5-20220511      Sampler: Greg Kusel  
 Well ID: M505-MW0013      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	6.82
Top of Screen (ft-BTOR):	23	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	28	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	28.02	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	10:30	0.05		0	6.82								Clear	None
5/11/2022	10:40	0.05	0.5	0.5	6.96	6.93	235.4	0.20	16.12	25.70	-61.6	0.11	Clear	None
5/11/2022	10:42	0.05	0.1	0.6	6.96	6.92	232.6	0.16	4.19	25.82	-150.2	0.11	Clear	None
5/11/2022	10:44	0.05	0.1	0.7	6.96	6.89	233.5	0.15	5.94	25.86	-153.3	0.11	Clear	None
5/11/2022	10:46	0.05	0.1	0.8	6.96	6.88	232.3	0.12	2.80	25.99	-162.1	0.11	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:30	10:46	16	0.8	6.88	232.3	0.12	2.80	25.99	-162.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0032-035.0-20220511      Sampler: Dustin Slater  
 Well ID: M505-MW0032      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	8.78
Top of Screen (ft-BTOR):	32.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	37.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	40.61	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	11:30			0	8.78								Clear	None
5/11/2022	11:45	0.05	0.75	0.75	8.94	6.98	2813	0.46	5.63	25.5	-105.4	1.44	Clear	None
5/11/2022	11:47	0.05	0.1	0.85	8.94	6.98	2828	0.37	5.11	25.6	-104.3	1.45	Clear	None
5/11/2022	11:49	0.05	0.1	0.95	8.94	6.99	2832	0.34	3.66	25.6	-103.9	1.45	Clear	None
5/11/2022	11:51	0.05	0.1	1.05	8.94	6.99	2833	0.34	3.21	25.6	-103.5	1.45	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:30	11:51	21	1.05	6.99	2833	0.34	3.21	25.6	-103.5

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0033-025.0-20220511      Sampler: Dustin Slater  
 Well ID: M505-MW0033      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	8.7
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	30.72	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	11:58			0	8.7								Clear	None
5/11/2022	12:08	0.05	0.5	0.5	8.79	6.49	2209	0.43	5.33	25.2	-76.8	1.13	Clear	None
5/11/2022	12:10	0.05	0.1	0.6	7.89	6.49	2220	0.41	4.96	25.2	-74.6	1.13	Clear	None
5/11/2022	12:12	0.05	0.1	0.7	7.89	6.48	2227	0.39	3.65	25.3	-73	1.13	Clear	None
5/11/2022	12:14	0.05	0.1	0.8	7.89	6.47	2234	0.36	3.09	25.4	-72.2	1.13	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:58	12:14	16	0.8	6.47	2234	0.36	3.09	25.4	-72.2



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0039-032.5-20220511      Sampler: Greg Kusel  
 Well ID: M505-MW0039      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.88
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	38.02	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	11:18	0.05		0	5.88								Clear	None
5/11/2022	11:28	0.05	0.5	0.5	6.26	7.38	710.7	8.05	9.07	26.56	-138.6	0.35	Clear	None
5/11/2022	11:30	0.05	0.1	0.6	6.26	6.79	964.8	0.21	14.43	25.62	-196.5	0.48	Clear	None
5/11/2022	11:32	0.05	0.1	0.7	6.96	6.77	1000.2	0.18	10.69	25.60	-197.3	0.50	Clear	None
5/11/2022	11:34	0.05	0.1	0.8	6.96	6.76	1002.9	0.14	10.53	25.61	-194.3	0.51	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:18	11:34	16	0.8	6.76	1002.9	0.14	10.53	25.61	-194.3

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0049-009.0-20220511      Sampler: Dustin Slater  
 Well ID: M505-MW0049      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	8.2
Top of Screen (ft-BTOR):	20	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	32.95	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	10:31			0	8.2								Clear	None
5/11/2022	10:56	0.05	1.25	1.25	5.29	6.84	2221	0.4	4.94	25.1	-119.2	1.13	Clear	None
5/11/2022	11:02	0.05	0.3	1.55	5.29	6.83	2230	0.41	3.76	25.2	-119.6	1.14	Clear	None
5/11/2022	11:08	0.05	0.3	1.85	5.29	6.82	2241	0.37	2.98	25.2	-123.8	1.15	Clear	None
5/11/2022	11:14	0.05	0.3	2.15	5.29	6.82	2244	0.34	2.54	25.3	-124.6	1.15	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:31	11:14	43	2.15	6.82	2244	0.34	2.54	25.3	-124.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0051-025.0-20220511      Sampler: Dustin Slater  
 Well ID: M505-MW0051      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	7.77
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	31.38	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	12:22			0	7.77								Clear	None
5/11/2022	12:32	0.05	0.5	0.5	8.09	6.71	2693	0.92	3.48	25	-80	1.4	Clear	None
5/11/2022	12:34	0.05	0.1	0.6	8.09	6.7	2711	0.79	3.07	25	-81.4	1.4	Clear	None
5/11/2022	12:36	0.05	0.1	0.7	8.09	6.7	2719	0.86	2.98	25.1	-83	1.41	Clear	None
5/11/2022	12:38	0.05	0.1	0.8	8.09	6.68	2724	0.85	2.9	25.1	-82.1	1.41	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:22	12:38	16	0.8	6.68	2724	0.85	2.9	25.1	-82.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0055-025.0-20220511      Sampler: Greg Kusel  
 Well ID: M505-MW0055      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	7.72
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	27.93	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	12:18	0.05		0	7.72								Clear	None
5/11/2022	12:28	0.05	0.5	0.5	8.07	6.67	2645.1	0.66	4.19	24.09	-161.3	1.39	Clear	None
5/11/2022	12:30	0.05	0.1	0.6	8.07	6.69	2654.7	0.21	7.98	23.84	-169.3	1.39	Clear	None
5/11/2022	12:32	0.05	0.1	0.7	8.07	6.63	2646.4	0.15	10.20	23.98	-171.9	1.39	Clear	None
5/11/2022	12:36	0.05	0.1	0.8	8.07	6.64	2640.9	0.15	9.19	24.00	-141.6	1.38	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:18	12:36	18	0.8	6.64	2640.9	0.15	9.19	24.00	-141.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Building M7-505 (SWMU 039)  
 Project No: 60610905

Sample ID: M505-MW0059-025.0-20220511      Sampler: Greg Kusel  
 Well ID: M505-MW0059      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.74
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	26.6	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	11:50	0.05		0	4.74								Clear	None
5/11/2022	12:00	0.05	0.1	0.1	4.9	6.68	1149.5	0.18	13.82	25.80	-154.5	0.58	Clear	None
5/11/2022	12:02	0.05	0.1	0.2	4.9	6.74	1156.7	0.29	10.09	25.86	-144.6	0.58	Clear	None
5/11/2022	12:04	0.05	0.1	0.3	4.9	6.68	1156.5	0.20	7.93	25.81	-153.4	0.58	Clear	None
5/11/2022	12:06	0.05	0.1	0.4	4.9	6.66	1148.0	0.17	10.21	25.70	-158.6	0.58	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:50	12:06	16	0.4	6.66	1148.0	0.17	10.21	25.70	-158.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Operations and Checkout Building (SWMU 076)  
 Project No: 60610905

Sample ID: O\_C-MW0005I-042.5-20220509      Sampler: Dustin Slater  
 Well ID: O\_C-MW0005I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	7.88
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	43.72	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	13:51			0	7.88								Clear	None
5/9/2022	14:11	0.05	1	1	7.9	6.7	1007	0.76	3.47	27.7	-62.8	0.45	Clear	None
5/9/2022	14:13	0.05	0.1	1.1	7.9	6.69	1013	0.65	2.97	27.6	-70.4	0.46	Clear	None
5/9/2022	14:15	0.05	0.1	1.2	7.9	6.68	1025	0.65	2.99	27.5	-74.1	0.51	Clear	None
5/9/2022	14:17	0.05	0.1	1.3	7.9	6.68	1028	0.74	2.76	27.5	-77	0.52	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:51	14:17	26	1.3	6.68	1028	0.74	2.76	27.5	-77

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Operations and Checkout Building (SWMU 076)  
 Project No: 60610905

Sample ID: O\_C-MW0007I-042.5-20220509      Sampler: Greg Kusel  
 Well ID: O\_C-MW0007I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.76
Top of Screen (ft-BTOR):	40	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	45	Sample Analysis:	VC Only

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	13:57			0	4.76								Gray	None
5/9/2022	14:12	0.1	1.5	1.5	5.03								Gray	None
5/9/2022	14:27	0.1	1.5	3.0	5.03	6.68	1434.2	0.21	456.81	26.71	-204.0	0.73	Gray	None
5/9/2022	14:42	0.05	0.75	3.75	4.87	7.15	1255.7	7.84	23.29	26.93	-183.7	0.63	Clear	None
5/9/2022	14:44	0.05	0.1	3.85	4.87	6.69	1408.6	0.24	18.41	26.80	-179.6	0.71	Clear	None
5/9/2022	14:46	0.05	0.1	3.95	4.87	6.65	1407.9	0.22	13.11	26.76	-184.1	0.71	Clear	None
5/9/2022	14:48	0.05	0.1	4.05	4.87	6.64	1408.5	0.16	7.60	26.68	-189.6	0.71	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:57	14:48	51	4.05	6.64	1408.5	0.16	7.60	26.68	-189.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-IW0008I-020.0-20220512      Sampler: Greg Kusel  
 Well ID: VPF-IW0008I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	2.78
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	23.43	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	12:25	0.05		0	2.78								Clear	None
5/12/2022	12:35	0.05	0.5	0.5	2.91	6.51	11117.5	0.10	6.59	24.51	-226.0	6.40	Clear	None
5/12/2022	12:37	0.05	0.1	0.6	2.91	6.53	11300.9	0.09	6.55	24.58	-235.6	6.52	Clear	None
5/12/2022	12:39	0.05	0.1	0.7	2.91	6.53	11432.8	0.09	5.55	24.51	-243.0	6.6	Clear	None
5/12/2022	12:41	0.05	0.1	0.8	2.91	6.53	11561.9	0.08	5.55	24.58	-253.7	6.68	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:25	12:41	16	0.8	6.53	11561.9	0.08	5.55	24.58	-253.7



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-IW0018I-023.0-20220512      Sampler: Greg Kusel  
 Well ID: VPF-IW0018I      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.65
Top of Screen (ft-BTOR):	18	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	28	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	30.04	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	11:03	0.05		0	4.65								Clear	None
5/12/2022	11:13	0.05	0.5	0.5	6.05	6.49	15037.9	0.14	7.45	23.71	-135.7	8.87	Clear	None
5/12/2022	11:15	0.05	0.1	0.6	6.05	6.50	15054.3	0.11	7.3	23.69	-141.6	8.88	Clear	None
5/12/2022	11:17	0.05	0.1	0.7	6.05	6.51	14862.3	0.09	5.65	23.72	-145.2	8.76	Clear	None
5/12/2022	11:19	0.05	0.1	0.8	6.05	6.51	14972.4	0.09	7.32	23.74	-145.6	8.83	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:03	11:19	16	0.8	6.51	14972.4	0.09	7.32	23.74	-145.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-MW0021-030.0-20220512      Sampler: Dustin Slater  
 Well ID: VPF-MW0021      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.7
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	37.48	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	10:25			0	4.7								Clear	None
5/12/2022	10:45	0.05	1	1	4.75	6.71	27375	0.22	4.58	24.6	-77.2	16.93	Clear	None
5/12/2022	10:47	0.05	0.1	1.1	4.75	6.71	27355	0.21	4.07	24.7	-77.3	16.91	Clear	None
5/12/2022	10:49	0.05	0.1	1.2	4.75	6.71	27356	0.21	3.23	24.6	-77.3	16.93	Clear	None
5/12/2022	10:51	0.05	0.1	1.3	4.75	6.71	27344	0.2	2.87	24.6	-77.3	16.94	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:25	10:51	26	1.3	6.71	27344	0.2	2.87	24.6	-77.3

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-MW0022-007.5-20220512      Sampler: Greg Kusel  
 Well ID: VPF-MW0022      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.61
Top of Screen (ft-BTOR):	5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	13.85	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	10:33	0.05		0	6.61								Clear	None
5/12/2022	10:43	0.05	0.5	0.5	7.42	6.70	556.2	0.19	3.90	25.42	-165.0	0.27	Clear	None
5/12/2022	10:45	0.05	0.1	0.6	7.42	6.68	557.1	0.17	3.92	25.38	-165.9	0.27	Clear	None
5/12/2022	10:47	0.05	0.1	0.7	7.42	6.66	558.3	0.13	3.17	25.50	-169.3	0.27	Clear	None
5/12/2022	10:49	0.05	0.1	0.8	7.42	6.64	556.9	0.12	3.40	25.41	-171.2	0.27	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:33	10:49	16	0.8	6.64	556.9	0.12	3.40	25.41	-171.2

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-MW0025-040.0-20220512      Sampler: Dustin Slater  
 Well ID: VPF-MW0025      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.06
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	44.76	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	11:02			0	6.06								Clear	None
5/12/2022	11:22	0.05	1	1	6.31	6.73	44366	0.26	1.74	25.5	-50.7	28.34	Clear	None
5/12/2022	11:24	0.05	0.1	1.1	6.31	6.79	44320	0.26	1.65	25.4	-50.7	28.35	Clear	None
5/12/2022	11:26	0.05	0.1	1.2	6.31	6.79	44295	0.25	1.23	25.4	-50.8	28.36	Clear	None
5/12/2022	11:28	0.05	0.1	1.3	6.31	6.79	44309	0.25	1.07	25.4	-50.8	28.37	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:02	11:28	26	1.3	6.79	44309	0.25	1.07	25.4	-50.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Vertical Processing Facility (SWMU 077)  
 Project No: 60610905

Sample ID: VPF-MW0027-040.0-20220512      Sampler: Dustin Slater  
 Well ID: VPF-MW0027      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.8
Top of Screen (ft-BTOR):	35	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	45	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	44.20	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	11:38			0	5.8								Clear	None
5/12/2022	11:58	0.05	1	1	5.97	6.85	42799	0.18	2.54	23.1	-110.1	28.8	Clear	None
5/12/2022	12:00	0.05	0.1	1.1	5.97	6.84	42976	0.18	2.09	23.1	-108.6	28.94	Clear	None
5/12/2022	12:02	0.05	0.1	1.2	5.97	6.84	43211	0.18	1.87	23.2	-107.8	29.11	Clear	None
5/12/2022	12:04	0.05	0.1	1.3	5.97	6.83	43223	0.18	1.43	23.2	-106.9	29.28	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:38	12:04	26	1.3	6.83	43223	0.18	1.43	23.2	-106.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Kennedy Athletic Recreation and Social (KARS) Park 1 (SWMU 084)  
 Project No: 60610905

Sample ID: KP1-MW0022-004.5-20220512      Sampler: Dustin Slater  
 Well ID: KP1-MW0022      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.38
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12	Sample Analysis:	Lead

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/12/2022	7:31			0	3.38								Clear	None
5/12/2022	7:51	0.05	1	1	3.55	6.04	6613	0.34	8	23.2	-199.1	3.75	Clear	None
5/12/2022	7:53	0.05	0.1	1.1	3.55	6.04	6563	0.29	5.77	23.3	-200.6	3.72	Clear	None
5/12/2022	7:55	0.05	0.1	1.2	3.55	6.04	6561	0.26	6.44	23.4	-201.7	3.71	Clear	None
5/12/2022	7:57	0.05	0.1	1.3	3.55	6.03	6569	0.28	5.07	23.4	-203.1	3.7	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
7:31	7:57	26	1.3	6.03	6569	0.28	5.07	23.4	-203.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Space Station Processing Facility (SWMU 098)  
 Project No: 60610905

Sample ID: SSPF-MW0004-009.5-20220510      Sampler: Dustin Slater  
 Well ID: SSPF-MW0004      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	8.38
Top of Screen (ft-BTOR):	6	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	16	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15.52	Sample Analysis:	Ammonia

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	15:03			0	8.38								Clear	None
5/10/2022	15:13	0.05	0.5	0.5	8.54	6.04	552	0.12	2.88	26.5	-220	0.26	Clear	None
5/10/2022	15:15	0.05	0.1	0.6	8.54	6.05	553	0.1	2.23	26.5	-223.2	0.26	Clear	None
5/10/2022	15:17	0.05	0.1	0.7	8.54	6.06	554	0.09	1.87	26.4	-225.2	0.26	Clear	None
5/10/2022	15:19	0.05	0.1	0.8	8.54	6.06	555	0.09	1.76	26.6	-228	0.26	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:03	15:19	16	0.8	6.06	555	0.09	1.76	26.6	-228

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Space Station Processing Facility (SWMU 098)  
 Project No: 60610905

Sample ID: SSPF-MW0006-010.0-20220510      Sampler: Greg Kusel  
 Well ID: SSPF-MW0006      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	9.48
Top of Screen (ft-BTOR):	6	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	16	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15.71	Sample Analysis:	Ammonia

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	14:25	0.05		0	9.48								Clear	None
5/10/2022	14:35	0.05	0.5	0.5	9.61	6.24	930.1	0.48	15.09	25.78	-183.6	0.46	Clear	None
5/10/2022	14:37	0.05	0.1	0.6	9.61	6.27	928.2	0.19	9.11	25.79	-201.6	0.46	Clear	None
5/10/2022	14:39	0.05	0.1	0.7	9.61	6.42	915.7	1.48	16.42	25.65	-176.4	0.46	Clear	None
5/10/2022	14:41	0.05	0.1	0.8	9.61	6.40	911.3	0.34	11.52	25.62	-193.1	0.45	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:25	14:41	16	0.8	6.40	911.3	0.34	11.52	25.62	-193.1



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Space Station Processing Facility (SWMU 098)  
 Project No: 60610905

Sample ID: SSPF-MW0013-021.0-20220510      Sampler: Greg Kusel  
 Well ID: SSPF-MW0013      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	10.04
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	26	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	26	Sample Analysis:	Ammonia

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	15:43	0.05		0	10.04								Clear	None
5/10/2022	15:53	0.05	0.5	0.5	10.12	7.10	0.1	8.14	51.38	25.01	-165.5	0	Clear	None
5/10/2022	15:55	0.05	0.1	0.6	10.13	6.77	777.7	0.37	55.19	24.86	-190.4	0.39	Clear	None
5/10/2022	15:57	0.05	0.1	0.7	10.13	6.76	749.6	0.16	55.55	24.82	-201.2	0.37	Clear	None
5/10/2022	15:59	0.05	0.1	0.8	10.13	6.76	742.2	0.17	54.44	24.85	-205.2	0.37	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:43	15:59	16	0.8	6.76	742.2	0.17	54.44	24.85	-205.2

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Space Station Processing Facility (SWMU 098)  
 Project No: 60610905

Sample ID: SSPF-MW0014-008.0-20220510      Sampler: Dustin Slater  
 Well ID: SSPF-MW0014      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.83
Top of Screen (ft-BTOR):	6	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	16	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15.71	Sample Analysis:	Ammonia

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	15:30			0	6.83								Clear	None
5/10/2022	15:52	0.07	1.5	1.5	7.04	6.37	776	0.32	2.82	27.5	-288.3	0.36	Clear	None
5/10/2022	15:54	0.07	0.14	1.64	7.04	6.37	774	0.29	2.14	27.5	-288.5	0.36	Clear	None
5/10/2022	15:56	0.07	0.14	1.78	7.04	6.37	773	0.28	1.87	27.6	-288.5	0.36	Clear	None
5/10/2022	15:58	0.07	0.14	1.92	7.04	6.36	773	0.27	1.65	27.7	-288.9	0.36	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:30	15:58	28	1.92	6.36	773	0.27	1.65	27.7	-288.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Space Station Processing Facility (SWMU 098)  
 Project No: 60610905

Sample ID: SSPF-MW0016-016.0-20220510      Sampler: Greg Kusel  
 Well ID: SSPF-MW0016      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.49
Top of Screen (ft-BTOR):	11	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	20.48	Sample Analysis:	Ammonia

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/10/2022	15:10	0.05		0	6.49								Clear	None
5/10/2022	15:20	0.05	0.5	0.5	6.55	6.14	641.0	0.12	19.11	25.77	-351.8	0.32	Clear	None
5/10/2022	15:22	0.05	0.1	0.6	6.55	6.16	644.9	0.10	15.72	26.04	-355.4	0.32	Clear	None
5/10/2022	15:24	0.05	0.1	0.7	6.55	6.18	643.4	0.09	11.40	26.03	-358.0	0.32	Clear	None
5/10/2022	15:26	0.05	0.1	0.8	6.55	6.20	647.5	0.11	11.57	26.08	-362.7	0.32	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:10	15:26	16	0.8	6.20	647.5	0.11	11.57	26.08	-362.7

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / CITGO Service Station (SWMU 093)  
 Project No: 60610905

Sample ID: CGO-MW0006-025.0-20220511      Sampler: Greg Kusel  
 Well ID: CGO-MW0006      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.5
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	26.59	Sample Analysis:	Select VOCs and Select PAHs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	13:18	0.05		0	5.5								Clear	None
5/11/2022	13:28	0.05	0.5	0.5	5.74	6.33	217.7	0.11	7.19	25.82	-151.4	0.10	Clear	None
5/11/2022	13:30	0.05	0.1	0.6	5.74	6.26	218.1	0.10	7.58	25.77	-158.4	0.10	Clear	None
5/11/2022	13:37	0.05	0.1	0.7	5.74	6.22	219.4	0.11	8.92	25.73	-162.0	0.11	Clear	None
5/11/2022	13:39	0.05	0.1	0.8	5.74	6.19	223.4	0.10	8.50	25.70	-174.5	0.11	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:18	13:39	21	0.8	6.19	223.4	0.10	8.50	25.70	-174.5

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / CITGO Service Station (SWMU 093)  
 Project No: 60610905

Sample ID: CGO-MW0018-025.0-20220511      Sampler: Dustin Slater  
 Well ID: CGO-MW0018      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.39
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	26.85	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	13:10			0	3.39								Clear	None
5/11/2022	13:20	0.05	0.1	0.1	3.52	5.86	249.5	0.33	2.78	27.5	-125.4	0.12	Clear	None
5/11/2022	13:22	0.05	0.1	0.2	3.52	5.88	262.4	0.37	2.11	27.6	-131.1	0.12	Clear	None
5/11/2022	13:24	0.05	0.1	0.3	3.52	5.9	270.7	0.38	1.76	27.7	-135.3	0.13	Clear	None
5/11/2022	13:26	0.05	0.1	0.4	3.52	5.91	273.5	0.42	1.43	27.7	-136.4	0.13	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:10	13:26	16	0.4	5.91	273.5	0.42	1.43	27.7	-136.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / CITGO Service Station (SWMU 093)  
 Project No: 60610905

Sample ID: CGO-MW0019-025.0-20220511      Sampler: Dustin Slater  
 Well ID: CGO-MW0019      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.84
Top of Screen (ft-BTOR):	22.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	27.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	26.81	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/11/2022	13:32			0	2.87								Clear	None
5/11/2022	13:52	0.05	1	1	3.8	6.28	270.7	0.39	10.5	26.9	-100.5	0.13	Clear	None
5/11/2022	13:54	0.05	0.1	1.1	3.8	6.26	273.6	0.43	10.4	26.9	-104.6	0.13	Clear	None
5/11/2022	13:56	0.05	0.1	1.2	3.8	6.24	274.2	0.43	6.12	26.8	-106.1	0.13	Clear	None
5/11/2022	13:58	0.05	0.1	1.3	3.8	6.24	274.5	0.41	4.56	26.8	-106.1	0.13	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:32	13:58	26	1.3	6.24	274.5	0.41	4.56	26.8	-106.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0001-005.5-20220509      Sampler: Dustin Slater  
 Well ID: FSA1-MW0001      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.82
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.63	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	11:44			0	4.85								Clear	None
5/9/2022	11:54	0.05	0.5	0.5	N/A	6.7	1160	0.67	4.66	27.3	-124.9	55	Clear	None
5/9/2022	11:56	0.05	0.1	0.6	N/A	6.7	1170	0.69	4.12	27.4	-125.1	0.55	Clear	None
5/9/2022	11:58	0.05	0.1	0.7	N/A	6.7	1173	0.68	3.76	27.3	-125.3	0.56	Clear	None
5/9/2022	12:00	0.05	0.1	0.8	N/A	6.7	1179	0.66	1.93	27.3	-125.6	0.56	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:44	12:00	16	0.8	6.7	1179	0.66	1.93	27.3	-125.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0002-005.0-20220509      Sampler: Dustin Slater  
 Well ID: FSA1-MW0002      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	4.19
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.73	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	12:12			0	4.2								Clear	None
5/9/2022	12:27	0.05	0.75	0.75	N/A	6.77	963	0.79	9.61	26.8	-115.3	0.46	Clear	None
5/9/2022	12:29	0.05	0.1	0.85	N/A	6.76	962	0.69	6.87	27.1	-114.3	0.45	Clear	None
5/9/2022	12:31	0.05	0.1	0.95	N/A	6.75	955	0.62	5.98	27.2	-114	0.45	Clear	None
5/9/2022	12:33	0.05	0.1	1.05	N/A	6.75	954	0.55	4.87	27.2	-113.9	0.45	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:12	12:33	21	1.05	6.75	954	0.55	4.87	27.2	-113.9



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0012R-006.0-20220509      Sampler: Dustin Slater  
 Well ID: FSA1-MW0012R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.04
Top of Screen (ft-BTOR):	3	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	13	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12.60	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	10:25			0	5.02								Clear	None
5/9/2022	10:45	0.05	1	1	5.18	7.38	419.3	0.36	13.1	26.7	-135	0.2	Clear	None
5/9/2022	10:47	0.05	0.1	1.1	5.18	7.38	419.4	0.33	4	26.7	-137.9	0.2	Clear	None
5/9/2022	10:49	0.05	0.1	1.2	5.18	7.38	419.2	0.27	3.54	26.6	-140.3	0.2	Clear	None
5/9/2022	10:51	0.05	0.1	1.3	5.18	7.38	418.3	0.25	3.82	26.5	-142	0.2	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:25	10:51	26	1.3	7.38	418.3	0.25	3.82	26.5	-142

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0014-006.0-20220509      Sampler: Dustin Slater  
 Well ID: FSA1-MW0014      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.13
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12.08	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	11:02			0	5.15								Clear	None
5/9/2022	11:27	0.05	1.25	1.25	5.2	6.95	441.1	0.62	5.32	27.2	-111.7	0.2	Clear	None
5/9/2022	11:29	0.05	0.1	1.35	5.2	6.96	441.7	0.61	4.55	27.2	-112.2	0.2	Clear	None
5/9/2022	11:31	0.05	0.1	1.45	5.2	6.96	442.7	0.58	4.07	27.3	-112.4	0.2	Clear	None
5/9/2022	11:33	0.05	0.1	1.55	5.2	6.96	443.8	0.62	3.65	27.4	-112.6	0.2	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:02	11:33	31	1.55	6.96	443.8	0.62	3.65	27.4	-112.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0017A-006.5-20220509      Sampler: Dustin Slater  
 Well ID: FSA1-MW0017A      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	5.43
Top of Screen (ft-BTOR):	3	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	13	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	13.26	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	9:46			0	5.45								Clear	None
5/9/2022	10:06	0.06	1.25	1.25	5.58	6.81	798	0.28	16	26.9	-133.2	0.38	Clear	None
5/9/2022	10:08	0.06	0.12	1.37	5.58	6.81	802	0.25	11.5	27	-132	0.38	Clear	None
5/9/2022	10:10	0.06	0.12	1.49	5.58	6.81	807	0.26	9.87	27	-132.2	0.38	Clear	None
5/9/2022	10:12	0.06	0.12	1.61	5.58	6.81	811	0.31	8.65	27.1	-132	0.38	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
9:46	10:12	26	1.61	6.81	811	0.31	8.65	27.1	-132

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0021-005.0-20220509      Sampler: Greg Kusel  
 Well ID: FSA1-MW0021      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.19
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.65	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	11:40			0	4.19								Clear	None
5/9/2022	11:50	0.05	0.5	0.5	4.91	6.78	761.2	0.57	23.55	25.70	-219.1	0.38	Clear	None
5/9/2022	11:52	0.05	0.1	0.6	4.91	6.76	759.4	0.26	46.46	25.72	-224.1	0.38	Clear	None
5/9/2022	11:54	0.05	0.1	0.7	4.91	6.73	748.4	0.16	7.52	25.82	-228.9	0.37	Clear	None
5/9/2022	11:56	0.05	0.1	0.8	4.91	6.71	739.5	0.11	16.83	25.90	-233.8	0.37	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:40	11:56	16	0.8	6.71	739.5	0.11	16.83	25.90	-233.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0022R-006.5-20220509      Sampler: Greg Kusel  
 Well ID: FSA1-MW0022R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.83
Top of Screen (ft-BTOR):	3	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	13	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	12.55	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	10:35			0	5.83								Clear	None
5/9/2022	10:45	0.05	0.5	0.5	6.11	7.07	648.2	0.23	32.47	25.45	-242.2	0.32	Clear	None
5/9/2022	10:47	0.05	0.1	0.6	6.11	7.08	645.4	0.29	248.46	25.44	-237.1	0.32	Clear	None
5/9/2022	10:49	0.05	0.1	0.7	6.11	7.08	639.7	0.17	82.95	25.43	-239.1	0.31	Clear	None
5/9/2022	10:51	0.05	0.1	0.8	6.11	7.08	637.6	0.18	33.20	25.38	-238.4	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:35	10:51	16	0.8	7.08	637.6	0.18	33.20	25.38	-238.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0023-006.0-20220509      Sampler: Greg Kusel  
 Well ID: FSA1-MW0023      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.05
Top of Screen (ft-BTOR):	2	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	12	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	11.81	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	12:10	0.05		0	5.05								Clear	None
5/9/2022	12:20	0.05	0.05	0.05	5.9	6.68	664.6	0.68	8.97	25.22	-214.8	0.33	Clear	None
5/9/2022	12:22	0.05	0.1	0.15	5.9	6.66	655.9	0.23	7.96	25.19	-222.7	0.32	Clear	None
5/9/2022	12:24	0.05	0.1	0.25	5.9	6.66	633.4	0.18	11.86	25.18	-226.9	0.31	Clear	None
5/9/2022	12:26	0.05	0.1	0.35	5.9	6.65	624.4	0.16	7.28	25.13	-229.7	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:10	12:26	16	0.35	6.65	624.4	0.16	7.28	25.13	-229.7

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0027-020.0-20220509      Sampler: Greg Kusel  
 Well ID: FSA1-MW0027      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.15
Top of Screen (ft-BTOR):	14.5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	24.5	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	23.92	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	11:05			0	6.15								Clear	None
5/9/2022	11:15	0.05	0.5	0.5	6.25	7.05	840.2	0.13	31.24	25.66	-317.3	0.42	Clear	None
5/9/2022	11:17	0.05	0.1	0.6	6.25	7.05	864.7	0.11	22.44	25.68	-324.9	0.43	Clear	None
5/9/2022	11:19	0.05	0.1	0.7	6.25	7.03	869.3	0.10	15.21	25.70	-329.8	0.43	Clear	None
5/9/2022	11:21	0.05	0.1	0.8	6.25	7.05	870.1	0.09	12.07	25.81	-333.4	0.43	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:05	11:21	16	0.8	7.05	870.1	0.09	12.07	25.81	-333.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area / Fuel Storage Area #1 Underground Storage Tank [Building 1044] (PRL 157)  
 Project No: 60610905

Sample ID: FSA1-MW0028-020.0-20220509      Sampler: Greg Kusel  
 Well ID: FSA1-MW0028      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.95
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Select PAHs, TPH

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
5/9/2022	10:00			0	5.95								Clear	None
5/9/2022	10:10	0.05	0.5	0.5	6.01	7.33	2014.8	0.20	16.96	25.18	-329.3	1.04	Clear	None
5/9/2022	10:12	0.05	0.1	0.6	6.01	7.33	2137.1	0.15	14.90	25.27	-335.8	1.11	Clear	None
5/9/2022	10:14	0.05	0.1	0.7	6.01	7.34	2207.7	0.12	8.17	25.19	-344.6	1.15	Clear	None
5/9/2022	10:16	0.05	0.1	0.8	6.01	7.35	2280.5	0.10	6.50	25.22	-349.7	1.18	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:00	10:16	16	0.8	7.35	2280.5	0.10	6.50	25.22	-349.7



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0013-003.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0013      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.22
Top of Screen (ft-BTOR):	5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	14:11			0	2.22								Clear	None
11/8/2022	14:31	0.05	1	1	2.57	6.44	481.6	0.16	4.67	26.41	-361.7	0.23	Clear	None
11/8/2022	14:34	0.05	0.15	1.15	2.57	6.45	484.3	0.18	5.75	26.14	-362.5	0.24	Clear	None
11/8/2022	14:37	0.05	0.15	1.30	2.57	6.45	488.3	0.20	8.25	26.07	-362.9	0.24	Clear	None
11/8/2022	14:40	0.05	0.15	1.45	2.57	6.48	491.6	0.13	9.64	26.01	-358.4	0.24	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:11	14:40	29	1.45	6.48	491.6	0.13	9.64	26.01	-358.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0019-020.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0019      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.2
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	15:08	0.1		0	3.2								Clear	None
11/8/2022	15:18	0.1	1	1	3.21	6.94	731.8	0.07	1.86	27.04	-219.0	0.36	Clear	None
11/8/2022	15:20	0.1	0.2	1.2	3.21	6.94	732.7	0.07	1.69	27.14	-218.4	0.36	Clear	None
11/8/2022	15:22	0.1	0.2	1.4	3.21	6.96	732.7	0.06	1.69	27.06	-220.6	0.36	Clear	None
11/8/2022	15:24	0.1	0.2	1.6	3.21	6.96	732.7	0.06	1.68	26.93	-223.3	0.36	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
15:08	15:24	16	1.6	6.96	732.7	0.06	1.68	26.93	-223.3

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0020-030.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0020      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.23
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	14:39	0.1		0	3.23								Clear	None
11/8/2022	14:49	0.1	1	1	3.24	6.92	763.9	0.09	15.65	25.87	-212.5	0.38	Clear	None
11/8/2022	14:51	0.1	0.2	1.2	3.24	6.92	764.2	0.09	17.43	25.80	-213.0	0.38	Clear	None
11/8/2022	14:53	0.1	0.2	1.4	3.24	6.93	764.8	0.09	12.12	25.82	-214.7	0.38	Clear	None
11/8/2022	14:55	0.1	0.2	1.6	3.24	6.92	764.6	0.09	14.36	25.79	-212.8	0.38	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:39	14:55	16	1.6	6.92	764.6	0.09	14.36	25.79	-212.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0024R-020.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0024R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):		Static Water Level (ft-BTOR):	1.55
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Naphthalene

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	13:20	0.1		0	1.55								Clear	None
11/8/2022	13:30	0.1	1	1	N/A	6.79	625.0	0.14	1.52	25.30	-240.4	0.31	Clear	None
11/8/2022	13:32	0.1	0.2	1.2	N/A	6.79	624.5	0.10	1.65	25.27	-242.4	0.31	Clear	None
11/8/2022	13:34	0.1	0.2	1.4	N/A	6.79	616.6	0.09	1.44	25.26	-243.3	0.30	Clear	None
11/8/2022	13:36	0.1	0.2	1.6	N/A	6.80	622.6	0.09	1.40	25.30	-246.2	0.31	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:20	13:36	16	1.6	6.80	622.6	0.09	1.40	25.30	-246.2

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0034-006.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0034      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.28
Top of Screen (ft-BTOR):	5	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	12:13	0.1		0	5.28								Clear	None
11/8/2022	12:23	0.1	1	1	5.51	6.00	391.1	0.10	1.17	24.79	-214.9	0.19	Clear	None
11/8/2022	12:25	0.1	0.2	1.2	5.51	5.99	392.0	0.10	1.11	24.70	-220.2	0.19	Clear	None
11/8/2022	12:27	0.1	0.1	1.3	5.51	6.00	392.0	0.09	1.10	24.86	-215.0	0.19	Clear	None
11/8/2022	12:29	0.1	0.2	1.5	5.51	5.99	383.0	0.09	1.10	24.79	-217.8	0.19	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:13	12:29	16	1.5	5.99	383.0	0.09	1.10	24.79	-217.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0035-020.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0035      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.23
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Naphthalene

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	12:39	0.1		0	5.23								Clear	None
11/8/2022	12:49	0.1	1	1	5.24	6.71	728.1	0.08	1.43	24.17	-197.5	0.36	Clear	None
11/8/2022	12:51	0.1	0.2	1.2	5.24	6.72	728.2	0.08	1.71	24.21	-199.0	0.36	Clear	None
11/8/2022	12:53	0.1	0.2	1.4	5.24	6.72	728.3	0.08	1.45	24.23	-199.6	0.36	Clear	None
11/8/2022	12:55	0.1	0.2	1.6	5.24	6.73	727.0	0.08	1.78	24.13	-201.4	0.36	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:39	12:55	16	1.6	6.73	727.0	0.08	1.78	24.13	-201.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0036-035.0-20221108      Sampler: Greg Kusel  
 Well ID: GSSP-MW0036      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	5.29
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	11:50	0.1		0	5.29								Clear	None
11/8/2022	12:00	0.1	1	1	5.3	6.72	942.9	0.10	1.24	23.83	-168.2	0.47	Clear	None
11/8/2022	12:02	0.1	0.2	1.2	5.3	6.70	946.8	0.09	1.32	23.82	-168.7	0.47	Clear	None
11/8/2022	12:04	0.1	0.2	1.4	5.3	6.70	949.7	0.09	1.57	23.87	-168.8	0.47	Clear	None
11/8/2022	12:06	0.1	0.2	1.6	5.3	6.70	951.6	0.08	5.17	23.80	-169.3	0.47	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:50	12:06	16	1.6	6.70	951.6	0.08	5.17	23.80	-169.3

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0044R-030.0-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0044R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.9
Top of Screen (ft-BTOR):	25	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	35	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	35	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	14:47			0	3.9								Clear	None
11/8/2022	15:07	0.05	1	1	4.04	7.01	573.4	0.16	0.97	26.18	-208.5	0.28	Clear	None
11/8/2022	15:09	0.05	0.1	1.1	4.04	7.00	579.2	0.14	0.85	26.37	-211.0	0.28	Clear	None
11/8/2022	15:11	0.05	0.1	1.2	4.04	6.99	579.6	0.14	0.79	26.38	-211.2	0.28	Clear	None
11/8/2022	15:13	0.05	0.1	1.3	4.04	6.98	580.3	0.14	0.65	26.42	-211.4	0.28	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
14:47	15:13	26	1.3	6.98	580.3	0.14	0.65	26.42	-211.4



# GROUNDWATER SAMPLE LOG SHEET



**Event:** Kennedy Space Center IA LTM  
**Site Name:** Industrial Area/General Services Administration Seized Property (SWMU 95)  
**Project No:** 60610905

**Sample ID:** GSSP-MW0053-020.0-20221108      **Sampler:** Greg Kusel  
**Well ID:** GSSP-MW0053      **Well Type:** Monitoring Well  
**Remark:**

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.12
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Select VOCs, Naphthalene

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	13:54	0.1		0	3.12								Clear	None
11/8/2022	14:21	0.1	0.2	0.2	3.13	6.95	837.3	0.11	11.21	26.58	-238.7	0.42	Clear	None
11/8/2022	14:22	0.1	0.2	0.8	3.13	6.95	836.8	0.06	13.16	26.61	-239.4	0.42	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:54	14:22	28	0.8	6.95	836.8	0.06	13.16	26.61	-239.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0059-018.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0059      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.88
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	21	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	12:27			0	3.88								Clear	None
11/8/2022	12:47	0.05	1	1	3.99	6.82	791.1	0.11	5.52	26.85	-356.3	0.39	Clear	None
11/8/2022	12:49	0.05	0.1	1.1	3.99	6.82	790.7	0.11	7.39	26.89	-357.4	0.39	Clear	None
11/8/2022	12:51	0.05	0.1	1.2	3.99	6.83	791.0	0.11	5.69	26.91	-358.5	0.39	Clear	None
11/8/2022	12:53	0.05	0.1	1.3	3.99	6.82	789.6	0.11	4.80	26.83	-359.1	0.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:27	12:53	26	1.3	6.82	789.6	0.11	4.80	26.83	-359.1

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0060-012.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0060      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.15
Top of Screen (ft-BTOR):	10	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	13:03			0	4.15								Clear	None
11/8/2022	13:23	0.05	1	1	4.27	6.37	498.9	0.20	4.77	26.78	-311.8	0.24	Clear	None
11/8/2022	13:25	0.05	0.1	1.1	4.27	6.36	488.1	0.20	5.91	26.75	-313.0	0.24	Clear	None
11/8/2022	13:27	0.05	0.1	1.2	4.27	6.37	504.9	0.21	5.60	26.79	-314.0	0.25	Clear	None
11/8/2022	13:29	0.05	0.1	1.3	4.27	6.37	508.0	0.20	3.65	26.87	-314.2	0.25	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:03	13:29	26	1.3	6.37	508.0	0.20	3.65	26.87	-314.2

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0061-018.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0061      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	4.3
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	21	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	13:37			0	4.3								Clear	None
11/8/2022	13:57	0.05	1	1	4.42	6.82	769.4	0.13	1.77	26.67	-328.7	0.38	Clear	None
11/8/2022	13:59	0.05	0.1	1.1	4.42	6.82	765.5	0.13	1.54	26.61	-327.8	0.38	Clear	None
11/8/2022	14:01	0.05	0.1	1.2	4.42	6.82	763.8	0.13	1.23	26.62	-327.7	0.38	Clear	None
11/8/2022	14:03	0.05	0.1	1.3	4.42	6.82	760.3	0.13	1.16	26.62	-338.0	0.38	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:37	14:03	26	1.3	6.82	760.3	0.13	1.16	26.62	-338.0

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0062-012.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0062      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	2.99
Top of Screen (ft-BTOR):	10	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	15	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	15	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	10:38			0	2.99								Clear	None
11/8/2022	10:58	0.05	1	1	3.08	6.82	545.1	0.18	4.61	27.31	-272.8	0.27	Clear	None
11/8/2022	11:00	0.05	0.1	1.1	3.08	6.82	548.4	0.16	4.23	27.31	-277.3	0.27	Clear	None
11/8/2022	11:02	0.05	0.1	1.2	3.08	6.83	529.0	0.16	3.67	27.22	-278.7	0.26	Clear	None
11/8/2022	11:04	0.05	0.1	1.3	3.08	6.83	531.2	0.14	3.17	27.25	-282.8	0.27	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:38	11:04	26	1.3	6.83	531.2	0.14	3.17	27.25	-282.8

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/General Services Administration Seized Property (SWMU 95)  
 Project No: 60610905

Sample ID: GSSP-MW0063-018.5-20221108      Sampler: Dustin Slater  
 Well ID: GSSP-MW0063      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	3.08
Top of Screen (ft-BTOR):	16	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	21	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	21	Sample Analysis:	Select VOCs

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/8/2022	11:45			0	3.08								Clear	None
11/8/2022	12:05	0.05	1	1	3.31	6.94	616.0	0.16	1.18	26.46	-261.6	0.30	Clear	None
11/8/2022	12:07	0.05	0.1	1.1	3.31	6.91	617.8	0.15	3.00	26.69	-262.1	0.30	Clear	None
11/8/2022	12:09	0.05	0.1	1.2	3.31	6.91	617.7	0.15	0	26.63	-262.7	0.30	Clear	None
11/8/2022	12:11	0.05	0.1	1.3	3.31	6.90	616.3	0.15	0	26.60	-263.4	0.30	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:45	12:11	26	1.3	6.90	616.3	0.15	0	26.60	-263.4

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Environmental Health Facility (SWMU 079)  
 Project No: 60610905

Sample ID: EHF-MW0001-025.0-20221115      Sampler: Dustin Slater  
 Well ID: EHF-MW0001      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	2	Static Water Level (ft-BTOR):	4.21
Top of Screen (ft-BTOR):	20	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	30	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	30	Sample Analysis:	Vinyl Chloride

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/15/2022	10:04			0	4.21								Clear	None
11/15/2022	10:24	0.05	1	1	4.32	6.92	779.4	0.18	6.41	26.76	-235.1	0.39	Clear	None
11/15/2022	10:26	0.05	0.1	1.1	4.32	6.92	781.1	0.17	4.33	26.73	-237.6	0.39	Clear	None
11/15/2022	10:28	0.05	0.1	1.2	4.32	6.91	783.2	0.17	3.09	26.80	-239.6	0.39	Clear	None
11/15/2022	10:30	0.05	0.1	1.3	4.32	6.92	783.6	0.17	3.80	26.81	-239.7	0.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:04	10:30	26	1.3	6.92	783.6	0.17	3.80	26.81	-239.7

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Environmental Health Facility (SWMU 079)  
 Project No: 60610905

Sample ID: EHF-MW0004-017.5-20221115      Sampler: Dustin Slater  
 Well ID: EHF-MW0004      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.99
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	20	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	20	Sample Analysis:	Vinyl Chloride

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/15/2022	11:22			0	0.99								Clear	None
11/15/2022	11:42	0.05	1	1	1.23	7.04	3065.0	0.13	18.50	26.12	-273.2	1.62	Clear	None
11/15/2022	11:44	0.05	0.1	1.1	1.23	7.04	3037.1	0.13	12.27	26.10	-273.8	1.60	Clear	None
11/15/2022	11:46	0.05	0.1	1.3	1.23	7.04	3097.6	0.12	10.31	25.98	-276.4	1.64	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
11:22	11:46	24	1.3	7.04	3097.6	0.12	10.31	25.98	-276.4



# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Environmental Health Facility (SWMU 079)  
 Project No: 60610905

Sample ID: EHF-MW0005-020.0-20221115      Sampler: Dustin Slater  
 Well ID: EHF-MW0005      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	0.69
Top of Screen (ft-BTOR):	15	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	25	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	25	Sample Analysis:	Vinyl Chloride

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/15/2022	10:43			0	0.69								Clear	None
11/15/2022	11:03	0.05	1	1	1.13	6.90	718.7	0.14	0.16	25.54	-240.2	0.35	Clear	None
11/15/2022	11:05	0.05	0.1	1.1	1.13	6.92	720.5	0.14	0	25.63	-241.5	0.36	Clear	None
11/15/2022	11:07	0.05	0.1	1.2	1.13	6.91	723.5	0.13	0	25.76	-242.8	0.36	Clear	None
11/15/2022	11:09	0.05	0.1	1.3	1.13	6.91	724.4	0.14	0	25.78	-242.9	0.36	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
10:43	11:09	26	1.3	6.91	724.4	0.14	0	25.78	-242.9

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Engineering Development Laboratory (SWMU 085)  
 Project No: 60610905

Sample ID: EDL-MW0004-035.0-20221115      Sampler: Dustin Slater  
 Well ID: EDL-MW0004      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	0.75	Static Water Level (ft-BTOR):	5.03
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Vinyl Chloride

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/15/2022	12:33			0	5.03								Clear	None
11/15/2022	12:53	0.05	1	1	5.17	7.14	4418.3	0.24	0	26.18	-185.1	2.39	Clear	None
11/15/2022	12:55	0.05	0.1	1.1	5.17	7.13	4421.2	0.21	0.28	26.39	-185.4	2.39	Clear	None
11/15/2022	12:57	0.05	0.1	1.2	5.17	7.12	4448.6	0.21	0	26.49	-185.5	2.40	Clear	None
11/15/2022	12:59	0.05	0.1	1.3	5.17	7.13	4434.3	0.21	0	26.49	-185.6	2.39	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
12:33	12:59	26	1.3	7.13	4434.3	0.21	0	26.49	-185.6

# GROUNDWATER SAMPLE LOG SHEET



Event: Kennedy Space Center IA LTM  
 Site Name: Industrial Area/Engineering Development Laboratory (SWMU 085)  
 Project No: 60610905

Sample ID: EDL-MW0006R-035.0-20221115      Sampler: Dustin Slater  
 Well ID: EDL-MW0006R      Well Type: Monitoring Well  
 Remark:

Well Information			
Well Diameter (in.):	1	Static Water Level (ft-BTOR):	6.45
Top of Screen (ft-BTOR):	30	H/S PID Monitor Reading (ppm):	0
Bottom of Screen (ft-BTOR):	40	Purge/Sample Method:	Low flow - peristaltic
Total Depth of Well (ft-BTOR):	40	Sample Analysis:	Vinyl Chloride

Purge Information														
Date	Time	Purge Rate (gal/min)	Volume Purged (gal)	Cum Vol Purged (gal)	Depth To Water (ft)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)	Salinity (S.U.)	Color	Odor
11/15/2022	13:09			0	6.45								Clear	None
11/15/2022	13:29	0.05	1	1	6.67	7.45	3667.6	0.24	7.32	26.97	-221.8	1.96	Clear	None
11/15/2022	13:31	0.05	0.1	1.1	6.67	7.44	3700.3	0.21	0.24	26.93	-224.2	1.98	Clear	None
11/15/2022	13:33	0.05	0.1	1.2	6.67	7.44	3720.7	0.21	0.04	26.88	-225.1	1.99	Clear	None
11/15/2022	13:35	0.05	0.1	1.3	6.67	7.43	3727.0	0.20	1.43	26.91	-225.2	1.99	Clear	None

Start Purge	End Purge	Duration (min)	Total Vol (gal)	pH (S.U.)	S.C. (µS/cm)	DO (mg/l)	Turbidity (NTUs)	Temp (C)	ORP (mV)
13:09	13:35	26	1.3	7.43	3727.0	0.20	1.43	26.91	-225.2

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## **APPENDIX D**

### **RIS COMPLETION TICKETS**

# Data Checker

Completion Ticket

On 10/15/2021 at 10:40 AM the following files were submitted to Tetra Tech

**COMPLETION\_AECOM\_IA\_20211014.txt**

**LITHOLOGY\_AECOM\_IA\_20211014.txt**

**LOCATION\_AECOM\_IA\_20211014.txt**

**PROJECT\_AECOM\_IA\_20211014.txt**

**RESULT\_AECOM\_IA\_20211014.txt**

**SAMPLE\_AECOM\_IA\_20211014.txt**

**WATER\_AECOM\_IA\_20211014.txt**

The following comment was provided with this submission:

**Hello - attached is the September 2021 Industrial Area LTM data for ORSY, KP1, HMF, and IDW. If you have any questions let me know. thanks! Jennifer Chastain**

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

**TetraTechExternalClientsProtectedDataRepository20211015\_5855713810\_kedd\_AECOM**

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# Data Checker

## Completion Ticket

On 5/23/2023 at 10:43 AM the following files were submitted to Tetra Tech

**COMPLETION\_AECOM\_IA\_20230523.txt**

**LITHOLOGY\_AECOM\_IA\_20230523.txt**

**LOCATION\_AECOM\_IA\_20230523.txt**

**PROJECT\_AECOM\_IA\_20230523.txt**

**RESULT\_AECOM\_IA\_20230523.txt**

**SAMPLE\_AECOM\_IA\_20230523.txt**

**WATER\_AECOM\_IA\_20230523.txt**

The following comment was provided with this submission:

**Hello - attached are November 2021 IA LTM files. Please let me know if there are any questions or issues. thank you! Jennifer Chastain**

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

**TetraTechExternalClientsProtectedDataRepository2023523\_3907574759\_kedd\_AECOM**

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# Data Checker

## Completion Ticket

On 5/23/2023 at 10:19 AM the following files were submitted to Tetra Tech

**COMPLETION\_AECOM\_IA\_20230522.txt**

**LITHOLOGY\_AECOM\_IA\_20230522.txt**

**LOCATION\_AECOM\_IA\_20230522.txt**

**PROJECT\_AECOM\_IA\_20230522.txt**

**RESULT\_AECOM\_IA\_20230522.txt**

**SAMPLE\_AECOM\_IA\_20230522.txt**

**WATER\_AECOM\_IA\_20230522.txt**

The following comment was provided with this submission:

**Hello TT! Attached are the Industrial Area LTM samples from May and November 2022. There are also three wells from FSA1 that were installed by HGL. I included all the info I could find. If you have any questions or issues please let me know. thank you! Jennifer Chastain**

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

**TetraTechExternalClientsProtectedDataRepository2023523\_79277196\_kedd\_AECOM**

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# Data Checker

## Completion Ticket

On 6/8/2023 at 11:01 AM the following files were submitted to Tetra Tech

**COMPLETION\_AECOM\_IA\_20230519.txt**

**LITHOLOGY\_AECOM\_IA\_20230519.txt**

**LOCATION\_AECOM\_IA\_20230519.txt**

**PROJECT\_AECOM\_IA\_20230519.txt**

**RESULT\_AECOM\_IA\_20230519.txt**

**SAMPLE\_AECOM\_IA\_20230519.txt**

**WATER\_AECOM\_IA\_20230519.txt**

The following comment was provided with this submission:

**Hello Tetra Tech! Thank you for the help on this upload. Attached are the Industrial Area EDL, EHF, and RRLF January and March 2023 DPT results. If there are any issues please let me know. thank you! Jennifer Chastain**

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

**TetraTechExternalClientsProtectedDataRepository202368\_5208294132\_kedd\_AECOM**

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## **APPENDIX E**

### **LABORATORY ANALYTICAL DATA**



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

---

Friday, September 24, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905.Subs 2021-23-Subs 2021-23, Project Name/Desc: NASA KSC**

**ENCO Workorder(s): AE07198**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, September 16, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: ORSY-EXC-MW0001I-022.5-2021091      Lab ID: AE07198-01      Sampled: 09/16/21 12:35      Received: 09/16/21 13:40**

6

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	09/30/21	09/23/21 10:32	09/24/21 00:29

**Client ID: ORSY-EXC-MW0003I-022.5-2021091      Lab ID: AE07198-02      Sampled: 09/16/21 12:13      Received: 09/16/21 13:40**

6

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	09/30/21	09/23/21 10:32	09/24/21 00:57

**Client ID: ORSY-TB-20210916-01      Lab ID: AE07198-03      Sampled: 09/16/21 08:00      Received: 09/16/21 13:40**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	09/30/21	09/23/21 10:32	09/24/21 01:26



www.encolabs.com

**SAMPLE DETECTION SUMMARY**

**Client ID:** ORSY-EXC-MW0001I-022.5-20210916      **Lab ID:** AE07198-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
1,2,4-Trichlorobenzene	0.73	I	0.70	1.0	ug/L	EPA 8260D	

### ANALYTICAL RESULTS

**Description:** ORSY-EXC-MW0001I-022.5-20210916

**Lab Sample ID:** AE07198-01

**Received:** 09/16/21 13:40

**Matrix:** Ground Water

**Sampled:** 09/16/21 12:35

**Work Order:** AE07198

**Project:** NASA KSC

**Sampled By:** Greg Kusel/Dustin Slater

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1123022	EPA 8260D	09/24/21 00:29	nmc	
1,2,4-Trichlorobenzene [120-82-1]^	0.73	I	ug/L	1	0.70	1.0	1123022	EPA 8260D	09/24/21 00:29	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	45	1	50.0	90 %	41-142	1123022	EPA 8260D	09/24/21 00:29	nmc	
Dibromofluoromethane	51	1	50.0	102 %	53-146	1123022	EPA 8260D	09/24/21 00:29	nmc	
Toluene-d8	45	1	50.0	91 %	41-146	1123022	EPA 8260D	09/24/21 00:29	nmc	

**Description:** ORSY-EXC-MW0003I-022.5-20210916

**Lab Sample ID:** AE07198-02

**Received:** 09/16/21 13:40

**Matrix:** Ground Water

**Sampled:** 09/16/21 12:13

**Work Order:** AE07198

**Project:** NASA KSC

**Sampled By:** Greg Kusel/Dustin Slater

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1123022	EPA 8260D	09/24/21 00:57	nmc	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1123022	EPA 8260D	09/24/21 00:57	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	91 %	41-142	1123022	EPA 8260D	09/24/21 00:57	nmc	
Dibromofluoromethane	52	1	50.0	103 %	53-146	1123022	EPA 8260D	09/24/21 00:57	nmc	
Toluene-d8	47	1	50.0	93 %	41-146	1123022	EPA 8260D	09/24/21 00:57	nmc	

**Description:** ORSY-TB-20210916-01

**Lab Sample ID:** AE07198-03

**Received:** 09/16/21 13:40

**Matrix:** Ground Water

**Sampled:** 09/16/21 08:00

**Work Order:** AE07198

**Project:** NASA KSC

**Sampled By:** Greg Kusel/Dustin Slater

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1123022	EPA 8260D	09/24/21 01:26	nmc	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1123022	EPA 8260D	09/24/21 01:26	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	91 %	41-142	1123022	EPA 8260D	09/24/21 01:26	nmc	
Dibromofluoromethane	51	1	50.0	102 %	53-146	1123022	EPA 8260D	09/24/21 01:26	nmc	
Toluene-d8	46	1	50.0	91 %	41-146	1123022	EPA 8260D	09/24/21 01:26	nmc	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1123022 - EPA 5030B\_MS**

**Blank (1123022-BLK1)**

Prepared: 09/23/2021 10:32 Analyzed: 09/23/2021 22:34

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	0.86	U	1.0	ug/L							
1,2,4-Trichlorobenzene	0.70	U	1.0	ug/L							
4-Bromofluorobenzene	47			ug/L	50.0		94	41-142			
Dibromofluoromethane	53			ug/L	50.0		106	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

**LCS (1123022-BS1)**

Prepared: 09/23/2021 10:32 Analyzed: 09/23/2021 20:11

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	24		1.0	ug/L	20.0		120	43-168			
1,2,4-Trichlorobenzene	21		1.0	ug/L	20.0		105	52-159			
4-Bromofluorobenzene	47			ug/L	50.0		94	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Matrix Spike (1123022-MS1)**

Prepared: 09/23/2021 10:32 Analyzed: 09/23/2021 20:40

Source: AE06854-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	21		1.0	ug/L	20.0	0.86 U	107	43-168			
1,2,4-Trichlorobenzene	20		1.0	ug/L	20.0	0.70 U	98	52-159			
4-Bromofluorobenzene	46			ug/L	50.0		92	41-142			
Dibromofluoromethane	50			ug/L	50.0		101	53-146			
Toluene-d8	50			ug/L	50.0		100	41-146			

**Matrix Spike Dup (1123022-MSD1)**

Prepared: 09/23/2021 10:32 Analyzed: 09/23/2021 21:08

Source: AE06854-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	21		1.0	ug/L	20.0	0.86 U	104	43-168	3	26	
1,2,4-Trichlorobenzene	18		1.0	ug/L	20.0	0.70 U	92	52-159	6	24	
4-Bromofluorobenzene	46			ug/L	50.0		91	41-142			
Dibromofluoromethane	50			ug/L	50.0		101	53-146			
Toluene-d8	47			ug/L	50.0		93	41-146			



## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AEO7198

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>					COC No.		Page: 1 of 1		
Project Name: NASA KSC					PO No.		Project No. 60610905.Subs 2021-23.Subs 2021-23		Phase:
Site Location: Orsino Storage Yard					Send Invoice To: Instructions in MSA # 19S-24548-GV03			EDD to: Jennifer Chastain Cc: Teresa Ament Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall			Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando			Report to: Jennifer Chastain Cc: Teresa Ament Jennings	
Sampler/Phone #: Greg Kusel / (772) 631-7426		Dustin Slater / (407) 766-0747			Deliver Samples To: ENCO			Site-Specific WS# 15 from QAPP: 15-30	

Lab Name: ENCO		Turnaround Time(specify):		Standard 14 day				Sample Analysis Requested (Enter number of containers for each test)										Comments				
Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl													
	ORSY-EXC-MW0001I- <del>200009</del>	ORSY-EXC-MW0001I	20210916	1235	WG	N	G	3	3													
	ORSY-EXC-MW0003I- <del>200009</del>	ORSY-EXC-MW0003I	20210916	1213	WG	N	G	3	3													
	ORSY-TB-20210916-01	ORSY-TB01	20210916	0800	WQ	TB	G	2	2													

<b>Field Comments:</b> Report only per QAPP WS #15-30		<b>Lab Comments:</b>				<b>Sample Shipment and Delivery Details</b>					
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:					
1 [Signature]	04/13/21	11:50	1 [Signature]	9/16/21	9:00	Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>					
2 [Signature]	9/16/21	1340	2 [Signature]	9/16/21	1340	Shipping Company:					
3			3			Tracking No:					
						Date Shipped:					

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank

SM3R7 0.1pc



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Wednesday, September 29, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC**

**ENCO Workorder(s): AE07200**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, September 22, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: HMF-NLP-IW0004I-037.5-20210922      Lab ID: AE07200-01      Sampled: 09/22/21 09:37      Received: 09/22/21 15:00**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	10/06/21	09/27/21 00:00	09/27/21 13:05

**Client ID: HMF-MW0006IR-037.5-20210922      Lab ID: AE07200-02      Sampled: 09/22/21 10:19      Received: 09/22/21 15:00**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	10/06/21	09/27/21 00:00	09/27/21 13:34

**Client ID: HMF-TB-20210922      Lab ID: AE07200-03      Sampled: 09/22/21 09:30      Received: 09/22/21 15:00**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	10/06/21	09/27/21 00:00	09/27/21 14:02



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**SAMPLE DETECTION SUMMARY**

**Client ID:** HMF-NLP-IW0004I-037.5-20210922      **Lab ID:** AE07200-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Trichlorofluoromethane	1300		47	50	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

<b>Description:</b> HMF-NLP-IW0004I-037.5-20210922	<b>Lab Sample ID:</b> AE07200-01	<b>Received:</b> 09/22/21 15:00
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 09/22/21 09:37	<b>Work Order:</b> AE07200
<b>Project:</b> NASA KSC	<b>Sampled By:</b> Greg Kusel/Dustin Slater	

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Trichlorofluoromethane [75-69-4]^	1300		ug/L	50	47	50	1127008	EPA 8260D	09/27/21 13:05	nmc	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	46	1	50.0	91 %	41-142		1127008	EPA 8260D	09/27/21 13:05	nmc	
<i>Dibromofluoromethane</i>	48	1	50.0	97 %	53-146		1127008	EPA 8260D	09/27/21 13:05	nmc	
<i>Toluene-d8</i>	44	1	50.0	89 %	41-146		1127008	EPA 8260D	09/27/21 13:05	nmc	

<b>Description:</b> HMF-MW0006IR-037.5-20210922	<b>Lab Sample ID:</b> AE07200-02	<b>Received:</b> 09/22/21 15:00
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 09/22/21 10:19	<b>Work Order:</b> AE07200
<b>Project:</b> NASA KSC	<b>Sampled By:</b> Greg Kusel/Dustin Slater	

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Trichlorofluoromethane [75-69-4]^	0.94	U	ug/L	1	0.94	1.0	1127008	EPA 8260D	09/27/21 13:34	nmc	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	46	1	50.0	92 %	41-142		1127008	EPA 8260D	09/27/21 13:34	nmc	
<i>Dibromofluoromethane</i>	49	1	50.0	99 %	53-146		1127008	EPA 8260D	09/27/21 13:34	nmc	
<i>Toluene-d8</i>	45	1	50.0	90 %	41-146		1127008	EPA 8260D	09/27/21 13:34	nmc	

<b>Description:</b> HMF-TB-20210922	<b>Lab Sample ID:</b> AE07200-03	<b>Received:</b> 09/22/21 15:00
<b>Matrix:</b> Water	<b>Sampled:</b> 09/22/21 09:30	<b>Work Order:</b> AE07200
<b>Project:</b> NASA KSC	<b>Sampled By:</b> ENCO ORL	

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Trichlorofluoromethane [75-69-4]^	0.94	U	ug/L	1	0.94	1.0	1127008	EPA 8260D	09/27/21 14:02	nmc	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	49	1	50.0	98 %	41-142		1127008	EPA 8260D	09/27/21 14:02	nmc	
<i>Dibromofluoromethane</i>	51	1	50.0	102 %	53-146		1127008	EPA 8260D	09/27/21 14:02	nmc	
<i>Toluene-d8</i>	46	1	50.0	93 %	41-146		1127008	EPA 8260D	09/27/21 14:02	nmc	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1127008 - EPA 5030B\_MS**

**Blank (1127008-BLK1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 10:42

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichlorofluoromethane	0.94	U	1.0	ug/L							
4-Bromofluorobenzene	47			ug/L	50.0		94	41-142			
Dibromofluoromethane	48			ug/L	50.0		97	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**LCS (1127008-BS1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 08:18

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichlorofluoromethane	25		1.0	ug/L	20.0		126	56-155			
4-Bromofluorobenzene	50			ug/L	50.0		100	41-142			
Dibromofluoromethane	50			ug/L	50.0		99	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike (1127008-MS1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 08:47

Source: AE07615-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichlorofluoromethane	24		1.0	ug/L	20.0	0.94 U	118	56-155			
4-Bromofluorobenzene	51			ug/L	50.0		101	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike Dup (1127008-MSD1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 09:16

Source: AE07615-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Trichlorofluoromethane	24		1.0	ug/L	20.0	0.94 U	120	56-155	1	22	
4-Bromofluorobenzene	51			ug/L	50.0		101	41-142			
Dibromofluoromethane	51			ug/L	50.0		103	53-146			
Toluene-d8	49			ug/L	50.0		97	41-146			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.



AEO7200

	<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1		
	Project Name: NASA KSC				PO No.		Project No. 60610905.Subs 2021-23-Subs 2021-23		
	Site Location: Hypergol Maintenance Facility South				Send Invoice To: Instructions in MSA # 195-24548-GV03		Phase:		
	TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings		
Sampler/Phone #		Greg Kusel / (772) 631-7426		Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO		Site-Specific WS#15 from QAPP: 15-32	

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	4 DEG C	HCL								Comments
								Total No. of Containers	Trichlorofluoromethane by SW8260B	Trichlorofluoromethane by SW8260B								
	037-5-20210922 HMF-NLP-IW0004I-202109	HMF-NLP-IW0004I	20210922	0937	WG	N	G	6	3	3								
	037-5-20210922 HMF-MW0006IR-202109	HMF-MW0006IR	20210922	1019	WG	N	G	6	3	3								
	22 HMF-TB-202109	HMF-TB	20210922	0930	WQ	TB	G	6	3	3								

<b>Field Comments:</b> Report only per QAPP WS #15-32. UNPRESERVED VIALS & PRESERVED VIALS. Analyze preserved if no headspace. If headspace, analyze unpreserved.				<b>Lab Comments:</b>				<b>Sample Shipment and Delivery Details</b>			
Relinquished by (signature)		Date	Time	Received by (signature)		Date	Time	Number of coolers in shipment:			
1		09/13/21	11:25	1		9/22/21	0700	Samples Iced?(check) Yes _____ No _____			
2		9/22/21	1400	2				Shipping Company:			
3				3		09/22/21	15:00	Tracking No:			
								Date Shipped:			

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mL, ZnAct 2/500=Add 2 mL of zinc acetate to 500mL, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19

Med Red '19 4.9°C



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Friday, September 24, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905.Subs 2021-23-Subs 2021-23, Project Name/Desc: NASA KSC**

**ENCO Workorder(s): AE07199**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, September 16, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



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**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: KP1-MW0003-003.5-20210916      Lab ID: AE07199-01      Sampled: 09/16/21 11:09      Received: 09/16/21 13:40**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 6010D	EPA 3005A	03/15/22	09/21/21 12:36	09/22/21 15:07

**Client ID: KP1-MW0022-003.5-20210916      Lab ID: AE07199-02      Sampled: 09/16/21 10:27      Received: 09/16/21 13:40**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 6010D	EPA 3005A	03/15/22	09/21/21 12:36	09/22/21 15:09

**Client ID: KP1-MW0035-003.0-20210916      Lab ID: AE07199-03      Sampled: 09/16/21 10:48      Received: 09/16/21 13:40**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 6010D	EPA 3005A	03/15/22	09/21/21 12:36	09/22/21 15:14



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**SAMPLE DETECTION SUMMARY**

**Client ID:** KP1-MW0003-003.5-20210916      **Lab ID:** AE07199-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Lead - Total	13.9		4.40	10.0	ug/L	EPA 6010D	

**Client ID:** KP1-MW0022-003.5-20210916      **Lab ID:** AE07199-02

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Lead - Total	15.8		4.40	10.0	ug/L	EPA 6010D	

**Client ID:** KP1-MW0035-003.0-20210916      **Lab ID:** AE07199-03

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Lead - Total	14.6		4.40	10.0	ug/L	EPA 6010D	



**ANALYTICAL RESULTS**

**Description:** KP1-MW0003-003.5-20210916      **Lab Sample ID:** AE07199-01      **Received:** 09/16/21 13:40  
**Matrix:** Ground Water      **Sampled:** 09/16/21 11:09      **Work Order:** AE07199  
**Project:** NASA KSC      **Sampled By:** Greg Kusel/Dustin Slater

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

*^ - ENCO Orlando certified analyte [NELAC E83182]*

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Lead [7439-92-1]^	13.9		ug/L	1	4.40	10.0	1121021	EPA 6010D	09/22/21 15:07	NRB	

**Description:** KP1-MW0022-003.5-20210916      **Lab Sample ID:** AE07199-02      **Received:** 09/16/21 13:40  
**Matrix:** Ground Water      **Sampled:** 09/16/21 10:27      **Work Order:** AE07199  
**Project:** NASA KSC      **Sampled By:** Greg Kusel/Dustin Slater

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

*^ - ENCO Orlando certified analyte [NELAC E83182]*

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Lead [7439-92-1]^	15.8		ug/L	1	4.40	10.0	1121021	EPA 6010D	09/22/21 15:09	NRB	

**Description:** KP1-MW0035-003.0-20210916      **Lab Sample ID:** AE07199-03      **Received:** 09/16/21 13:40  
**Matrix:** Ground Water      **Sampled:** 09/16/21 10:48      **Work Order:** AE07199  
**Project:** NASA KSC      **Sampled By:** Greg Kusel/Dustin Slater

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

*^ - ENCO Orlando certified analyte [NELAC E83182]*

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Lead [7439-92-1]^	14.6		ug/L	1	4.40	10.0	1121021	EPA 6010D	09/22/21 15:14	NRB	

**QUALITY CONTROL DATA**

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

**Batch 1I21021 - EPA 3005A**

**Blank (1I21021-BLK1)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 13:17

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	4.40	U	10.0	ug/L							

**Blank (1I21021-BLK2)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 16:39

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	4.40	U	10.0	ug/L							

**LCS (1I21021-BS1)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 13:20

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	500		10.0	ug/L	498		100	80-120			

**LCS (1I21021-BS2)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 16:42

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	513		10.0	ug/L	498		103	80-120			

**Matrix Spike (1I21021-MS1)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 13:26

Source: AE06543-02

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	497		10.0	ug/L	498	7.53	98	75-125			

**Matrix Spike (1I21021-MS2)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 13:35

Source: AE06543-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	509		10.0	ug/L	498	7.69	101	75-125			

**Matrix Spike Dup (1I21021-MSD1)**

Prepared: 09/21/2021 12:36 Analyzed: 09/22/2021 13:29

Source: AE06543-02

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	504		10.0	ug/L	498	7.53	100	75-125	1	20	

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AEO7199

<b>ENCO</b>	<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1				
	Project Name: NASA KSC				PO No.		Project No. 60610905 Subs 2021-23 Subs 2021-23		Phase:		
	Site Location: KARS Park 1 LOC#9				Send Invoice To: Instructions in MSA # 195-24548-GV03				EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings		
	TO No.: 80KSCO19F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando			Report to: Jennifer Chastain Cc: Teresa Amentt Jennings			
Sampler/Phone #		Greg Kusel / (772) 631-7426		Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO			Site-Specific WS#15 from QAPP: 15-35		

Lab Name: ENCO		Turnaround Time(specify):		Standard 14 day		Sample Analysis Requested (Enter number of containers for each test)																		
Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HNO3 <2															Comments
	KP1-MW0003- <del>20210916</del> <sup>003.5-20210916</sup>	KP1-MW0003	20210916	1109	WG	N	G	1	1															
	KP1-MW0022- <del>20210916</del> <sup>003.5-20210916</sup>	KP1-MW0022	20210916	1027	WG	N	G	1	1															
	KP1-MW0035- <del>20210916</del> <sup>003.0-20210916</sup>	KP1-MW0035	20210916	1048	WG	N	G	1	1															

<b>Field Comments:</b> Report only per QAPP WS #15-35			<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:		
1 <i>[Signature]</i>	09/13/21	11:50	1 <i>[Signature]</i>	9/16/21	0700	Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
2 <i>[Signature]</i>	9/16/21	1340	2 <i>[Signature]</i>	9/16/21	1340	Shipping Company:		
3			3			Tracking No:		
						Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19  
*[Signature]*  
 MUD-334 0.1x





# ENCO Laboratories

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10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Tuesday, October 5, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC**

**ENCO Workorder(s): AE07201**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, September 22, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



www.encolabs.com

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: IA-IDW01-20210922      Lab ID: AE07201-01      Sampled: 09/22/21 10:45      Received: 09/22/21 15:02**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 6010D	EPA 3005A	03/21/22	10/01/21 13:48	10/04/21 11:28
EPA 8260D	EPA 5030B_MS	10/06/21	09/27/21 00:00	09/27/21 14:31

**Client ID: IA-TB01-20210922      Lab ID: AE07201-02      Sampled: 09/22/21 10:30      Received: 09/22/21 15:02**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	10/06/21	09/27/21 00:00	09/27/21 15:00



www.encolabs.com

**SAMPLE DETECTION SUMMARY**

**Client ID:** IA-IDW01-20210922      **Lab ID:** AE07201-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Trichlorofluoromethane	25		0.94	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

<b>Description:</b> IA-IDW01-20210922	<b>Lab Sample ID:</b> AE07201-01	<b>Received:</b> 09/22/21 15:02
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 09/22/21 10:45	<b>Work Order:</b> AE07201
<b>Project:</b> NASA KSC	<b>Sampled By:</b> Greg Kusel/Dustin Slater	

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1127008	EPA 8260D	09/27/21 14:31	nmc	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1127008	EPA 8260D	09/27/21 14:31	nmc	
Trichlorofluoromethane [75-69-4]^	25		ug/L	1	0.94	1.0	1127008	EPA 8260D	09/27/21 14:31	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	47	1	50.0	93 %	41-142	1127008	EPA 8260D	09/27/21 14:31	nmc	
Dibromofluoromethane	49	1	50.0	98 %	53-146	1127008	EPA 8260D	09/27/21 14:31	nmc	
Toluene-d8	45	1	50.0	90 %	41-146	1127008	EPA 8260D	09/27/21 14:31	nmc	

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Lead [7439-92-1]^	4.40	U	ug/L	1	4.40	10.0	1J01038	EPA 6010D	10/04/21 11:28	NRB	

<b>Description:</b> IA-TB01-20210922	<b>Lab Sample ID:</b> AE07201-02	<b>Received:</b> 09/22/21 15:02
<b>Matrix:</b> Water	<b>Sampled:</b> 09/22/21 10:30	<b>Work Order:</b> AE07201
<b>Project:</b> NASA KSC	<b>Sampled By:</b> ENCO ORL	

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1127008	EPA 8260D	09/27/21 15:00	nmc	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1127008	EPA 8260D	09/27/21 15:00	nmc	
Trichlorofluoromethane [75-69-4]^	0.94	U	ug/L	1	0.94	1.0	1127008	EPA 8260D	09/27/21 15:00	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	93 %	41-142	1127008	EPA 8260D	09/27/21 15:00	nmc	
Dibromofluoromethane	48	1	50.0	96 %	53-146	1127008	EPA 8260D	09/27/21 15:00	nmc	
Toluene-d8	45	1	50.0	89 %	41-146	1127008	EPA 8260D	09/27/21 15:00	nmc	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1127008 - EPA 5030B\_MS**

**Blank (1127008-BLK1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 10:42

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	0.86	U	1.0	ug/L							
1,2,4-Trichlorobenzene	0.70	U	1.0	ug/L							
Trichlorofluoromethane	0.94	U	1.0	ug/L							
4-Bromofluorobenzene	47			ug/L	50.0		94	41-142			
Dibromofluoromethane	48			ug/L	50.0		97	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**LCS (1127008-BS1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 08:18

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	23		1.0	ug/L	20.0		113	43-168			
1,2,4-Trichlorobenzene	21		1.0	ug/L	20.0		103	52-159			
Trichlorofluoromethane	25		1.0	ug/L	20.0		126	56-155			
4-Bromofluorobenzene	50			ug/L	50.0		100	41-142			
Dibromofluoromethane	50			ug/L	50.0		99	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike (1127008-MS1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 08:47

**Source: AE07615-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	23		1.0	ug/L	20.0	0.86 U	116	43-168			
1,2,4-Trichlorobenzene	21		1.0	ug/L	20.0	0.70 U	107	52-159			
Trichlorofluoromethane	24		1.0	ug/L	20.0	0.94 U	118	56-155			
4-Bromofluorobenzene	51			ug/L	50.0		101	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike Dup (1127008-MSD1)**

Prepared: 09/27/2021 00:00 Analyzed: 09/27/2021 09:16

**Source: AE07615-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	24		1.0	ug/L	20.0	0.86 U	118	43-168	2	26	
1,2,4-Trichlorobenzene	22		1.0	ug/L	20.0	0.70 U	110	52-159	2	24	
Trichlorofluoromethane	24		1.0	ug/L	20.0	0.94 U	120	56-155	1	22	
4-Bromofluorobenzene	51			ug/L	50.0		101	41-142			
Dibromofluoromethane	51			ug/L	50.0		103	53-146			
Toluene-d8	49			ug/L	50.0		97	41-146			

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

**Batch 1J01038 - EPA 3005A**

**Blank (1J01038-BLK1)**

Prepared: 10/01/2021 13:48 Analyzed: 10/04/2021 11:11

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	4.40	U	10.0	ug/L							

**QUALITY CONTROL DATA**

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

*Batch 1J01038 - EPA 3005A - Continued*

**LCS (1J01038-BS1)**

Prepared: 10/01/2021 13:48 Analyzed: 10/04/2021 11:16

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	481		10.0	ug/L	498		96	80-120			

**Matrix Spike (1J01038-MS1)**

Prepared: 10/01/2021 13:48 Analyzed: 10/04/2021 11:22

Source: AE07044-03

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	474		10.0	ug/L	498	4.40 U	95	75-125			

**Matrix Spike (1J01038-MS2)**

Prepared: 10/01/2021 13:48 Analyzed: 10/04/2021 11:33

Source: AE07201-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	458		10.0	ug/L	498	4.40 U	92	75-125			

**Matrix Spike Dup (1J01038-MSD1)**

Prepared: 10/01/2021 13:48 Analyzed: 10/04/2021 11:25

Source: AE07044-03

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	471		10.0	ug/L	498	4.40 U	94	75-125	0.6	20	

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AE07201

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1	
Project Name: NASA KSC				PO No.		Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase:	
Site Location: Industrial Area IDW				Send Invoice To: Instructions in MSA # 195-24548-GV03		EDD to: Jennifer Chastain Cc: Teresa Amendt Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amendt Jennings	
Sampler/Phone #		Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO		Site-Specific WS# 15 from QAPP: 15-39	

Lab Name: ENCO		Turnaround Time(specify): Standard 14 day		Sample Analysis Requested (Enter number of containers for each test)										Comments						
Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	4 DEG C	HNO3 <2	4 DEG C									
	IA-IDW01-202109 22	IA-IDW01	20210922	1045	WG	N	G	6	3	1	2									
	IA-TB01-202109 22	IA-TB01	20210922	1030	WQ	TB	G	3	3											

<b>Field Comments:</b> Report only per QAPP WS #15-39			<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:		
1 [Signature]	09/13/21	12:20	1 [Signature]	9/22/21	0700	Samples Iced?(check) Yes ___ No ___		
2 [Signature]	9/22/21	1400	2 [Signature]	09/22/21	15:02	Shipping Company:		
3			3 [Signature]			Tracking No:		
						Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19

Mud Red. 195 4.9°C





September 28, 2021

Kaitlin Dylnicki  
Environmental Conservation Laboratories, Inc.  
10775 Central Port Drive  
Orlando, Florida 32824

Re: NASA PFAS - Dylnicki  
Work Order: 556641  
SDG: AE07201

Dear Kaitlin Dylnicki:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on September 23, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4523.

Sincerely,

Grace Bodiford for  
Samuel Hogan  
Project Manager

Purchase Order: GELP20-0372  
Enclosures

## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENCL001 Environmental Conservation Laboratories

Client SDG: AE07201 GEL Work Order: 556641

**The Qualifiers in this report are defined as follows:**

\* A quality control analyte recovery is outside of specified acceptance criteria

\*\* Analyte is a Tracer compound

\*\* Analyte is a surrogate compound

I The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Samuel Hogan.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: September 28, 2021

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW01-20210922	Project: ENCL00421
Sample ID: 556641001	Client ID: ENCL001
Matrix: Ground Water	
Collect Date: 22-SEP-21 10:45	
Receive Date: 23-SEP-21	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>LCMSMS PFCs</b>												
<b>EPA 537.1 Mod PFCs by LC-MS/MS "As Received"</b>												
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	U	ND	0.000608	0.00173	ug/L	0.0184	1	JMB3	09/24/21	1622	2178044	1
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	U	ND	0.000608	0.00184	ug/L	0.0184	1					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	U	ND	0.000608	0.00172	ug/L	0.0184	1					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	ND	0.00122	0.00368	ug/L	0.0184	1					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	ND	0.00122	0.00368	ug/L	0.0184	1					
Perfluorobutane sulfonic acid (PFBS)		0.00305	0.000608	0.00164	ug/L	0.0184	1					
Perfluorodecanoic acid (PFDA)	U	ND	0.000718	0.00184	ug/L	0.0184	1					
Perfluorododecanoic acid (PFDOA)	U	ND	0.000608	0.00184	ug/L	0.0184	1					
Perfluoroheptanoic acid (PFHpA)		0.00555	0.000608	0.00184	ug/L	0.0184	1					
Perfluorohexane sulfonic acid (PFHxS)		0.0276	0.000608	0.00168	ug/L	0.0184	1					
Perfluorohexanoic acid (PFHxA)		0.00805	0.000736	0.00184	ug/L	0.0184	1					
Perfluorononanoic acid (PFNA)	I	0.000908	0.000608	0.00184	ug/L	0.0184	1					
Perfluorooctane sulfonic acid (PFOS)		0.0659	0.000736	0.00184	ug/L	0.0184	1					
Perfluorooctanoic acid (PFOA)		0.00743	0.000736	0.00184	ug/L	0.0184	1					
Perfluorotetradecanoic acid (PFTDA)	U	ND	0.000736	0.00184	ug/L	0.0184	1					
Perfluorotridecanoic acid (PFTTrDA)	U	ND	0.000608	0.00184	ug/L	0.0184	1					
Perfluoroundecanoic acid (PFUnDA)	U	ND	0.000608	0.00184	ug/L	0.0184	1					
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	U	ND	0.000608	0.00184	ug/L	0.0184	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 537.1 Mod, PFAS, Compl PFCs Extraction in Liquid		LMI	09/24/21	0857	2178043

# GEL LABORATORIES LLC

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## Certificate of Analysis

Report Date: September 28, 2021

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW01-20210922  
Sample ID: 556641001

Project: ENCL00421  
Client ID: ENCL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
The following Analytical Methods were performed:											
Method	Description		Analyst Comments								
1	EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15										

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

# GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

## QC Summary

Report Date: September 28, 2021

Page 1 of 6

Environmental Conservation Laboratories, Inc.  
10775 Central Port Drive  
Orlando, Florida

Contact: Kaitlin Dylnicki

Workorder: 556641

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2178044										
QC1204917289 LCS											
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0183			0.0117	ug/L		64	(59%-144%)	JMB3	09/24/21	15:43
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0194			0.0155	ug/L		80	(67%-136%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0181			0.0153	ug/L		85	(68%-135%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0194			0.0176	ug/L		91	(67%-144%)		09/27/21	12:10
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0194			0.0183	ug/L		95	(57%-139%)		09/24/21	15:43
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0194			0.0155	ug/L		80	(59%-145%)			
Perfluorobutane sulfonic acid (PFBS)	0.0172			0.0142	ug/L		82	(70%-144%)			
Perfluorodecanoic acid (PFDA)	0.0194			0.0166	ug/L		86	(65%-145%)			
Perfluorododecanoic acid (PFDOA)	0.0194			0.0176	ug/L		91	(65%-137%)			
Perfluoroheptanoic acid (PFHpA)	0.0194			0.0156	ug/L		81	(71%-133%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0177			0.0140	ug/L		79	(67%-145%)			
Perfluorohexanoic acid (PFHxA)	0.0194			0.0160	ug/L		83	(70%-138%)			
Perfluorononanoic acid (PFNA)	0.0194			0.0152	ug/L		78	(69%-133%)			
Perfluorooctane sulfonic acid (PFOS)	0.0194			0.0166	ug/L		86	(65%-133%)			

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## QC Summary

Workorder: 556641

Page 2 of 6

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2178044										
Perfluorooctanoic acid (PFOA)	0.0194			0.0166	ug/L		86	(66%-139%)	JMB3	09/24/21	15:43
Perfluorotetradecanoic acid (PFTDA)	0.0194			0.0173	ug/L		89	(66%-138%)			
Perfluorotridecanoic acid (PFTTrDA)	0.0194			0.0164	ug/L		85	(58%-140%)			
Perfluoroundecanoic acid (PFUnDA)	0.0194			0.0159	ug/L		82	(63%-135%)			
QC1204917288 MB											
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)			U	ND	ug/L					09/24/21	15:30
4,8-Dioxa-3H-perfluorononanoic acid (DONA)			U	ND	ug/L						
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)			U	ND	ug/L						
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)			U	ND	ug/L					09/27/21	11:49
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)			U	ND	ug/L					09/24/21	15:30
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)			U	ND	ug/L						
Perfluorobutane sulfonic acid (PFBS)			U	ND	ug/L						
Perfluorodecanoic acid (PFDA)			U	ND	ug/L						
Perfluorododecanoic acid (PFDOA)			U	ND	ug/L						
Perfluoroheptanoic acid (PFHpA)			U	ND	ug/L						
Perfluorohexane sulfonic acid (PFHxS)			U	ND	ug/L						

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 556641

Page 3 of 6

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2178044										
Perfluorohexanoic acid (PFHxA)			U	ND	ug/L				JMB3	09/24/21	15:30
Perfluorononanoic acid (PFNA)			U	ND	ug/L						
Perfluorooctane sulfonic acid (PFOS)			U	ND	ug/L						
Perfluorooctanoic acid (PFOA)			U	ND	ug/L						
Perfluorotetradecanoic acid (PFTDA)			U	ND	ug/L						
Perfluorotridecanoic acid (PFTTrDA)			U	ND	ug/L						
Perfluoroundecanoic acid (PFUnDA)			U	ND	ug/L						
QC1204917290 556645003 MS											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0173	U	ND	0.0120	ug/L		69	(42%-138%)		09/24/21	17:14
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0184	U	ND	0.0153	ug/L		83	(62%-132%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0171	U	ND	0.0136	ug/L		80	(54%-139%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0184		0.00169	0.0208	ug/L		104	(51%-159%)		09/27/21	13:34
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0184	U	ND	0.0201	ug/L		110	(38%-148%)		09/24/21	17:14
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0184	U	ND	0.0157	ug/L		85	(40%-144%)			
Perfluorobutane sulfonic acid (PFBS)	0.0162		0.00837	0.0233	ug/L		92	(52%-147%)			
Perfluorodecanoic acid (PFDA)	0.0184	U	ND	0.0158	ug/L		86	(44%-143%)			

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 556641

Page 4 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2178044										
Perfluorododecanoic acid (PFDOA)	0.0184	U	ND	0.0171	ug/L		93	(45%-142%)	JMB3	09/24/21	17:14
Perfluoroheptanoic acid (PFHpA)	0.0184		0.00235	0.0188	ug/L		90	(51%-149%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0167	I	0.00135	0.0147	ug/L		80	(50%-148%)			
Perfluorohexanoic acid (PFHxA)	0.0184		0.00421	0.0195	ug/L		83	(50%-150%)			
Perfluorononanoic acid (PFNA)	0.0184	U	ND	0.0157	ug/L		86	(54%-146%)			
Perfluorooctane sulfonic acid (PFOS)	0.0184		0.00604	0.0227	ug/L		91	(42%-150%)			
Perfluorooctanoic acid (PFOA)	0.0184		0.00701	0.0250	ug/L		98	(50%-151%)			
Perfluorotetradecanoic acid (PFTDA)	0.0184	U	ND	0.0169	ug/L		92	(41%-148%)			
Perfluorotridecanoic acid (PFTTrDA)	0.0184	U	ND	0.0159	ug/L		87	(41%-142%)			
Perfluoroundecanoic acid (PFUnDA)	0.0184	U	ND	0.0167	ug/L		91	(44%-141%)			
QC1204917291 556645003 MSD											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0179	U	ND	0.0115	ug/L	4	64	(0%-36%)		09/24/21	17:27
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0190	U	ND	0.0164	ug/L	7	86	(0%-28%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0177	U	ND	0.0143	ug/L	5	81	(0%-33%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0190		0.00169	0.0212	ug/L	2	103	(0%-28%)		09/27/21	13:55
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0190	U	ND	0.0195	ug/L	3	103	(0%-36%)		09/24/21	17:27



# GEL LABORATORIES LLC

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## QC Summary

Workorder: 556641

Page 5 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2178044										
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0190	U	ND	0.0161	ug/L	3	85	(0%-36%)	JMB3	09/24/21	17:27
Perfluorobutane sulfonic acid (PFBS)	0.0168		0.00837	0.0240	ug/L	3	93	(0%-27%)			
Perfluorodecanoic acid (PFDA)	0.0190	U	ND	0.0174	ug/L	9	91	(0%-35%)			
Perfluorododecanoic acid (PFDOA)	0.0190	U	ND	0.0172	ug/L	0	91	(0%-30%)			
Perfluoroheptanoic acid (PFHpA)	0.0190		0.00235	0.0205	ug/L	9	95	(0%-26%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0173	I	0.00135	0.0154	ug/L	5	81	(0%-31%)			
Perfluorohexanoic acid (PFHxA)	0.0190		0.00421	0.0215	ug/L	10	91	(0%-26%)			
Perfluorononanoic acid (PFNA)	0.0190	U	ND	0.0167	ug/L	6	88	(0%-30%)			
Perfluorooctane sulfonic acid (PFOS)	0.0190		0.00604	0.0231	ug/L	2	90	(0%-31%)			
Perfluorooctanoic acid (PFOA)	0.0190		0.00701	0.0247	ug/L	1	93	(0%-28%)			
Perfluorotetradecanoic acid (PFTDA)	0.0190	U	ND	0.0176	ug/L	4	93	(0%-32%)			
Perfluorotridecanoic acid (PFTrDA)	0.0190	U	ND	0.0166	ug/L	4	87	(0%-35%)			
Perfluoroundecanoic acid (PFUnDA)	0.0190	U	ND	0.0172	ug/L	3	91	(0%-34%)			

**Notes:**

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 556641

Page 6 of 6

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
A											
A											
B											
B											
C											
C											
D											
D											
E											
E											
I											
I											
J											
J											
JNX											
JNX											
N											
N											
N											
N/A											
N/A											
N1											
N1											
ND											
ND											
NJ											
NJ											
P											
P											
Q											
Q											
Q											
Q											
R											
R											
U											
U											
UJ											
UJ											
X											
X											
Y											
Y											
^											
^											

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**LCMSMS-Misc  
Technical Case Narrative  
Environmental Conservation Laboratories  
SDG #: AE07201  
Work Order #: 556641**

**Product:** The Extraction and Analysis of Per and Polyfluoroalkyl Substances Using LCMSMS

**Analytical Method:** EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15

**Analytical Procedure:** GL-OA-E-076 REV# 12

**Analytical Batches:** 2178044 and 2178043

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
556641001	IA-IDW01-20210922
1204917288	Method Blank (MB)
1204917289	Laboratory Control Sample (LCS)
1204917290	556645003(NonSDG) Matrix Spike (MS)
1204917291	556645003(NonSDG) Matrix Spike Duplicate (MSD)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Technical Information**

**Sample Re-extraction/Re-analysis**

Samples were re-analyzed on a second instrument in order to meet client requirements for a select subset of analytes. 1204917288 (MB), 1204917289 (LCS), 1204917290 (Non SDG 556645003MS) and 1204917291 (Non SDG 556645003MSD).

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

SUBCONTRACT ORDER

ENCO Orlando  
AE07201

556641

SENDING LABORATORY:

ENCO Orlando  
10775 Central Port Drive  
Orlando, FL 32824  
Phone: 407.826.5314  
Fax: 407.850.6945  
Project Manager: Kaitlin Dylnicki




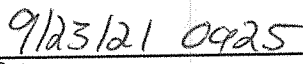
RECEIVING LABORATORY:

GEL Laboratories, Inc. (SC)  
2040 Savage Road  
Charleston, SC 29407  
Phone :(843) 556-8171  
Fax: (843) 766-1178  
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	IA-IDW01-20210922	Ground Water	22-Sep-21 10:45	

Analysis	Due	Expires	Analysis Comments
PFAS	29-Sep-21 15:00	06-Oct-21 10:45	14 analyte 537 GELP21-0027
<i>Containers Supplied:</i>			
5mLV (A)	250mLP (B)	250mLP (C)	

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>ENCL</u>	SDG/AR/COC/Work Order: <u>556641</u>
Received By: <u>PG</u>	Date Received: <u>9/23/21</u>
Carrier and Tracking Number	Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>0201530788325278</u>

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
A) Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____ If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___
B) Did the client designate the samples are to be received as radioactive?		<input checked="" type="checkbox"/>	COC notation or radioactive stickers on containers equal client designation.
C) Did the RSO classify the samples as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> <input checked="" type="checkbox"/> CPM/mR/hr Classified as: Rad 1    Rad 2    Rad 3
D) Did the client designate samples are hazardous?		<input checked="" type="checkbox"/>	COC notation or hazard labels on containers equal client designation.
E) Did the RSO identify possible hazards?		<input checked="" type="checkbox"/>	If D or E is yes, select Hazards below. PCB's    Flammable    Foreign Soil    RCRA    Asbestos    Beryllium    Other: _____

Sample Receipt Criteria	Yes	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>		Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>		Circle Applicable: Client contacted and provided COC    COC created upon receipt
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>		Preservation Method: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry ice <input type="checkbox"/> None    Other: _____ *all temperatures are recorded in Celsius    TEMP: <u>1</u>
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>		Temperature Device Serial #: <u>12021</u> Secondary Temperature Device Serial # (If Applicable): _____
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>		Circle Applicable: Seals broken    Damaged container    Leaking container    Other (describe)
6 Samples requiring chemical preservation at proper pH?		<input checked="" type="checkbox"/>	Sample ID's and Containers Affected: _____ If Preservation added, Lot#: _____
7 Do any samples require Volatile Analysis?		<input checked="" type="checkbox"/>	If Yes, are Encores or Soil Kits present for solids? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes ___ No ___ NA ___ Sample ID's and containers affected: _____
8 Samples received within holding time?	<input checked="" type="checkbox"/>		ID's and tests affected: _____
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>		ID's and containers affected: _____
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>		Circle Applicable: No dates on containers    No times on containers    COC missing info    Other (describe)
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>		Circle Applicable: No container count on COC    Other (describe)
12 Are sample containers identifiable as GEL provided by use of GEL labels?		<input checked="" type="checkbox"/>	
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>		Circle Applicable: Not relinquished    Other (describe)

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials GB Date 9/24/21 Page 1 of 1

**List of current GEL Certifications as of 28 September 2021**

<b>State</b>	<b>Certification</b>
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122021-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-165
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-21-19
Utah NELAP	SC000122021-35
Vermont	VT87156
Virginia NELAP	460202
Washington	C780



# ENCO Laboratories

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Orlando FL, 32824

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Tuesday, November 30, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC -**

**ENCO Workorder(s): AE09084**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, November 23, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: LETF-MW0001-025.0-20211123      Lab ID: AE09084-01      Sampled: 11/23/21 10:10      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 15:23

**Client ID: LETF-MW0002-025.0-20211123      Lab ID: AE09084-02      Sampled: 11/23/21 11:35      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 15:51

**Client ID: LETF-MW0005-025.0-20211123      Lab ID: AE09084-03      Sampled: 11/23/21 11:30      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 16:19

**Client ID: LETF-MW0007-036.0-20211123      Lab ID: AE09084-04      Sampled: 11/23/21 10:50      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 16:46

**Client ID: LETF-PSB-MW0001I-024.5-2021112      Lab ID: AE09084-05      Sampled: 11/23/21 10:55      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 17:14

**Client ID: LETF-PSB-MW0002I-024.5-2021112      Lab ID: AE09084-06      Sampled: 11/23/21 10:16      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 17:42

**Client ID: LETF-TB01-20211123      Lab ID: AE09084-07      Sampled: 11/23/21 08:00      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/07/21	11/24/21 09:21	11/24/21 18:10





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**SAMPLE DETECTION SUMMARY**

**Client ID:** LETF-MW0001-025.0-20211123      **Lab ID:** AE09084-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	7.0		0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** LETF-MW0001-025.0-20211123      **Lab Sample ID:** AE09084-01      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 10:10      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	7.0		ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 15:23	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	51	1	50.0	102 %	41-142		1K24012	EPA 8260D	11/24/21 15:23	KKW	
<i>Dibromofluoromethane</i>	51	1	50.0	102 %	53-146		1K24012	EPA 8260D	11/24/21 15:23	KKW	
<i>Toluene-d8</i>	52	1	50.0	104 %	41-146		1K24012	EPA 8260D	11/24/21 15:23	KKW	

**Description:** LETF-MW0002-025.0-20211123      **Lab Sample ID:** AE09084-02      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 11:35      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 15:51	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	51	1	50.0	103 %	41-142		1K24012	EPA 8260D	11/24/21 15:51	KKW	
<i>Dibromofluoromethane</i>	50	1	50.0	101 %	53-146		1K24012	EPA 8260D	11/24/21 15:51	KKW	
<i>Toluene-d8</i>	53	1	50.0	105 %	41-146		1K24012	EPA 8260D	11/24/21 15:51	KKW	

**Description:** LETF-MW0005-025.0-20211123      **Lab Sample ID:** AE09084-03      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 11:30      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 16:19	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	51	1	50.0	103 %	41-142		1K24012	EPA 8260D	11/24/21 16:19	KKW	
<i>Dibromofluoromethane</i>	51	1	50.0	101 %	53-146		1K24012	EPA 8260D	11/24/21 16:19	KKW	
<i>Toluene-d8</i>	52	1	50.0	104 %	41-146		1K24012	EPA 8260D	11/24/21 16:19	KKW	

**Description:** LETF-MW0007-036.0-20211123      **Lab Sample ID:** AE09084-04      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 10:50      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 16:46	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	52	1	50.0	103 %	41-142		1K24012	EPA 8260D	11/24/21 16:46	KKW	
<i>Dibromofluoromethane</i>	51	1	50.0	102 %	53-146		1K24012	EPA 8260D	11/24/21 16:46	KKW	
<i>Toluene-d8</i>	52	1	50.0	104 %	41-146		1K24012	EPA 8260D	11/24/21 16:46	KKW	

**ANALYTICAL RESULTS**

**Description:** LETF-PSB-MW0001I-024.5-20211123      **Lab Sample ID:** AE09084-05      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 10:55      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 17:14	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	<i>52</i>	<i>1</i>	<i>50.0</i>	<i>103 %</i>	<i>41-142</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:14</i>	<i>KKW</i>	
<i>Dibromofluoromethane</i>	<i>51</i>	<i>1</i>	<i>50.0</i>	<i>101 %</i>	<i>53-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:14</i>	<i>KKW</i>	
<i>Toluene-d8</i>	<i>54</i>	<i>1</i>	<i>50.0</i>	<i>108 %</i>	<i>41-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:14</i>	<i>KKW</i>	

**Description:** LETF-PSB-MW0002I-024.5-20211123      **Lab Sample ID:** AE09084-06      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/23/21 10:16      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 17:42	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	<i>51</i>	<i>1</i>	<i>50.0</i>	<i>102 %</i>	<i>41-142</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:42</i>	<i>KKW</i>	
<i>Dibromofluoromethane</i>	<i>52</i>	<i>1</i>	<i>50.0</i>	<i>103 %</i>	<i>53-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:42</i>	<i>KKW</i>	
<i>Toluene-d8</i>	<i>53</i>	<i>1</i>	<i>50.0</i>	<i>106 %</i>	<i>41-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 17:42</i>	<i>KKW</i>	

**Description:** LETF-TB01-20211123      **Lab Sample ID:** AE09084-07      **Received:** 11/23/21 16:30  
**Matrix:** Water      **Sampled:** 11/23/21 08:00      **Work Order:** AE09084  
**Project:** NASA KSC -      **Sampled By:** ENCO - ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 18:10	KKW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	<i>52</i>	<i>1</i>	<i>50.0</i>	<i>103 %</i>	<i>41-142</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 18:10</i>	<i>KKW</i>	
<i>Dibromofluoromethane</i>	<i>50</i>	<i>1</i>	<i>50.0</i>	<i>100 %</i>	<i>53-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 18:10</i>	<i>KKW</i>	
<i>Toluene-d8</i>	<i>53</i>	<i>1</i>	<i>50.0</i>	<i>105 %</i>	<i>41-146</i>		<i>1K24012</i>	<i>EPA 8260D</i>	<i>11/24/21 18:10</i>	<i>KKW</i>	

**QUALITY CONTROL DATA**
**Volatile Organic Compounds by GCMS - Quality Control**
**Batch 1K24012 - EPA 5030B\_MS**
**Blank (1K24012-BLK1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 09:50

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	53			ug/L	50.0		106	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	52			ug/L	50.0		105	41-146			

**LCS (1K24012-BS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 08:55

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Vinyl chloride	16		1.0	ug/L	20.0		81	20-167			
4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	53			ug/L	50.0		106	41-146			

**Matrix Spike (1K24012-MS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 19:33

Source: AE09085-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Vinyl chloride	24		1.0	ug/L	20.0	6.4	87	20-167			
4-Bromofluorobenzene	52			ug/L	50.0		103	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	54			ug/L	50.0		107	41-146			

**Matrix Spike Dup (1K24012-MSD1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 20:00

Source: AE09085-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Vinyl chloride	24		1.0	ug/L	20.0	6.4	88	20-167	0.3	24	
4-Bromofluorobenzene	54			ug/L	50.0		108	41-142			
Dibromofluoromethane	52			ug/L	50.0		104	53-146			
Toluene-d8	53			ug/L	50.0		106	41-146			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AE 04084

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>		COC No.	Page: 1 of 1
Project Name: NASA KSC		PO No. 138224	Project No. 60610905 Subs 2021-23-Subs 2021-23
Site Location: LETF		Send Invoice To: Instructions in MSA # 195-24548-GV03	Phase: EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>	Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando
Sampler/Phone #: Greg Kusel / (772) 631-7426		Deliver Samples To: ENCO	Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Lab Name: ENCO		Turnaround Time(specify): Standard 14 day	Site-Specific WS# 15 from QAPP: 15-11

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Sample Analysis Requested (Enter number of containers for each test)										Comments		
										Total No. of Containers	Vinyl chloride by SW8260B											
	GK LETF-MW0001- <del>202111</del> -025.0-20211123	LETF-MW0001	20211123	1010	WG	N	G	3	3													
	LETF-MW0002- <del>202111</del> -025.0-20211123	LETF-MW0002	20211123	1135	WG	N	G	3	3													
	LETF-MW0005- <del>202111</del> -025.0-20211123	LETF-MW0005	20211123	1130	WG	N	G	3	3													
	LETF-MW0007- <del>202111</del> -036.0-20211123	LETF-MW0007	20211123	1050	WG	N	G	3	3													
	LETF-PSB-MW0001I- <del>202111</del> -024.5-20211123	LETF-PSB-MW0001I	20211123	1055	WG	N	G	3	3													
	LETF-PSB-MW0002I- <del>202111</del> -024.5-20211123	LETF-PSB-MW0002I	20211123	1016	WG	N	G	3	3													
	LETF-TB-20211123-01	LETF-TB-01	20211123	0800	WQ	TB	G	2	2													

<b>Field Comments:</b> Report only per QAPP WS #15-11		<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:	
1 <i>Greg Kusel</i>	11-18-21	15:35	1 <i>Drake Marshall</i>	11/22/21	9:00	Samples Iced?(check) Yes <input type="checkbox"/> No <input type="checkbox"/>	
2 <i>Greg Kusel</i>	11/23/21	1630	2 <i>Drake Marshall</i>	11/23/21	1630	Shipping Company:	
3			3			Tracking No:	
						Date Shipped:	

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19

C-555 0.08



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

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Tuesday, November 30, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC -**

**ENCO Workorder(s): AE09085**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, November 23, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

<b>Client ID: GSSP-MW0013-010.0-20211122</b>		<b>Lab ID: AE09085-01</b>		<b>Sampled: 11/22/21 14:40</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 09:21		11/24/21 10:18	
<b>Client ID: GSSP-MW0019-020.0-20211122</b>		<b>Lab ID: AE09085-02</b>		<b>Sampled: 11/22/21 15:41</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 09:21		11/24/21 10:46	
<b>Client ID: GSSP-MW0020-030.0-20211122</b>		<b>Lab ID: AE09085-03</b>		<b>Sampled: 11/22/21 16:17</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 09:21		11/24/21 11:14	
<b>Client ID: GSSP-MW0020-030.0-20211122</b>		<b>Lab ID: AE09085-03RE1</b>		<b>Sampled: 11/22/21 16:17</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/29/21 00:00		11/29/21 14:04	
<b>Client ID: GSSP-MW0034-010.0-20211122</b>		<b>Lab ID: AE09085-04</b>		<b>Sampled: 11/22/21 16:50</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 09:21		11/24/21 11:41	
<b>Client ID: GSSP-MW0036-035.0-20211122</b>		<b>Lab ID: AE09085-05</b>		<b>Sampled: 11/22/21 15:50</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 09:21		11/24/21 12:09	
<b>Client ID: GSSP-MW0044R-030.0-20211122</b>		<b>Lab ID: AE09085-06</b>		<b>Sampled: 11/22/21 12:33</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 00:00		11/24/21 16:21	
<b>Client ID: GSSP-MW0059-018.5-20211122</b>		<b>Lab ID: AE09085-07</b>		<b>Sampled: 11/22/21 14:00</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 00:00		11/24/21 17:47	
<b>Client ID: GSSP-MW0060-012.5-20211122</b>		<b>Lab ID: AE09085-08</b>		<b>Sampled: 11/22/21 13:16</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 00:00		11/24/21 18:16	
<b>Client ID: GSSP-MW0061-018.5-20211122</b>		<b>Lab ID: AE09085-09</b>		<b>Sampled: 11/22/21 12:44</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 10:25		11/25/21 03:51	
<b>Client ID: GSSP-MW0062-012.5-20211122</b>		<b>Lab ID: AE09085-10</b>		<b>Sampled: 11/22/21 14:23</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 10:25		11/25/21 04:19	
<b>Client ID: GSSP-MW0063-018.5-20211122</b>		<b>Lab ID: AE09085-11</b>		<b>Sampled: 11/22/21 15:05</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 10:25		11/25/21 04:47	
<b>Client ID: GSSP-MW0024R-020.0-20211122</b>		<b>Lab ID: AE09085-12</b>		<b>Sampled: 11/22/21 17:26</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 10:25		11/25/21 05:15	
EPA 8270E	EPA 3511_MS	11/29/21	01/03/22	11/24/21 13:00		11/29/21 14:56	
<b>Client ID: GSSP-MW0035-020.0-20211122</b>		<b>Lab ID: AE09085-13</b>		<b>Sampled: 11/22/21 16:20</b>		<b>Received: 11/23/21 16:30</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>	
EPA 8260D	EPA 5030B_MS	12/06/21		11/24/21 10:25		11/25/21 05:42	
EPA 8270E	EPA 3511_MS	11/29/21	01/03/22	11/24/21 13:00		11/29/21 15:18	





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**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: GSSP-MW0053-020.0-20211122      Lab ID: AE09085-14      Sampled: 11/22/21 16:50      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/06/21	11/24/21 10:25	11/25/21 06:10
EPA 8270E	EPA 3511_MS	11/29/21      01/03/22	11/24/21 13:00	11/29/21 15:40

**Client ID: GSSP-TB-20211122-01      Lab ID: AE09085-15      Sampled: 11/22/21 08:00      Received: 11/23/21 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/06/21	11/24/21 10:25	11/25/21 06:38

**SAMPLE DETECTION SUMMARY**

<b>Client ID: GSSP-MW0013-010.0-20211122</b>		<b>Lab ID: AE09085-01</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	6.4		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0019-020.0-20211122</b>		<b>Lab ID: AE09085-02</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	2.5		0.53	1.0	ug/L	EPA 8260D	
trans-1,2-Dichloroethene	1.0		0.73	1.0	ug/L	EPA 8260D	
Vinyl chloride	81		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0020-030.0-20211122</b>		<b>Lab ID: AE09085-03</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
trans-1,2-Dichloroethene	2.4		0.73	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0020-030.0-20211122</b>		<b>Lab ID: AE09085-03RE1</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	220		3.6	5.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0036-035.0-20211122</b>		<b>Lab ID: AE09085-05</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	1.8		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0059-018.5-20211122</b>		<b>Lab ID: AE09085-07</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	2.2		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0060-012.5-20211122</b>		<b>Lab ID: AE09085-08</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	1.6		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0062-012.5-20211122</b>		<b>Lab ID: AE09085-10</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	0.55	I	0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	7.1		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0024R-020.0-20211122</b>		<b>Lab ID: AE09085-12</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Naphthalene	0.051	I	0.050	0.10	ug/L	EPA 8270E	
<b>Client ID: GSSP-MW0035-020.0-20211122</b>		<b>Lab ID: AE09085-13</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	2.9		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: GSSP-MW0053-020.0-20211122</b>		<b>Lab ID: AE09085-14</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Naphthalene	0.069	I	0.050	0.10	ug/L	EPA 8270E	
Vinyl chloride	63		0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** GSSP-MW0013-010.0-20211122

**Lab Sample ID:** AE09085-01

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 14:40

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24012	EPA 8260D	11/24/21 10:18	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24012	EPA 8260D	11/24/21 10:18	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24012	EPA 8260D	11/24/21 10:18	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24012	EPA 8260D	11/24/21 10:18	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>6.4</b>		ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 10:18	KKW	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	103 %	41-142	1K24012	EPA 8260D	11/24/21 10:18	KKW	
Dibromofluoromethane	50	1	50.0	100 %	53-146	1K24012	EPA 8260D	11/24/21 10:18	KKW	
Toluene-d8	52	1	50.0	105 %	41-146	1K24012	EPA 8260D	11/24/21 10:18	KKW	

**Description:** GSSP-MW0019-020.0-20211122

**Lab Sample ID:** AE09085-02

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 15:41

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	2.5		ug/L	1	0.53	1.0	1K24012	EPA 8260D	11/24/21 10:46	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24012	EPA 8260D	11/24/21 10:46	KKW	
trans-1,2-Dichloroethene [156-60-5]^	1.0		ug/L	1	0.73	1.0	1K24012	EPA 8260D	11/24/21 10:46	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24012	EPA 8260D	11/24/21 10:46	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>81</b>		ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 10:46	KKW	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	105 %	41-142	1K24012	EPA 8260D	11/24/21 10:46	KKW	
Dibromofluoromethane	51	1	50.0	101 %	53-146	1K24012	EPA 8260D	11/24/21 10:46	KKW	
Toluene-d8	52	1	50.0	105 %	41-146	1K24012	EPA 8260D	11/24/21 10:46	KKW	

**ANALYTICAL RESULTS**

**Description:** GSSP-MW0020-030.0-20211122

**Lab Sample ID:** AE09085-03

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 16:17

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24012	EPA 8260D	11/24/21 11:14	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24012	EPA 8260D	11/24/21 11:14	KKW	
<b>trans-1,2-Dichloroethene [156-60-5]^</b>	<b>2.4</b>		ug/L	1	0.73	1.0	1K24012	EPA 8260D	11/24/21 11:14	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24012	EPA 8260D	11/24/21 11:14	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>220</b>		ug/L	5	3.6	5.0	1K29005	EPA 8260D	11/29/21 14:04	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	103 %	41-142	1K24012	EPA 8260D	11/24/21 11:14	KKW	
4-Bromofluorobenzene	40	1	50.0	79 %	41-142	1K29005	EPA 8260D	11/29/21 14:04	nmc	
Dibromofluoromethane	51	1	50.0	101 %	53-146	1K24012	EPA 8260D	11/24/21 11:14	KKW	
Dibromofluoromethane	44	1	50.0	87 %	53-146	1K29005	EPA 8260D	11/29/21 14:04	nmc	
Toluene-d8	53	1	50.0	106 %	41-146	1K24012	EPA 8260D	11/24/21 11:14	KKW	
Toluene-d8	45	1	50.0	90 %	41-146	1K29005	EPA 8260D	11/29/21 14:04	nmc	

**Description:** GSSP-MW0034-010.0-20211122

**Lab Sample ID:** AE09085-04

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 16:50

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24012	EPA 8260D	11/24/21 11:41	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24012	EPA 8260D	11/24/21 11:41	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24012	EPA 8260D	11/24/21 11:41	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24012	EPA 8260D	11/24/21 11:41	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 11:41	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	105 %	41-142	1K24012	EPA 8260D	11/24/21 11:41	KKW	
Dibromofluoromethane	50	1	50.0	100 %	53-146	1K24012	EPA 8260D	11/24/21 11:41	KKW	
Toluene-d8	53	1	50.0	105 %	41-146	1K24012	EPA 8260D	11/24/21 11:41	KKW	

**ANALYTICAL RESULTS**

**Description:** GSSP-MW0036-035.0-20211122      **Lab Sample ID:** AE09085-05      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/22/21 15:50      **Work Order:** AE09085  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24012	EPA 8260D	11/24/21 12:09	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24012	EPA 8260D	11/24/21 12:09	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24012	EPA 8260D	11/24/21 12:09	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24012	EPA 8260D	11/24/21 12:09	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>1.8</b>		ug/L	1	0.71	1.0	1K24012	EPA 8260D	11/24/21 12:09	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	51	1	50.0	102 %	41-142	1K24012	EPA 8260D	11/24/21 12:09	KKW	
Dibromofluoromethane	50	1	50.0	99 %	53-146	1K24012	EPA 8260D	11/24/21 12:09	KKW	
Toluene-d8	53	1	50.0	106 %	41-146	1K24012	EPA 8260D	11/24/21 12:09	KKW	

**Description:** GSSP-MW0044R-030.0-20211122      **Lab Sample ID:** AE09085-06      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/22/21 12:33      **Work Order:** AE09085  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24011	EPA 8260D	11/24/21 16:21	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24011	EPA 8260D	11/24/21 16:21	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24011	EPA 8260D	11/24/21 16:21	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24011	EPA 8260D	11/24/21 16:21	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24011	EPA 8260D	11/24/21 16:21	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	40	1	50.0	81 %	41-142	1K24011	EPA 8260D	11/24/21 16:21	KKW	
Dibromofluoromethane	49	1	50.0	98 %	53-146	1K24011	EPA 8260D	11/24/21 16:21	KKW	
Toluene-d8	47	1	50.0	95 %	41-146	1K24011	EPA 8260D	11/24/21 16:21	KKW	

**Description:** GSSP-MW0059-018.5-20211122      **Lab Sample ID:** AE09085-07      **Received:** 11/23/21 16:30  
**Matrix:** Ground Water      **Sampled:** 11/22/21 14:00      **Work Order:** AE09085  
**Project:** NASA KSC -      **Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24011	EPA 8260D	11/24/21 17:47	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24011	EPA 8260D	11/24/21 17:47	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24011	EPA 8260D	11/24/21 17:47	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24011	EPA 8260D	11/24/21 17:47	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>2.2</b>		ug/L	1	0.71	1.0	1K24011	EPA 8260D	11/24/21 17:47	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	40	1	50.0	79 %	41-142	1K24011	EPA 8260D	11/24/21 17:47	KKW	
Dibromofluoromethane	48	1	50.0	96 %	53-146	1K24011	EPA 8260D	11/24/21 17:47	KKW	
Toluene-d8	46	1	50.0	93 %	41-146	1K24011	EPA 8260D	11/24/21 17:47	KKW	

### ANALYTICAL RESULTS

<b>Description:</b> GSSP-MW0060-012.5-20211122	<b>Lab Sample ID:</b> AE09085-08	<b>Received:</b> 11/23/21 16:30
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 11/22/21 13:16	<b>Work Order:</b> AE09085
<b>Project:</b> NASA KSC -	<b>Sampled By:</b> Greg Kusel	

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24011	EPA 8260D	11/24/21 18:16	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24011	EPA 8260D	11/24/21 18:16	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24011	EPA 8260D	11/24/21 18:16	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24011	EPA 8260D	11/24/21 18:16	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>1.6</b>		ug/L	1	0.71	1.0	1K24011	EPA 8260D	11/24/21 18:16	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	39	1	50.0	78 %	41-142	1K24011	EPA 8260D	11/24/21 18:16	KKW	
Dibromofluoromethane	48	1	50.0	95 %	53-146	1K24011	EPA 8260D	11/24/21 18:16	KKW	
Toluene-d8	47	1	50.0	93 %	41-146	1K24011	EPA 8260D	11/24/21 18:16	KKW	

<b>Description:</b> GSSP-MW0061-018.5-20211122	<b>Lab Sample ID:</b> AE09085-09	<b>Received:</b> 11/23/21 16:30
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 11/22/21 12:44	<b>Work Order:</b> AE09085
<b>Project:</b> NASA KSC -	<b>Sampled By:</b> Greg Kusel	

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 03:51	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 03:51	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 03:51	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 03:51	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 03:51	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	104 %	41-142	1K24018	EPA 8260D	11/25/21 03:51	KKW	
Dibromofluoromethane	51	1	50.0	102 %	53-146	1K24018	EPA 8260D	11/25/21 03:51	KKW	
Toluene-d8	53	1	50.0	107 %	41-146	1K24018	EPA 8260D	11/25/21 03:51	KKW	

<b>Description:</b> GSSP-MW0062-012.5-20211122	<b>Lab Sample ID:</b> AE09085-10	<b>Received:</b> 11/23/21 16:30
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 11/22/21 14:23	<b>Work Order:</b> AE09085
<b>Project:</b> NASA KSC -	<b>Sampled By:</b> Greg Kusel	

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
<b>cis-1,2-Dichloroethene [156-59-2]^</b>	<b>0.55</b>	I	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 04:19	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 04:19	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 04:19	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 04:19	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>7.1</b>		ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 04:19	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	51	1	50.0	101 %	41-142	1K24018	EPA 8260D	11/25/21 04:19	KKW	
Dibromofluoromethane	48	1	50.0	96 %	53-146	1K24018	EPA 8260D	11/25/21 04:19	KKW	
Toluene-d8	52	1	50.0	103 %	41-146	1K24018	EPA 8260D	11/25/21 04:19	KKW	

### ANALYTICAL RESULTS

<b>Description:</b> GSSP-MW0063-018.5-20211122	<b>Lab Sample ID:</b> AE09085-11	<b>Received:</b> 11/23/21 16:30
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 11/22/21 15:05	<b>Work Order:</b> AE09085
<b>Project:</b> NASA KSC -	<b>Sampled By:</b> Greg Kusel	

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 04:47	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 04:47	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 04:47	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 04:47	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 04:47	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	52	1	50.0	105 %	41-142	1K24018	EPA 8260D	11/25/21 04:47	KKW		
Dibromofluoromethane	49	1	50.0	98 %	53-146	1K24018	EPA 8260D	11/25/21 04:47	KKW		
Toluene-d8	52	1	50.0	105 %	41-146	1K24018	EPA 8260D	11/25/21 04:47	KKW		

<b>Description:</b> GSSP-MW0024R-020.0-20211122	<b>Lab Sample ID:</b> AE09085-12	<b>Received:</b> 11/23/21 16:30
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 11/22/21 17:26	<b>Work Order:</b> AE09085
<b>Project:</b> NASA KSC -	<b>Sampled By:</b> Greg Kusel	

#### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 05:15	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 05:15	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 05:15	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 05:15	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 05:15	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	51	1	50.0	102 %	41-142	1K24018	EPA 8260D	11/25/21 05:15	KKW		
Dibromofluoromethane	50	1	50.0	100 %	53-146	1K24018	EPA 8260D	11/25/21 05:15	KKW		
Toluene-d8	52	1	50.0	105 %	41-146	1K24018	EPA 8260D	11/25/21 05:15	KKW		

#### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Naphthalene [91-20-3]^	0.051	I	ug/L	1	0.050	0.10	1K24028	EPA 8270E	11/29/21 14:56	jfi	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
2-Methylnaphthalene-d10	4.4	1	5.71	77 %	50-150	1K24028	EPA 8270E	11/29/21 14:56	jfi		
Fluoranthene-d10	4.9	1	5.71	85 %	50-150	1K24028	EPA 8270E	11/29/21 14:56	jfi		

**ANALYTICAL RESULTS**

**Description:** GSSP-MW0035-020.0-20211122

**Lab Sample ID:** AE09085-13

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 16:20

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 05:42	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 05:42	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 05:42	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 05:42	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>2.9</b>		ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 05:42	KKW	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	51	1	50.0	103 %	41-142	1K24018	EPA 8260D	11/25/21 05:42	KKW	
Dibromofluoromethane	50	1	50.0	100 %	53-146	1K24018	EPA 8260D	11/25/21 05:42	KKW	
Toluene-d8	53	1	50.0	105 %	41-146	1K24018	EPA 8260D	11/25/21 05:42	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1K24028	EPA 8270E	11/29/21 15:18	jfi	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.0	1	5.71	88 %	50-150	1K24028	EPA 8270E	11/29/21 15:18	jfi	
Fluoranthene-d10	6.2	1	5.71	108 %	50-150	1K24028	EPA 8270E	11/29/21 15:18	jfi	

**Description:** GSSP-MW0053-020.0-20211122

**Lab Sample ID:** AE09085-14

**Received:** 11/23/21 16:30

**Matrix:** Ground Water

**Sampled:** 11/22/21 16:50

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 06:10	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 06:10	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 06:10	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 06:10	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>63</b>		ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 06:10	KKW	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	103 %	41-142	1K24018	EPA 8260D	11/25/21 06:10	KKW	
Dibromofluoromethane	49	1	50.0	99 %	53-146	1K24018	EPA 8260D	11/25/21 06:10	KKW	
Toluene-d8	53	1	50.0	106 %	41-146	1K24018	EPA 8260D	11/25/21 06:10	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Naphthalene [91-20-3]^	0.069	I	ug/L	1	0.050	0.10	1K24028	EPA 8270E	11/29/21 15:40	jfi	

**Surrogates**

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.9	1	5.71	102 %	50-150	1K24028	EPA 8270E	11/29/21 15:40	jfi	
Fluoranthene-d10	6.5	1	5.71	114 %	50-150	1K24028	EPA 8270E	11/29/21 15:40	jfi	





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### ANALYTICAL RESULTS

**Description:** GSSP-TB-20211122-01

**Lab Sample ID:** AE09085-15

**Received:** 11/23/21 16:30

**Matrix:** Water

**Sampled:** 11/22/21 08:00

**Work Order:** AE09085

**Project:** NASA KSC -

**Sampled By:** ENCO - ORL

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1K24018	EPA 8260D	11/25/21 06:38	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1K24018	EPA 8260D	11/25/21 06:38	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1K24018	EPA 8260D	11/25/21 06:38	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1K24018	EPA 8260D	11/25/21 06:38	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1K24018	EPA 8260D	11/25/21 06:38	KKW	

#### Surrogates

<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
4-Bromofluorobenzene	51	1	50.0	103 %	41-142	1K24018	EPA 8260D	11/25/21 06:38	KKW	
Dibromofluoromethane	51	1	50.0	101 %	53-146	1K24018	EPA 8260D	11/25/21 06:38	KKW	
Toluene-d8	52	1	50.0	105 %	41-146	1K24018	EPA 8260D	11/25/21 06:38	KKW	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1K24011 - EPA 5030B\_MS**

**Blank (1K24011-BLK1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 11:33

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Tetrachloroethene	0.76	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	40			ug/L	50.0		79	41-142			
Dibromofluoromethane	47			ug/L	50.0		94	53-146			
Toluene-d8	46			ug/L	50.0		92	41-146			

**LCS (1K24011-BS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 09:08

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0		119	56-128			
Tetrachloroethene	21		1.0	ug/L	20.0		103	60-147			
trans-1,2-Dichloroethene	24		1.0	ug/L	20.0		119	54-134			
Trichloroethene	24		1.0	ug/L	20.0		119	62-135			
Vinyl chloride	31		1.0	ug/L	20.0		154	20-167			
4-Bromofluorobenzene	41			ug/L	50.0		82	41-142			
Dibromofluoromethane	47			ug/L	50.0		95	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

**Matrix Spike (1K24011-MS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 10:06

**Source: AE09336-01**

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0	0.53 U	125	56-128			
Tetrachloroethene	20		1.0	ug/L	20.0	0.76 U	100	60-147			
trans-1,2-Dichloroethene	26		1.0	ug/L	20.0	0.73 U	130	54-134			
Trichloroethene	26		1.0	ug/L	20.0	0.89 U	128	62-135			
Vinyl chloride	27		1.0	ug/L	20.0	0.71 U	134	20-167			
4-Bromofluorobenzene	39			ug/L	50.0		79	41-142			
Dibromofluoromethane	47			ug/L	50.0		94	53-146			
Toluene-d8	46			ug/L	50.0		92	41-146			

**Matrix Spike Dup (1K24011-MSD1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 10:35

**Source: AE09336-01**

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0	0.53 U	123	56-128	1	17	
Tetrachloroethene	20		1.0	ug/L	20.0	0.76 U	100	60-147	0.4	21	
trans-1,2-Dichloroethene	25		1.0	ug/L	20.0	0.73 U	127	54-134	3	20	
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	125	62-135	3	20	
Vinyl chloride	27		1.0	ug/L	20.0	0.71 U	133	20-167	1	24	
4-Bromofluorobenzene	40			ug/L	50.0		80	41-142			
Dibromofluoromethane	46			ug/L	50.0		92	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Batch 1K24012 - EPA 5030B\_MS**

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1K24012 - EPA 5030B\_MS - Continued**

**Blank (1K24012-BLK1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 09:50

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Tetrachloroethene	0.76	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
<i>4-Bromofluorobenzene</i>	<i>53</i>			<i>ug/L</i>	<i>50.0</i>		<i>106</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>50</i>			<i>ug/L</i>	<i>50.0</i>		<i>100</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>52</i>			<i>ug/L</i>	<i>50.0</i>		<i>105</i>	<i>41-146</i>			

**LCS (1K24012-BS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 08:55

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0		98	56-128			
Tetrachloroethene	20		1.0	ug/L	20.0		99	60-147			
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0		103	54-134			
Trichloroethene	19		1.0	ug/L	20.0		94	62-135			
Vinyl chloride	16		1.0	ug/L	20.0		81	20-167			
<i>4-Bromofluorobenzene</i>	<i>53</i>			<i>ug/L</i>	<i>50.0</i>		<i>105</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>51</i>			<i>ug/L</i>	<i>50.0</i>		<i>102</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>53</i>			<i>ug/L</i>	<i>50.0</i>		<i>106</i>	<i>41-146</i>			

**Matrix Spike (1K24012-MS1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 19:33

Source: AE09085-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0	0.53 U	100	56-128			
Tetrachloroethene	20		1.0	ug/L	20.0	0.76 U	100	60-147			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	112	54-134			
Trichloroethene	20		1.0	ug/L	20.0	0.89 U	100	62-135			
Vinyl chloride	24		1.0	ug/L	20.0	6.4	87	20-167			
<i>4-Bromofluorobenzene</i>	<i>52</i>			<i>ug/L</i>	<i>50.0</i>		<i>103</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>50</i>			<i>ug/L</i>	<i>50.0</i>		<i>100</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>54</i>			<i>ug/L</i>	<i>50.0</i>		<i>107</i>	<i>41-146</i>			

**Matrix Spike Dup (1K24012-MSD1)**

Prepared: 11/24/2021 00:00 Analyzed: 11/24/2021 20:00

Source: AE09085-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0	0.53 U	98	56-128	2	17	
Tetrachloroethene	20		1.0	ug/L	20.0	0.76 U	102	60-147	2	21	
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.73 U	105	54-134	6	20	
Trichloroethene	19		1.0	ug/L	20.0	0.89 U	97	62-135	3	20	
Vinyl chloride	24		1.0	ug/L	20.0	6.4	88	20-167	0.3	24	
<i>4-Bromofluorobenzene</i>	<i>54</i>			<i>ug/L</i>	<i>50.0</i>		<i>108</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>52</i>			<i>ug/L</i>	<i>50.0</i>		<i>104</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>53</i>			<i>ug/L</i>	<i>50.0</i>		<i>106</i>	<i>41-146</i>			

**Batch 1K24018 - EPA 5030B\_MS**

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1K24018 - EPA 5030B\_MS - Continued**

**Blank (1K24018-BLK1)**

Prepared: 11/24/2021 10:25 Analyzed: 11/24/2021 23:14

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Tetrachloroethene	0.76	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	52			ug/L	50.0		104	41-142			
Dibromofluoromethane	49			ug/L	50.0		98	53-146			
Toluene-d8	52			ug/L	50.0		103	41-146			

**LCS (1K24018-BS1)**

Prepared: 11/24/2021 10:25 Analyzed: 11/24/2021 21:23

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	19		1.0	ug/L	20.0		96	56-128			
Tetrachloroethene	18		1.0	ug/L	20.0		88	60-147			
trans-1,2-Dichloroethene	20		1.0	ug/L	20.0		101	54-134			
Trichloroethene	18		1.0	ug/L	20.0		89	62-135			
Vinyl chloride	17		1.0	ug/L	20.0		84	20-167			
4-Bromofluorobenzene	52			ug/L	50.0		104	41-142			
Dibromofluoromethane	53			ug/L	50.0		106	53-146			
Toluene-d8	54			ug/L	50.0		108	41-146			

**Matrix Spike (1K24018-MS1)**

Prepared: 11/24/2021 10:25 Analyzed: 11/24/2021 21:51

**Source: AE09337-01**

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.53 U	106	56-128			
Tetrachloroethene	21		1.0	ug/L	20.0	0.76 U	106	60-147			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.73 U	112	54-134			
Trichloroethene	20		1.0	ug/L	20.0	0.89 U	101	62-135			
Vinyl chloride	20		1.0	ug/L	20.0	0.71 U	99	20-167			
4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	51			ug/L	50.0		103	53-146			
Toluene-d8	53			ug/L	50.0		105	41-146			

**Matrix Spike Dup (1K24018-MSD1)**

Prepared: 11/24/2021 10:25 Analyzed: 11/24/2021 22:19

**Source: AE09337-01**

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	20		1.0	ug/L	20.0	0.53 U	101	56-128	4	17	
Tetrachloroethene	20		1.0	ug/L	20.0	0.76 U	98	60-147	7	21	
trans-1,2-Dichloroethene	21		1.0	ug/L	20.0	0.73 U	106	54-134	6	20	
Trichloroethene	19		1.0	ug/L	20.0	0.89 U	97	62-135	4	20	
Vinyl chloride	19		1.0	ug/L	20.0	0.71 U	96	20-167	4	24	
4-Bromofluorobenzene	52			ug/L	50.0		103	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	52			ug/L	50.0		104	41-146			

**Batch 1K29005 - EPA 5030B\_MS**

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1K29005 - EPA 5030B\_MS - Continued**

**Blank (1K29005-BLK1)**

Prepared: 11/29/2021 00:00 Analyzed: 11/29/2021 10:43

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Tetrachloroethene	0.76	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	40			ug/L	50.0		79	41-142			
Dibromofluoromethane	43			ug/L	50.0		86	53-146			
Toluene-d8	44			ug/L	50.0		89	41-146			

**LCS (1K29005-BS1)**

Prepared: 11/29/2021 00:00 Analyzed: 11/29/2021 08:18

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0		108	56-128			
Tetrachloroethene	21		1.0	ug/L	20.0		105	60-147			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0		110	54-134			
Trichloroethene	23		1.0	ug/L	20.0		113	62-135			
Vinyl chloride	22		1.0	ug/L	20.0		110	20-167			
4-Bromofluorobenzene	41			ug/L	50.0		83	41-142			
Dibromofluoromethane	42			ug/L	50.0		84	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**Matrix Spike (1K29005-MS1)**

Prepared: 11/29/2021 00:00 Analyzed: 11/29/2021 08:47

**Source: AE09256-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2200		100	ug/L	2000	53 U	110	56-128			
Tetrachloroethene	2000		100	ug/L	2000	76 U	99	60-147			
trans-1,2-Dichloroethene	2300		100	ug/L	2000	73 U	114	54-134			
Trichloroethene	2300		100	ug/L	2000	89 U	117	62-135			
Vinyl chloride	2300		100	ug/L	2000	71 U	113	20-167			
4-Bromofluorobenzene	4100			ug/L	5000		81	41-142			
Dibromofluoromethane	4200			ug/L	5000		83	53-146			
Toluene-d8	4400			ug/L	5000		87	41-146			

**Matrix Spike Dup (1K29005-MSD1)**

Prepared: 11/29/2021 00:00 Analyzed: 11/29/2021 09:16

**Source: AE09256-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	2200		100	ug/L	2000	53 U	109	56-128	0.9	17	
Tetrachloroethene	2000		100	ug/L	2000	76 U	99	60-147	0	21	
trans-1,2-Dichloroethene	2300		100	ug/L	2000	73 U	113	54-134	0.6	20	
Trichloroethene	2400		100	ug/L	2000	89 U	118	62-135	0.9	20	
Vinyl chloride	2300		100	ug/L	2000	71 U	114	20-167	0.9	24	
4-Bromofluorobenzene	4200			ug/L	5000		83	41-142			
Dibromofluoromethane	4300			ug/L	5000		86	53-146			
Toluene-d8	4500			ug/L	5000		91	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1K24028 - EPA 3511\_MS**

**QUALITY CONTROL DATA**

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1K24028 - EPA 3511\_MS - Continued**

**Blank (1K24028-BLK1)**

Prepared: 11/24/2021 13:00 Analyzed: 11/29/2021 12:04

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	4.7			ug/L	5.71		83	50-150			
Fluoranthene-d10	7.3			ug/L	5.71		128	50-150			

**LCS (1K24028-BS1)**

Prepared: 11/24/2021 13:00 Analyzed: 11/29/2021 12:25

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Naphthalene	5.5		0.10	ug/L	5.71		97	68-120			
2-Methylnaphthalene-d10	5.3			ug/L	5.71		93	50-150			
Fluoranthene-d10	7.0			ug/L	5.71		122	50-150			

**Matrix Spike (1K24028-MS1)**

Prepared: 11/24/2021 13:00 Analyzed: 11/29/2021 12:47

Source: AE09268-02

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Naphthalene	5.8		0.10	ug/L	5.71	0.050 U	102	68-120			
2-Methylnaphthalene-d10	5.4			ug/L	5.71		95	50-150			
Fluoranthene-d10	7.8			ug/L	5.71		137	50-150			

**Matrix Spike Dup (1K24028-MSD1)**

Prepared: 11/24/2021 13:00 Analyzed: 11/29/2021 13:09

Source: AE09268-02

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Naphthalene	5.6		0.10	ug/L	5.71	0.050 U	98	68-120	4	25	
2-Methylnaphthalene-d10	5.2			ug/L	5.71		91	50-150			
Fluoranthene-d10	6.6			ug/L	5.71		115	50-150			

**FLAGS/NOTES AND DEFINITIONS**

<b>PQL</b>	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
<b>B</b>	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
<b>I</b>	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
<b>J</b>	Estimated value.
<b>K</b>	Off-scale low; Actual value is known to be less than the value given.
<b>L</b>	Off-scale high; Actual value is known to be greater than value given.
<b>M</b>	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
<b>N</b>	Presumptive evidence of presence of material.
<b>O</b>	Sampled, but analysis lost or not performed.
<b>Q</b>	Sample exceeded the accepted holding time.
<b>T</b>	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
<b>U</b>	Indicates that the compound was analyzed for but not detected.
<b>V</b>	Indicates that the analyte was detected in both the sample and the associated method blank.
<b>Y</b>	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
<b>Z</b>	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
<b>?</b>	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
<b>*</b>	Not reported due to interference.
<b>[CALC]</b>	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.
<b>QM-07</b>	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
<b>QV-01</b>	The associated continuing calibration verification standard exhibited high bias; since the result is ND, there is no impact.

AG09085

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 2	
Project Name: NASA KSC				PO No. 138224		Project No. 60610905.Subs 2021-23 Subs 2021-23	
Site Location: General Services Administration Seized Property				Send Invoice To: Instructions in MSA # 195-24548-GV03		Phase: EDD to: Jennifer Chastain Cc: Teresa Arment Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Arment Jennings	
Sampler/Phone #: Greg Kusel / (772) 631-7426				Deliver Samples To: ENCO		Site-Specific WS#15 from QAPP: 15-12	

Lab Name: ENCO		Turnaround Time(specify): Standard 14 day		Sample Analysis Requested (Enter number of containers for each test)																			
Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	4 DEG C													Comments
								Total No. of Containers	Select VOC by SW8260B	Naphthalene by SW8270C SIM													
	GK GSSP-MW0013- <del>202111</del> - 010.0- 20211122	GSSP-MW0013	20211122	1440	WG	N	G	3	3														
	GSSP-MW0019- <del>202111</del> - 020.0- 20211122	GSSP-MW0019	20211122	1541	WG	N	G	3	3														
	GSSP-MW0020- <del>202111</del> - 030.0- 20211122	GSSP-MW0020	20211122	1617	WG	N	G	3	3														
	GSSP-MW0034- <del>202111</del> - 010.0- 20211122	GSSP-MW0034	20211122	1650	WG	N	G	3	3														
	GSSP-MW0036- <del>202111</del> - 035.0- 20211122	GSSP-MW0036	20211122	1550	WG	N	G	3	3														
	GSSP-MW0044R- <del>202111</del> - 030.0- 20211122	GSSP-MW0044R	20211122	1233	WG	N	G	3	3														
	GSSP-MW0059- <del>202111</del> - 018.5- 20211122	GSSP-MW0059	20211122	1400	WG	N	G	3	3														
	GSSP-MW0060- <del>202111</del> - 012.5- 20211122	GSSP-MW0060	20211122	1316	WG	N	G	3	3														
	GSSP-MW0061- <del>202111</del> - 018.5- 20211122	GSSP-MW0061	20211122	1244	WG	N	G	3	3														
	GSSP-MW0062- <del>202111</del> - 012.5- 20211122	GSSP-MW0062	20211122	1423	WG	N	G	3	3														
	GSSP-MW0063- <del>202111</del> - 018.5- 20211122	GSSP-MW0063	20211122	1505	WG	N	G	3	3														

Field Comments:			Lab Comments:			Sample Shipment and Delivery Details					
Report only per QAPP WS #15						Number of coolers in shipment:					
Relinquished (signature)		Date	Time	Received by (signature)		Date	Time	Samples Iced?(check) Yes <input type="checkbox"/> No <input type="checkbox"/>			
1 <i>[Signature]</i>		11-18-21	16:10	1 <i>[Signature]</i>		11/22/21	0700	Shipping Company:			
2 <i>[Signature]</i>		11/23/21	1630	2 <i>[Signature]</i>		11/23/21	1630	Tracking No:			
3				3				Date Shipped:			

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C, H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mL, ZnAct 2/500=Add 2 mL of zinc acetate to 500mL, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C IF NO preservative added leave blank

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C-73 2.3<sup>rd</sup>



AE09083

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 2 of 2	
Project Name: NASA KSC				PO No.		Project No. 60610905.Subs 2021-23-Subs 2021-23	
Site Location: General Services Administration Seized Property				Send Invoice To: Instructions in MSA # 19S-24548-GV03		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings	
Sampler/Phone #: Greg Kusel / (772) 631-7426				Deliver Samples To: ENCO		Site-Specific WS# 15 from QAPP: 15-12	

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	4 DEG C									Comments
								Total No. of Containers	Select VOC by SW8260B	Naphthalene by SW8270C SIM									
	GK GSSP-MW0024R- <del>202111</del> -020.0- 20211122	GSSP-MW0024R	20211122	1726	WG	N	G	5	3	2									
	GSSP-MW0035- <del>202111</del> -020.0- 20211122	GSSP-MW0035	20211122	1620	WG	N	G	5	3	2									
	GSSP-MW0053- <del>202111</del> -020.0- 20211122	GSSP-MW0053	20211122	1650	WG	N	G	5	3	2									
	GSSP-TB-20211122-01	GSSP-TB 01	20211122	0800	WQ	TB	G	2	2										

<b>Field Comments:</b> Report only per QAPP WS #15				<b>Lab Comments:</b>				<b>Sample Shipment and Delivery Details</b>											
Relinquished by (signature)				Date		Time		Received by (signature)				Date		Time		Number of coolers in shipment:		Samples Iced?(check) Yes ___ No ___	
1 <i>[Signature]</i>				11-18-21		16:10		1 <i>[Signature]</i>				11/22/21		0700		Shipping Company:			
2 <i>[Signature]</i>				11/23/21		1630		2 <i>[Signature]</i>				11/23/21		1600		Tracking No:			
3								3								Date Shipped:			

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Wednesday, December 8, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC -**

**ENCO Workorder(s): AE09083**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, November 30, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: FSA1-MW0001-005.0-20211130      Lab ID: AE09083-01      Sampled: 11/30/21 10:52      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 15:05
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 14:07
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 19:43

**Client ID: FSA1-MW0002-004.5-20211130      Lab ID: AE09083-02      Sampled: 11/30/21 11:19      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 15:32
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 14:28
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 20:07

**Client ID: FSA1-MW0012R-005.5-20211130      Lab ID: AE09083-03      Sampled: 11/30/21 10:27      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 16:00
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 14:50
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 20:31

**Client ID: FSA1-MW0014-005.5-20211130      Lab ID: AE09083-04      Sampled: 11/30/21 09:50      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 16:28
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 15:11
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 20:56

**Client ID: FSA1-MW0021-004.0-20211130      Lab ID: AE09083-05      Sampled: 11/30/21 11:50      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 16:55
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 15:33
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 21:20

**Client ID: FSA1-MW0022R-005.0-20211130      Lab ID: AE09083-06      Sampled: 11/30/21 11:10      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 17:23
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 15:54
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 21:45

**Client ID: FSA1-MW0023-005.5-20211130      Lab ID: AE09083-07      Sampled: 11/30/21 11:59      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 17:51
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 16:16
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 22:09

**Client ID: FSA1-MW0027-020.0-20211130      Lab ID: AE09083-08      Sampled: 11/30/21 10:35      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 18:19
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 16:37
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 22:59

**Client ID: FSA1-MW0028-20.0-20211130      Lab ID: AE09083-09      Sampled: 11/30/21 09:50      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21		12/01/21	00:00	12/01/21 18:46
EPA 8270E	EPA 3511_MS	12/07/21	01/12/22	12/03/21	08:30	12/03/21 16:59
FL-PRO	EPA 3510C	12/07/21	01/10/22	12/01/21	09:50	12/03/21 23:23



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**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: FSA1-TB-20211130-01      Lab ID: AE09083-10      Sampled: 11/30/21 08:00      Received: 11/30/21 13:58**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21	12/01/21 00:00	12/01/21 12:18

**SAMPLE DETECTION SUMMARY**

**Client ID:** FSA1-MW0001-005.0-20211130      **Lab ID:** AE09083-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
1-Methylnaphthalene	3.4		0.050	0.10	ug/L	EPA 8270E	
2-Methylnaphthalene	3.0		0.050	0.10	ug/L	EPA 8270E	
Isopropylbenzene	4.6		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	2.9		0.050	0.10	ug/L	EPA 8270E	
TPH (C8-C40)	1300		100	680	ug/L	FL-PRO	

**Client ID:** FSA1-MW0002-004.5-20211130      **Lab ID:** AE09083-02

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Naphthalene	0.13		0.050	0.10	ug/L	EPA 8270E	

**Client ID:** FSA1-MW0014-005.5-20211130      **Lab ID:** AE09083-04

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Isopropylbenzene	1.1		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	0.23		0.050	0.10	ug/L	EPA 8270E	

**Client ID:** FSA1-MW0021-004.0-20211130      **Lab ID:** AE09083-05

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Isopropylbenzene	1.1		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	0.091	I	0.050	0.10	ug/L	EPA 8270E	

**Client ID:** FSA1-MW0027-020.0-20211130      **Lab ID:** AE09083-08

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Isopropylbenzene	1.0		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	0.24		0.050	0.10	ug/L	EPA 8270E	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0001-005.0-20211130

**Lab Sample ID:** AE09083-01

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 10:52

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	4.6		ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 15:05	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	104 %	41-142	1L01030	EPA 8260D	12/01/21 15:05	KKW	
Dibromofluoromethane	50	1	50.0	99 %	53-146	1L01030	EPA 8260D	12/01/21 15:05	KKW	
Toluene-d8	53	1	50.0	105 %	41-146	1L01030	EPA 8260D	12/01/21 15:05	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	3.4		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:07	jfi	
2-Methylnaphthalene [91-57-6]^	3.0		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:07	jfi	
Naphthalene [91-20-3]^	2.9		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:07	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.9	1	5.71	104 %	50-150	1L03002	EPA 8270E	12/03/21 14:07	jfi	
Fluoranthene-d10	5.7	1	5.71	100 %	50-150	1L03002	EPA 8270E	12/03/21 14:07	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	1300		ug/L	1	100	680	1L01010	FL-PRO	12/03/21 19:43	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	380	1	400	95 %	40-129	1L01010	FL-PRO	12/03/21 19:43	JJB	
o-Terphenyl	160	1	200	82 %	66-139	1L01010	FL-PRO	12/03/21 19:43	JJB	

## ANALYTICAL RESULTS

**Description:** FSA1-MW0002-004.5-20211130

**Lab Sample ID:** AE09083-02

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 11:19

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 15:32	KKW	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	<i>53</i>	<i>1</i>	<i>50.0</i>	<i>105 %</i>	<i>41-142</i>		<i>1L01030</i>	<i>EPA 8260D</i>	<i>12/01/21 15:32</i>	<i>KKW</i>	
<i>Dibromofluoromethane</i>	<i>52</i>	<i>1</i>	<i>50.0</i>	<i>104 %</i>	<i>53-146</i>		<i>1L01030</i>	<i>EPA 8260D</i>	<i>12/01/21 15:32</i>	<i>KKW</i>	
<i>Toluene-d8</i>	<i>53</i>	<i>1</i>	<i>50.0</i>	<i>105 %</i>	<i>41-146</i>		<i>1L01030</i>	<i>EPA 8260D</i>	<i>12/01/21 15:32</i>	<i>KKW</i>	

### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:28	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:28	jfi	
<b>Naphthalene [91-20-3]^</b>	<b>0.13</b>		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:28	jfi	
<b><u>Surrogates</u></b>											
<i>2-Methylnaphthalene-d10</i>	<i>5.4</i>	<i>1</i>	<i>5.71</i>	<i>95 %</i>	<i>50-150</i>		<i>1L03002</i>	<i>EPA 8270E</i>	<i>12/03/21 14:28</i>	<i>jfi</i>	
<i>Fluoranthene-d10</i>	<i>4.5</i>	<i>1</i>	<i>5.71</i>	<i>80 %</i>	<i>50-150</i>		<i>1L03002</i>	<i>EPA 8270E</i>	<i>12/03/21 14:28</i>	<i>jfi</i>	

### FL Petroleum Range Organics

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 20:07	JJB	
<b><u>Surrogates</u></b>											
<i>n-Pentatriacontane</i>	<i>430</i>	<i>1</i>	<i>400</i>	<i>108 %</i>	<i>40-129</i>		<i>1L01010</i>	<i>FL-PRO</i>	<i>12/03/21 20:07</i>	<i>JJB</i>	
<i>o-Terphenyl</i>	<i>180</i>	<i>1</i>	<i>200</i>	<i>88 %</i>	<i>66-139</i>		<i>1L01010</i>	<i>FL-PRO</i>	<i>12/03/21 20:07</i>	<i>JJB</i>	

## ANALYTICAL RESULTS

**Description:** FSA1-MW0012R-005.5-20211130

**Lab Sample ID:** AE09083-03

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 10:27

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 16:00	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	51	1	50.0	102 %	41-142	1L01030	EPA 8260D	12/01/21 16:00	KKW		
Dibromofluoromethane	50	1	50.0	101 %	53-146	1L01030	EPA 8260D	12/01/21 16:00	KKW		
Toluene-d8	54	1	50.0	107 %	41-146	1L01030	EPA 8260D	12/01/21 16:00	KKW		

### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:50	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:50	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 14:50	jfi	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
2-Methylnaphthalene-d10	5.3	1	5.71	93 %	50-150	1L03002	EPA 8270E	12/03/21 14:50	jfi		
Fluoranthene-d10	5.4	1	5.71	94 %	50-150	1L03002	EPA 8270E	12/03/21 14:50	jfi		

### FL Petroleum Range Organics

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 20:31	JJB	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
n-Pentatriacontane	490	1	400	122 %	40-129	1L01010	FL-PRO	12/03/21 20:31	JJB		
o-Terphenyl	200	1	200	102 %	66-139	1L01010	FL-PRO	12/03/21 20:31	JJB		



**ANALYTICAL RESULTS**

**Description:** FSA1-MW0014-005.5-20211130

**Lab Sample ID:** AE09083-04

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 09:50

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	1.1		ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 16:28	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	103 %	41-142	1L01030	EPA 8260D	12/01/21 16:28	KKW	
Dibromofluoromethane	50	1	50.0	99 %	53-146	1L01030	EPA 8260D	12/01/21 16:28	KKW	
Toluene-d8	53	1	50.0	106 %	41-146	1L01030	EPA 8260D	12/01/21 16:28	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:11	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:11	jfi	
Naphthalene [91-20-3]^	0.23		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:11	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.1	1	5.71	90 %	50-150	1L03002	EPA 8270E	12/03/21 15:11	jfi	
Fluoranthene-d10	5.0	1	5.71	88 %	50-150	1L03002	EPA 8270E	12/03/21 15:11	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 20:56	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	480	1	400	120 %	40-129	1L01010	FL-PRO	12/03/21 20:56	JJB	
o-Terphenyl	190	1	200	96 %	66-139	1L01010	FL-PRO	12/03/21 20:56	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0021-004.0-20211130

**Lab Sample ID:** AE09083-05

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 11:50

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	1.1		ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 16:55	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	51	1	50.0	102 %	41-142	1L01030	EPA 8260D	12/01/21 16:55	KKW	
Dibromofluoromethane	50	1	50.0	100 %	53-146	1L01030	EPA 8260D	12/01/21 16:55	KKW	
Toluene-d8	53	1	50.0	107 %	41-146	1L01030	EPA 8260D	12/01/21 16:55	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:33	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:33	jfi	
Naphthalene [91-20-3]^	0.091	I	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:33	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	6.7	1	5.71	117 %	50-150	1L03002	EPA 8270E	12/03/21 15:33	jfi	
Fluoranthene-d10	8.3	1	5.71	145 %	50-150	1L03002	EPA 8270E	12/03/21 15:33	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 21:20	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	510	1	400	128 %	40-129	1L01010	FL-PRO	12/03/21 21:20	JJB	
o-Terphenyl	210	1	200	106 %	66-139	1L01010	FL-PRO	12/03/21 21:20	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0022R-005.0-20211130

**Lab Sample ID:** AE09083-06

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 11:10

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 17:23	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	51	1	50.0	103 %	41-142	1L01030	EPA 8260D	12/01/21 17:23	KKW	
Dibromofluoromethane	49	1	50.0	98 %	53-146	1L01030	EPA 8260D	12/01/21 17:23	KKW	
Toluene-d8	53	1	50.0	107 %	41-146	1L01030	EPA 8260D	12/01/21 17:23	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:54	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:54	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 15:54	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	6.6	1	5.71	116 %	50-150	1L03002	EPA 8270E	12/03/21 15:54	jfi	
Fluoranthene-d10	6.6	1	5.71	116 %	50-150	1L03002	EPA 8270E	12/03/21 15:54	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 21:45	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	500	1	385	129 %	40-129	1L01010	FL-PRO	12/03/21 21:45	JJB	
o-Terphenyl	210	1	192	108 %	66-139	1L01010	FL-PRO	12/03/21 21:45	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0023-005.5-20211130

**Lab Sample ID:** AE09083-07

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 11:59

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 17:51	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	52	1	50.0	104 %	41-142	1L01030	EPA 8260D	12/01/21 17:51	KKW		
Dibromofluoromethane	50	1	50.0	100 %	53-146	1L01030	EPA 8260D	12/01/21 17:51	KKW		
Toluene-d8	53	1	50.0	107 %	41-146	1L01030	EPA 8260D	12/01/21 17:51	KKW		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:16	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:16	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:16	jfi	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
2-Methylnaphthalene-d10	6.5	1	5.71	114 %	50-150	1L03002	EPA 8270E	12/03/21 16:16	jfi		
Fluoranthene-d10	7.2	1	5.71	127 %	50-150	1L03002	EPA 8270E	12/03/21 16:16	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 22:09	JJB	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
n-Pentatriacontane	460	1	400	115 %	40-129	1L01010	FL-PRO	12/03/21 22:09	JJB		
o-Terphenyl	190	1	200	95 %	66-139	1L01010	FL-PRO	12/03/21 22:09	JJB		

## ANALYTICAL RESULTS

**Description:** FSA1-MW0027-020.0-20211130

**Lab Sample ID:** AE09083-08

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 10:35

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	1.0		ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 18:19	KKW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	52	1	50.0	103 %	41-142	1L01030	EPA 8260D	12/01/21 18:19	KKW	
Dibromofluoromethane	50	1	50.0	100 %	53-146	1L01030	EPA 8260D	12/01/21 18:19	KKW	
Toluene-d8	53	1	50.0	106 %	41-146	1L01030	EPA 8260D	12/01/21 18:19	KKW	

### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:37	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:37	jfi	
Naphthalene [91-20-3]^	0.24		ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:37	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	6.2	1	5.71	109 %	50-150	1L03002	EPA 8270E	12/03/21 16:37	jfi	
Fluoranthene-d10	7.7	1	5.71	135 %	50-150	1L03002	EPA 8270E	12/03/21 16:37	jfi	

### FL Petroleum Range Organics

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 22:59	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	470	1	400	117 %	40-129	1L01010	FL-PRO	12/03/21 22:59	JJB	
o-Terphenyl	210	1	200	104 %	66-139	1L01010	FL-PRO	12/03/21 22:59	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0028-20.0-20211130

**Lab Sample ID:** AE09083-09

**Received:** 11/30/21 13:58

**Matrix:** Ground Water

**Sampled:** 11/30/21 09:50

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 18:46	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	51	1	50.0	101 %	41-142	1L01030	EPA 8260D	12/01/21 18:46	KKW		
Dibromofluoromethane	50	1	50.0	100 %	53-146	1L01030	EPA 8260D	12/01/21 18:46	KKW		
Toluene-d8	52	1	50.0	105 %	41-146	1L01030	EPA 8260D	12/01/21 18:46	KKW		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:59	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:59	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 16:59	jfi	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
2-Methylnaphthalene-d10	5.6	1	5.71	99 %	50-150	1L03002	EPA 8270E	12/03/21 16:59	jfi		
Fluoranthene-d10	8.5	1	5.71	150 %	50-150	1L03002	EPA 8270E	12/03/21 16:59	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 23:23	JJB	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
n-Pentatriacontane	430	1	385	113 %	40-129	1L01010	FL-PRO	12/03/21 23:23	JJB		
o-Terphenyl	180	1	192	92 %	66-139	1L01010	FL-PRO	12/03/21 23:23	JJB		

**Description:** FSA1-TB-20211130-01

**Lab Sample ID:** AE09083-10

**Received:** 11/30/21 13:58

**Matrix:** Water

**Sampled:** 11/30/21 08:00

**Work Order:** AE09083

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 12:18	KKW	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	52	1	50.0	104 %	41-142	1L01030	EPA 8260D	12/01/21 12:18	KKW		
Dibromofluoromethane	50	1	50.0	101 %	53-146	1L01030	EPA 8260D	12/01/21 12:18	KKW		
Toluene-d8	53	1	50.0	106 %	41-146	1L01030	EPA 8260D	12/01/21 12:18	KKW		

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1L01030 - EPA 5030B\_MS**

**Blank (1L01030-BLK1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 09:32

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	0.67	U	1.0	ug/L							
4-Bromofluorobenzene	52			ug/L	50.0		105	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	53			ug/L	50.0		106	41-146			

**LCS (1L01030-BS1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 08:40

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	22		1.0	ug/L	20.0		111	60-132			
4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	49			ug/L	50.0		98	53-146			
Toluene-d8	54			ug/L	50.0		107	41-146			

**Matrix Spike (1L01030-MS1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 10:27

Source: AE08138-02

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	120	60-132			
4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	53			ug/L	50.0		105	53-146			
Toluene-d8	54			ug/L	50.0		107	41-146			

**Matrix Spike Dup (1L01030-MSD1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 10:55

Source: AE08138-02

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	119	60-132	0.9	23	
4-Bromofluorobenzene	53			ug/L	50.0		107	41-142			
Dibromofluoromethane	52			ug/L	50.0		105	53-146			
Toluene-d8	53			ug/L	50.0		107	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1L03002 - EPA 3511\_MS**

**Blank (1L03002-BLK1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 10:29

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	5.6			ug/L	5.71		98	50-150			
Fluoranthene-d10	5.6			ug/L	5.71		97	50-150			

**LCS (1L03002-BS1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 10:50

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.5		0.10	ug/L	5.71		97	59-120			
2-Methylnaphthalene	5.8		0.10	ug/L	5.71		102	43-120			

**QUALITY CONTROL DATA**

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1L03002 - EPA 3511\_MS - Continued**

**LCS (1L03002-BS1) Continued**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 10:50

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Naphthalene	5.7		0.10	ug/L	5.71		100	68-120			
2-Methylnaphthalene-d10	6.0			ug/L	5.71		105	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		105	50-150			

**Matrix Spike (1L03002-MS1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 11:12

Source: AE09386-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.7		0.10	ug/L	5.71	0.050 U	100	59-120			
2-Methylnaphthalene	6.1		0.10	ug/L	5.71	0.050 U	107	43-120			
Naphthalene	5.7		0.10	ug/L	5.71	0.050 U	100	68-120			
2-Methylnaphthalene-d10	6.0			ug/L	5.71		105	50-150			
Fluoranthene-d10	5.7			ug/L	5.71		99	50-150			

**Matrix Spike Dup (1L03002-MSD1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 11:34

Source: AE09386-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.2		0.10	ug/L	5.71	0.050 U	91	59-120	9	25	
2-Methylnaphthalene	5.6		0.10	ug/L	5.71	0.050 U	98	43-120	8	25	
Naphthalene	5.1		0.10	ug/L	5.71	0.050 U	89	68-120	12	25	
2-Methylnaphthalene-d10	6.2			ug/L	5.71		109	50-150			
Fluoranthene-d10	6.2			ug/L	5.71		109	50-150			

**FL Petroleum Range Organics - Quality Control**

**Batch 1L01010 - EPA 3510C**

**Blank (1L01010-BLK1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 09:25

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	100	U	680	ug/L							
n-Pentatriacontane	370			ug/L	400		93	40-129			
o-Terphenyl	150			ug/L	200		75	66-139			

**LCS (1L01010-BS1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 09:50

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6500		680	ug/L	6800		96	66-119			
n-Pentatriacontane	240			ug/L	400		61	40-129			
o-Terphenyl	190			ug/L	200		96	66-139			

**Matrix Spike (1L01010-MS1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 10:26

Source: AE09386-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7500		680	ug/L	6800	100 U	111	65-123			
n-Pentatriacontane	300			ug/L	400		75	40-129			
o-Terphenyl	220			ug/L	200		109	66-139			



**QUALITY CONTROL DATA**

**FL Petroleum Range Organics - Quality Control**

*Batch 1L01010 - EPA 3510C - Continued*

**Matrix Spike Dup (1L01010-MSD1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 10:50

Source: AE09386-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
TPH (C8-C40)	7100		680	ug/L	6800	100 U	104	65-123	6	20	
<i>n-Pentatriacontane</i>	<i>260</i>			<i>ug/L</i>	<i>400</i>		<i>65</i>	<i>40-129</i>			
<i>o-Terphenyl</i>	<i>210</i>			<i>ug/L</i>	<i>200</i>		<i>107</i>	<i>66-139</i>			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AED9083

	<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1		
	Project Name: NASA KSC				PO No. 138224		Project No. 60610905.Subs 2021-23-Subs 2021-23		Phase:
	Site Location: Fuel Storage Area #1 Underground Storage Tank				Send Invoice To: Instructions in MSA # 195-24548-GV03			EDD to: Jennifer Chastain Cc: Teresa Ament Jennings	
	TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando			Report to: Jennifer Chastain Cc: Teresa Ament Jennings	
Sampler/Phone #: Greg Kusel / (772) 631-7426				Deliver Samples To: ENCO			Site-Specific WS# 15 from QAPP: 15-5		

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	4 DEG C	H2SO4 <2							Comments
								Total No. of Containers	Isopropyl/benzene by SW8260B	Select PAH by SW8270C SIM	TRPH by FL PRO							
	FSA1-MW0001- <del>202111</del> 005.0-20211130	FSA1-MW0001	20211130	1052	WG	N	G	7	3	2	2							
	FSA1-MW0002- <del>202111</del> 004.5-20211130	FSA1-MW0002	20211130	1119	WG	N	G	7	3	2	2							
	FSA1-MW0012R- <del>202111</del> 005.5-20211130	FSA1-MW0012R	20211130	1027	WG	N	G	7	3	2	2							
	FSA1-MW0014- <del>202111</del> 005.5-20211130	FSA1-MW0014	20211130	0950	WG	N	G	7	3	2	2							
	FSA1-MW0021- <del>202111</del> 004.0-20211130	FSA1-MW0021	20211130	1150	WG	N	G	7	3	2	2							
	FSA1-MW0022R- <del>202111</del> 005.0-20211130	FSA1-MW0022R	20211130	1110	WG	N	G	7	3	2	2							
	FSA1-MW0023- <del>202111</del> 005.5-20211130	FSA1-MW0023	20211130	1159	WG	N	G	7	3	2	2							
	FSA1-MW0027- <del>202111</del> 020.0-20211130	FSA1-MW0027	20211130	1035	WG	N	G	7	3	2	2							
	FSA1-MW0028- <del>202111</del> 020.0-20211130	FSA1-MW0028	20211130	0950	WG	N	G	6	2	2	2							
	FSA1-TB-20211130-01	FSA1-TB 01	20211130	0800	WQ	TB	G	2	2									

<b>Field Comments:</b> Report only per QAPP WS #15-5				<b>Lab Comments:</b>				<b>Sample Shipment and Delivery Details</b>			
Relinquished by (signature)		Date	Time	Received by (signature)		Date	Time	Number of coolers in shipment:			
1		11-18-21	15:30	1		11/30/21	0645	Samples Iced?(check) Yes ___ No ___			
2		11/30/21	1358	2		11/30/21	7355	Shipping Company:			
3				3				Tracking No:			
								Date Shipped:			

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mL, ZnAct 2/500=Add 2 mL of zinc acetate to 500mL, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19  
 LAB 617 5.800 C-212 1-300



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Monday, December 13, 2021

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC -**

**ENCO Workorder(s): AE09082**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Tuesday, November 30, 2021.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



www.encolabs.com

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

<b>Client ID:</b> IA-IDW-20211130-01	<b>Lab ID:</b> AE09082-01	<b>Sampled:</b> 11/30/21 12:40	<b>Received:</b> 11/30/21 13:58	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21	12/01/21 00:00	12/01/21 14:37
EPA 8270E	EPA 3511_MS	12/07/21 01/12/22	12/03/21 08:30	12/03/21 13:45
FL-PRO	EPA 3510C	12/07/21 01/10/22	12/01/21 09:50	12/03/21 19:18

<b>Client ID:</b> IA-TB01-20211130-01	<b>Lab ID:</b> AE09082-02	<b>Sampled:</b> 11/30/21 08:00	<b>Received:</b> 11/30/21 13:58	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	12/14/21	12/01/21 00:00	12/01/21 11:50



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**SAMPLE DETECTION SUMMARY**

**Client ID:** IA-IDW-20211130-01      **Lab ID:** AE09082-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
TPH (C8-C40)	110	I	100	680	ug/L	FL-PRO	
Vinyl chloride	0.80	I	0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** IA-IDW-20211130-01

**Lab Sample ID:** AE09082-01

**Received:** 11/30/21 13:58

**Matrix:** Water

**Sampled:** 11/30/21 12:40

**Work Order:** AE09082

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Trichlorofluoromethane [75-69-4]^	0.94	U	ug/L	1	0.94	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	
<b>Vinyl chloride [75-01-4]^</b>	<b>0.80</b>	<b>I</b>	ug/L	1	0.71	1.0	1L01030	EPA 8260D	12/01/21 14:37	KKW	

**Surrogates**

	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	53	1	50.0	106 %	41-142	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Dibromofluoromethane	49	1	50.0	98 %	53-146	1L01030	EPA 8260D	12/01/21 14:37	KKW	
Toluene-d8	53	1	50.0	106 %	41-146	1L01030	EPA 8260D	12/01/21 14:37	KKW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 13:45	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 13:45	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	1L03002	EPA 8270E	12/03/21 13:45	jfi	

**Surrogates**

	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.8	1	5.71	102 %	50-150	1L03002	EPA 8270E	12/03/21 13:45	jfi	
Fluoranthene-d10	5.3	1	5.71	93 %	50-150	1L03002	EPA 8270E	12/03/21 13:45	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
<b>TPH (C8-C40)^</b>	<b>110</b>	<b>I</b>	ug/L	1	100	680	1L01010	FL-PRO	12/03/21 19:18	JJB	

**Surrogates**

	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	480	1	392	121 %	40-129	1L01010	FL-PRO	12/03/21 19:18	JJB	
o-Terphenyl	190	1	196	97 %	66-139	1L01010	FL-PRO	12/03/21 19:18	JJB	

**ANALYTICAL RESULTS**

**Description:** IA-TB01-20211130-01

**Lab Sample ID:** AE09082-02

**Received:** 11/30/21 13:58

**Matrix:** Water

**Sampled:** 11/30/21 08:00

**Work Order:** AE09082

**Project:** NASA KSC -

**Sampled By:** Greg Kusel

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1,2,3-Trichlorobenzene [87-61-6]^	0.86	U	ug/L	1	0.86	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
1,2,4-Trichlorobenzene [120-82-1]^	0.70	U	ug/L	1	0.70	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
Tetrachloroethene [127-18-4]^	0.76	U	ug/L	1	0.76	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
trans-1,2-Dichloroethene [156-60-5]^	0.73	U	ug/L	1	0.73	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
Trichlorofluoromethane [75-69-4]^	0.94	U	ug/L	1	0.94	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	1L01030	EPA 8260D	12/01/21 11:50	KKW	
<b><u>Surrogates</u></b>	<b><u>Results</u></b>	<b><u>DF</u></b>	<b><u>Spike Lvl</u></b>	<b><u>% Rec</u></b>	<b><u>% Rec Limits</u></b>	<b><u>Batch</u></b>	<b><u>Method</u></b>	<b><u>Analyzed</u></b>	<b><u>By</u></b>	<b><u>Notes</u></b>	
4-Bromofluorobenzene	52	1	50.0	105 %	41-142	1L01030	EPA 8260D	12/01/21 11:50	KKW		
Dibromofluoromethane	52	1	50.0	104 %	53-146	1L01030	EPA 8260D	12/01/21 11:50	KKW		
Toluene-d8	54	1	50.0	107 %	41-146	1L01030	EPA 8260D	12/01/21 11:50	KKW		



**QUALITY CONTROL DATA**
**Volatile Organic Compounds by GCMS - Quality Control**
**Batch 1L01030 - EPA 5030B\_MS**
**Blank (1L01030-BLK1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 09:32

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	0.86	U	1.0	ug/L							
1,2,4-Trichlorobenzene	0.70	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Isopropylbenzene	0.67	U	1.0	ug/L							
Tetrachloroethene	0.76	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.73	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Trichlorofluoromethane	0.94	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
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4-Bromofluorobenzene	52			ug/L	50.0		105	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	53			ug/L	50.0		106	41-146			

**LCS (1L01030-BS1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 08:40

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	21		1.0	ug/L	20.0		106	43-168			
1,2,4-Trichlorobenzene	24		1.0	ug/L	20.0		118	52-159			
cis-1,2-Dichloroethene	21		1.0	ug/L	20.0		107	56-128			
Isopropylbenzene	22		1.0	ug/L	20.0		111	60-132			
Tetrachloroethene	21		1.0	ug/L	20.0		104	60-147			
trans-1,2-Dichloroethene	22		1.0	ug/L	20.0		109	54-134			
Trichloroethene	20		1.0	ug/L	20.0		102	62-135			
Trichlorofluoromethane	16		1.0	ug/L	20.0		82	56-155			
Vinyl chloride	17		1.0	ug/L	20.0		83	20-167			
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4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	49			ug/L	50.0		98	53-146			
Toluene-d8	54			ug/L	50.0		107	41-146			

**Matrix Spike (1L01030-MS1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 10:27

Source: AE08138-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	22		1.0	ug/L	20.0	0.86 U	108	43-168			
1,2,4-Trichlorobenzene	24		1.0	ug/L	20.0	0.70 U	118	52-159			
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.53 U	111	56-128			
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	120	60-132			
Tetrachloroethene	22		1.0	ug/L	20.0	0.76 U	109	60-147			
trans-1,2-Dichloroethene	24		1.0	ug/L	20.0	0.73 U	122	54-134			
Trichloroethene	21		1.0	ug/L	20.0	0.89 U	107	62-135			
Trichlorofluoromethane	19		1.0	ug/L	20.0	0.94 U	97	56-155			
Vinyl chloride	20		1.0	ug/L	20.0	0.71 U	102	20-167			
<hr/>											
4-Bromofluorobenzene	53			ug/L	50.0		105	41-142			
Dibromofluoromethane	53			ug/L	50.0		105	53-146			
Toluene-d8	54			ug/L	50.0		107	41-146			

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 1L01030 - EPA 5030B\_MS - Continued**

**Matrix Spike Dup (1L01030-MSD1)**

Prepared: 12/01/2021 00:00 Analyzed: 12/01/2021 10:55

Source: AE08138-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,3-Trichlorobenzene	24		1.0	ug/L	20.0	0.86 U	119	43-168	10	26	
1,2,4-Trichlorobenzene	25		1.0	ug/L	20.0	0.70 U	123	52-159	4	24	
cis-1,2-Dichloroethene	22		1.0	ug/L	20.0	0.53 U	112	56-128	0.9	17	
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	119	60-132	0.9	23	
Tetrachloroethene	21		1.0	ug/L	20.0	0.76 U	107	60-147	2	21	
trans-1,2-Dichloroethene	23		1.0	ug/L	20.0	0.73 U	116	54-134	5	20	
Trichloroethene	21		1.0	ug/L	20.0	0.89 U	106	62-135	0.5	20	
Trichlorofluoromethane	19		1.0	ug/L	20.0	0.94 U	96	56-155	0.3	22	
Vinyl chloride	20		1.0	ug/L	20.0	0.71 U	98	20-167	4	24	
4-Bromofluorobenzene	53			ug/L	50.0		107	41-142			
Dibromofluoromethane	52			ug/L	50.0		105	53-146			
Toluene-d8	53			ug/L	50.0		107	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1L03002 - EPA 3511\_MS**

**Blank (1L03002-BLK1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 10:29

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	5.6			ug/L	5.71		98	50-150			
Fluoranthene-d10	5.6			ug/L	5.71		97	50-150			

**LCS (1L03002-BS1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 10:50

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.5		0.10	ug/L	5.71		97	59-120			
2-Methylnaphthalene	5.8		0.10	ug/L	5.71		102	43-120			
Naphthalene	5.7		0.10	ug/L	5.71		100	68-120			
2-Methylnaphthalene-d10	6.0			ug/L	5.71		105	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		105	50-150			

**Matrix Spike (1L03002-MS1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 11:12

Source: AE09386-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.7		0.10	ug/L	5.71	0.050 U	100	59-120			
2-Methylnaphthalene	6.1		0.10	ug/L	5.71	0.050 U	107	43-120			
Naphthalene	5.7		0.10	ug/L	5.71	0.050 U	100	68-120			
2-Methylnaphthalene-d10	6.0			ug/L	5.71		105	50-150			
Fluoranthene-d10	5.7			ug/L	5.71		99	50-150			

**Matrix Spike Dup (1L03002-MSD1)**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 11:34

Source: AE09386-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**QUALITY CONTROL DATA**

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 1L03002 - EPA 3511\_MS - Continued**

**Matrix Spike Dup (1L03002-MSD1) Continued**

Prepared: 12/03/2021 08:30 Analyzed: 12/03/2021 11:34

Source: AE09386-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.2		0.10	ug/L	5.71	0.050 U	91	59-120	9	25	
2-Methylnaphthalene	5.6		0.10	ug/L	5.71	0.050 U	98	43-120	8	25	
Naphthalene	5.1		0.10	ug/L	5.71	0.050 U	89	68-120	12	25	
<i>2-Methylnaphthalene-d10</i>	6.2			ug/L	5.71		109	50-150			
<i>Fluoranthene-d10</i>	6.2			ug/L	5.71		109	50-150			

**FL Petroleum Range Organics - Quality Control**

**Batch 1L01010 - EPA 3510C**

**Blank (1L01010-BLK1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 09:25

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	100	U	680	ug/L							
<i>n-Pentatriacontane</i>	370			ug/L	400		93	40-129			
<i>o-Terphenyl</i>	150			ug/L	200		75	66-139			

**LCS (1L01010-BS1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 09:50

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6500		680	ug/L	6800		96	66-119			
<i>n-Pentatriacontane</i>	240			ug/L	400		61	40-129			
<i>o-Terphenyl</i>	190			ug/L	200		96	66-139			

**Matrix Spike (1L01010-MS1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 10:26

Source: AE09386-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7500		680	ug/L	6800	100 U	111	65-123			
<i>n-Pentatriacontane</i>	300			ug/L	400		75	40-129			
<i>o-Terphenyl</i>	220			ug/L	200		109	66-139			

**Matrix Spike Dup (1L01010-MSD1)**

Prepared: 12/01/2021 09:50 Analyzed: 12/03/2021 10:50

Source: AE09386-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7100		680	ug/L	6800	100 U	104	65-123	6	20	
<i>n-Pentatriacontane</i>	260			ug/L	400		65	40-129			
<i>o-Terphenyl</i>	210			ug/L	200		107	66-139			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AEO9082

	<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1		
	Project Name: NASA KSC				PO No. 138224		Project No. 60610905 Subs 2021-23-Subs 2021-23		Phase:
	Site Location: Industrial Area IDW				Send Invoice To: Instructions in MSA # 195-24548-GV03				EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings
	TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando				Report to: Jennifer Chastain Cc: Teresa Amentt Jennings
Sampler/Phone #: Greg Kusel / (772) 631-7426				Deliver Samples To: ENCO				Site-Specific WS#15 from QAPP: 15-39	

Lab Name: ENCO		Turnaround Time(specify): Standard 14 day			<b>Sample Analysis Requested (Enter number of containers for each test)</b>						
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Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	4 DEG C	4 DEG C	H2SO4 <2	4 DEG C									Comments	
	IA-IDW01-20211130-01	IA-IDW01	202111	1240	IDW	IDW	G	9	3	2	2	2										
	IA-TB01-20211130-01	IA-TB01	20211130	0800	WQ	TB	G	2	2													

<b>Field Comments:</b> Report only per QAPP WS #15-39				<b>Lab Comments:</b>				<b>Sample Shipment and Delivery Details</b>			
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:	Samples Iced?(check) Yes No	Shipping Company:	Tracking No:	Date Shipped:	
1 <i>[Signature]</i>	11-18-21	16:55	1 <i>[Signature]</i>	11/30/21	0645						
2 <i>[Signature]</i>	11/30/21	1358	2 <i>[Signature]</i>	11/30/21	11358						
3			3								

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2= Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank

Rev 8/19

December 14, 2021

Kaitlin Dylnicki  
Environmental Conservation Laboratories, Inc.  
10775 Central Port Drive  
Orlando, Florida 32824

Re: NASA PFAS - Dylnicki  
Work Order: 563563  
SDG: AE09082

Dear Kaitlin Dylnicki:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on December 01, 2021. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4523.

Sincerely,



Samuel Hogan  
Project Manager

Purchase Order: GELP20-0372  
Enclosures

**GEL LABORATORIES LLC**

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

**Certificate of Analysis Report  
for**

ENCL001 Environmental Conservation Laboratories

Client SDG: AE09082 GEL Work Order: 563563

**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound

I The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Samuel Hogan.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: December 14, 2021

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW-20211130-01	Project: ENCL00421
Sample ID: 563563001	Client ID: ENCL001
Matrix: GW	
Collect Date: 30-NOV-21 12:40	
Receive Date: 01-DEC-21	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>LCMSMS PFCs</b>												
<b>EPA 537.1 Mod PFCs by LC-MS/MS "As Received"</b>												
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	U	ND	0.000668	0.00191	ug/L	0.0202	1	JMB3	12/07/21	1214	2204433	1
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	U	ND	0.000668	0.00202	ug/L	0.0202	1					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	U	ND	0.000668	0.00189	ug/L	0.0202	1					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	ND	0.00134	0.00405	ug/L	0.0202	1					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	ND	0.00134	0.00405	ug/L	0.0202	1					
Perfluorobutane sulfonic acid (PFBS)	I	0.00148	0.000668	0.00180	ug/L	0.0202	1					
Perfluorodecanoic acid (PFDA)	U	ND	0.000789	0.00202	ug/L	0.0202	1					
Perfluorododecanoic acid (PFDOA)	U	ND	0.000668	0.00202	ug/L	0.0202	1					
Perfluoroheptanoic acid (PFHpA)		0.00498	0.000668	0.00202	ug/L	0.0202	1					
Perfluorohexane sulfonic acid (PFHxS)		0.00866	0.000668	0.00184	ug/L	0.0202	1					
Perfluorohexanoic acid (PFHxA)		0.00555	0.000809	0.00202	ug/L	0.0202	1					
Perfluorononanoic acid (PFNA)	U	ND	0.000668	0.00202	ug/L	0.0202	1					
Perfluorooctane sulfonic acid (PFOS)		0.0284	0.000809	0.00202	ug/L	0.0202	1					
Perfluorooctanoic acid (PFOA)		0.00950	0.000809	0.00202	ug/L	0.0202	1					
Perfluorotetradecanoic acid (PFTDA)	U	ND	0.000809	0.00202	ug/L	0.0202	1					
Perfluorotridecanoic acid (PFTTrDA)	U	ND	0.000668	0.00202	ug/L	0.0202	1					
Perfluoroundecanoic acid (PFUnDA)	U	ND	0.000668	0.00202	ug/L	0.0202	1					
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	U	ND	0.000668	0.00202	ug/L	0.0202	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 537.1 Mod, PFAS, Compl PFCs Extraction in Liquid		TC2	12/06/21	0825	2204428



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## Certificate of Analysis

Report Date: December 14, 2021

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW-20211130-01  
Sample ID: 563563001

Project: ENCL00421  
Client ID: ENCL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
The following Analytical Methods were performed:											
Method	Description		Analyst Comments								
1	EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15										

### Notes:

Column headers are defined as follows:

DF: Dilution Factor

DL: Detection Limit

MDA: Minimum Detectable Activity

MDC: Minimum Detectable Concentration

Lc/LC: Critical Level

PF: Prep Factor

RL: Reporting Limit

SQL: Sample Quantitation Limit

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## QC Summary

Report Date: December 14, 2021

Page 1 of 5

Environmental Conservation Laboratories, Inc.

10775 Central Port Drive

Orlando, Florida

Contact: Kaitlin Dylnicki

Workorder: 563563

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2204433										
QC1204971764	LCS										
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0194			0.0174	ug/L		89	(59%-144%)	JMB3	12/07/21	11:48
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0206			0.0203	ug/L		98	(67%-136%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0192			0.0183	ug/L		95	(68%-135%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0206			0.0196	ug/L		95	(67%-144%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0206			0.0185	ug/L		89	(57%-139%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0206			0.0183	ug/L		88	(59%-145%)			
Perfluorobutane sulfonic acid (PFBS)	0.0183			0.0183	ug/L		100	(70%-144%)			
Perfluorodecanoic acid (PFDA)	0.0206			0.0218	ug/L		105	(65%-145%)			
Perfluorododecanoic acid (PFDOA)	0.0206			0.0198	ug/L		96	(65%-137%)			
Perfluoroheptanoic acid (PFHpA)	0.0206			0.0215	ug/L		104	(71%-133%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0188			0.0206	ug/L		110	(67%-145%)			
Perfluorohexanoic acid (PFHxA)	0.0206			0.0197	ug/L		96	(70%-138%)			
Perfluorononanoic acid (PFNA)	0.0206			0.0207	ug/L		100	(69%-133%)			
Perfluorooctane sulfonic acid (PFOS)	0.0206			0.0208	ug/L		101	(65%-133%)			

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## QC Summary

Workorder: 563563

Page 2 of 5

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2204433										
Perfluorooctanoic acid (PFOA)	0.0206			0.0217	ug/L		105	(66%-139%)	JMB3	12/07/21	11:48
Perfluorotetradecanoic acid (PFTDA)	0.0206			0.0208	ug/L		101	(66%-138%)			
Perfluorotridecanoic acid (PFTTrDA)	0.0206			0.0225	ug/L		109	(58%-140%)			
Perfluoroundecanoic acid (PFUnDA)	0.0206			0.0211	ug/L		102	(63%-135%)			
QC1204971765 LCSD											
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0193			0.0151	ug/L	14	78	(0%-27%)		12/07/21	12:01
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0205			0.0191	ug/L	6	93	(0%-26%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0191			0.0177	ug/L	3	93	(0%-26%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0205			0.0182	ug/L	8	89	(0%-25%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0205			0.0208	ug/L	12	102	(0%-27%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0205			0.0196	ug/L	7	95	(0%-27%)			
Perfluorobutane sulfonic acid (PFBS)	0.0181			0.0173	ug/L	6	95	(0%-23%)			
Perfluorodecanoic acid (PFDA)	0.0205			0.0206	ug/L	6	100	(0%-26%)			
Perfluorododecanoic acid (PFDOA)	0.0205			0.0210	ug/L	6	102	(0%-26%)			
Perfluoroheptanoic acid (PFHpA)	0.0205			0.0219	ug/L	2	107	(0%-23%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0187			0.0180	ug/L	14	96	(0%-27%)			

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## QC Summary

Workorder: 563563

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2204433										
Perfluorohexanoic acid (PFHxA)	0.0205			0.0197	ug/L	0	96	(0%-27%)	JMB3	12/07/21	12:01
Perfluorononanoic acid (PFNA)	0.0205			0.0203	ug/L	2	99	(0%-25%)			
Perfluorooctane sulfonic acid (PFOS)	0.0205			0.0202	ug/L	3	99	(0%-25%)			
Perfluorooctanoic acid (PFOA)	0.0205			0.0194	ug/L	11	95	(0%-27%)			
Perfluorotetradecanoic acid (PFTDA)	0.0205			0.0207	ug/L	0	101	(0%-26%)			
Perfluorotridecanoic acid (PFTrDA)	0.0205			0.0226	ug/L	1	110	(0%-31%)			
Perfluoroundecanoic acid (PFUnDA)	0.0205			0.0212	ug/L	1	103	(0%-26%)			
QC1204971763 MB											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)			U	ND	ug/L					12/07/21	11:35
4,8-Dioxa-3H-perfluorononanoic acid (DONA)			U	ND	ug/L						
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)			U	ND	ug/L						
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)			U	ND	ug/L						
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)			U	ND	ug/L						
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)			U	ND	ug/L						
Perfluorobutane sulfonic acid (PFBS)			U	ND	ug/L						
Perfluorodecanoic acid (PFDA)			U	ND	ug/L						

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## QC Summary

Workorder: 563563

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2204433										
Perfluorododecanoic acid (PFDOA)			U	ND	ug/L				JMB3	12/07/21	11:35
Perfluoroheptanoic acid (PFHpA)			U	ND	ug/L						
Perfluorohexane sulfonic acid (PFHxS)			U	ND	ug/L						
Perfluorohexanoic acid (PFHxA)			U	ND	ug/L						
Perfluorononanoic acid (PFNA)			U	ND	ug/L						
Perfluorooctane sulfonic acid (PFOS)			U	ND	ug/L						
Perfluorooctanoic acid (PFOA)			U	ND	ug/L						
Perfluorotetradecanoic acid (PFTDA)			U	ND	ug/L						
Perfluorotridecanoic acid (PFTTrDA)			U	ND	ug/L						
Perfluoroundecanoic acid (PFUnDA)			U	ND	ug/L						

### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E Concentration of the target analyte exceeds the instrument calibration range
- I The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
- J See case narrative for an explanation

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 563563

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
JNX	Non Calibrated Compound										
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor										
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
Q	Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UJ	Compound cannot be extracted										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	QC Samples were not spiked with this compound										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

**LCMSMS-Misc  
Technical Case Narrative  
Environmental Conservation Laboratories  
SDG #: AE09082  
Work Order #: 563563**

**Product:** The Extraction and Analysis of Per and Polyfluoroalkyl Substances Using LCMSMS

**Analytical Method:** EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15

**Analytical Procedure:** GL-OA-E-076 REV# 12

**Analytical Batches:** 2204433 and 2204428

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
563563001	IA-IDW-20211130-01
1204971763	Method Blank (MB)
1204971764	Laboratory Control Sample (LCS)
1204971765	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Miscellaneous Information**

**Additional Comments**

Additional sample was not provided for matrix QC.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

SUBCONTRACT ORDER

ENCO Orlando

AE09082

563563

SENDING LABORATORY:

ENCO Orlando  
10775 Central Port Drive  
Orlando, FL 32824  
Phone: 407.826.5314  
Fax: 407.850.6945  
Project Manager: Kaitlin Dylnicki

RECEIVING LABORATORY:

GEL Laboratories, Inc. (SC)  
2040 Savage Road  
Charleston, SC 29407  
Phone: (843) 556-8171  
Fax: (843) 766-1178  
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	IA-IDW-20211130-01	Water	30-Nov-21 12:40	

Analysis	Due	Expires	Analysis Comments
PFAS	07-Dec-21 15:00	14-Dec-21 12:40	14 analyte 537 GELP21-0027

Containers Supplied:

5mL (H)	250mLP (I)	250mLP (J)
---------	------------	------------

Revised  
copy

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_



SUBCONTRACT ORDER

Standard GELTHT

ENCO Orlando

AE09082

563563

11/30/21

**SENDING LABORATORY:**

ENCO Orlando  
10775 Central Port Drive  
Orlando, FL 32824  
Phone: 407.826.5314  
Fax: 407.850.6945  
Project Manager: Kaitlin Dylnicki

**RECEIVING LABORATORY:**

GEL Laboratories, Inc. (SC)  
2040 Savage Road  
Charleston, SC 29407  
Phone :(843) 556-8171  
Fax: (843) 766-1178  
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	IA-IDW-202111-30-01	Water	30-Nov-21 12:40	

Analysis	Due	Expires	Analysis Comments
PFAS	07-Dec-21 15:00	14-Dec-21 12:40	14 analyte 537 GELP21-0027
<i>Containers Supplied:</i>			
5mLV (H)	250mLP (I)	250mLP (J)	

Released By

*[Signature]* 11/30/21

Date

Received By

*[Signature]*

Date

12/1/21 *[Signature]*

Released By

Date

Received By

Date

**SAMPLE RECEIPT & REVIEW FORM**

Client: <u>EWCL</u>		SDG/AR/COC/Work Order: <u>563-563</u>			
Received By: <u>DC</u>		Date Received: <u>12-1-21</u>			
Carrier and Tracking Number		Circle Applicable: <input checked="" type="checkbox"/> FedEx Express <input type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <u>5307 8855 0704</u>			
Suspected Hazard Information		Yes	No		
*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.					
A) Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____ If UN2910, Is the Radioactive Shipment Survey Compliant? Yes ___ No ___		
B) Did the client designate the samples are to be received as radioactive?		<input checked="" type="checkbox"/>	COC notation or radioactive stickers on containers equal client designation.		
C) Did the RSO classify the samples as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3		
D) Did the client designate samples are hazardous?		<input checked="" type="checkbox"/>	COC notation or hazard labels on containers equal client designation.		
E) Did the RSO identify possible hazards?		<input checked="" type="checkbox"/>	If D or E is yes, select Hazards below. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:		
Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <span style="float: right;">TEMP: <u>20</u></span>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR6-21</u> Secondary Temperature Device Serial # (If Applicable):
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#:
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, are Encores or Soil Kits present for solids? Yes ___ No ___ NA ___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes ___ No ___ NA ___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes ___ No ___ NA ___ Sample ID's and containers affected:
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected:
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and containers affected:
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Not relinquished Other (describe)
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials GB Date 12/2/21 Page 1 of 1

**List of current GEL Certifications as of 14 December 2021**

<b>State</b>	<b>Certification</b>
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122021-1
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-165
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-21-19
Utah NELAP	SC000122021-36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780



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Friday, May 20, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - Ransom Rd LF**

**ENCO Workorder(s): AF03371**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, May 11, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: RRLF-MW0033-027.5-20220510      Lab ID: AF03371-01      Sampled: 05/10/22 11:48      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/24/22	05/16/22 00:00	05/16/22 17:02

**Client ID: RRLF-MW0038I-024.5-20220510      Lab ID: AF03371-02      Sampled: 05/10/22 11:37      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/24/22	05/16/22 00:00	05/16/22 17:31

**Client ID: RRLF-MW0039I-024.5-20220510      Lab ID: AF03371-03      Sampled: 05/10/22 12:12      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/24/22	05/16/22 00:00	05/16/22 18:00

**Client ID: RRLF-MW0040I-024.5-20220510      Lab ID: AF03371-04      Sampled: 05/10/22 12:29      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/24/22	05/16/22 00:00	05/16/22 18:29

**Client ID: RRLF-TB-20220510      Lab ID: AF03371-05      Sampled: 05/10/22 11:30      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/24/22	05/16/22 00:00	05/16/22 18:58



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**SAMPLE DETECTION SUMMARY**

**Client ID:** RRLF-MW0033-027.5-20220510      **Lab ID:** AF03371-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	8.9		0.71	1.0	ug/L	EPA 8260D	

**Client ID:** RRLF-MW00381-024.5-20220510      **Lab ID:** AF03371-02

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	7.7		0.71	1.0	ug/L	EPA 8260D	

**Client ID:** RRLF-MW00401-024.5-20220510      **Lab ID:** AF03371-04

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	3.4		0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** RRLF-MW0033-027.5-20220510      **Lab Sample ID:** AF03371-01      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 11:48      **Work Order:** AF03371  
**Project:** NASA KSC - Ransom Rd LF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	8.9		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 17:02	JMW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	45	1	50.0	91 %	41-142		2E16008	EPA 8260D	05/16/22 17:02	JMW	
<i>Dibromofluoromethane</i>	57	1	50.0	114 %	53-146		2E16008	EPA 8260D	05/16/22 17:02	JMW	
<i>Toluene-d8</i>	49	1	50.0	98 %	41-146		2E16008	EPA 8260D	05/16/22 17:02	JMW	

**Description:** RRLF-MW0038I-024.5-20220510      **Lab Sample ID:** AF03371-02      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 11:37      **Work Order:** AF03371  
**Project:** NASA KSC - Ransom Rd LF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	7.7		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 17:31	JMW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	45	1	50.0	91 %	41-142		2E16008	EPA 8260D	05/16/22 17:31	JMW	
<i>Dibromofluoromethane</i>	55	1	50.0	111 %	53-146		2E16008	EPA 8260D	05/16/22 17:31	JMW	
<i>Toluene-d8</i>	48	1	50.0	96 %	41-146		2E16008	EPA 8260D	05/16/22 17:31	JMW	

**Description:** RRLF-MW0039I-024.5-20220510      **Lab Sample ID:** AF03371-03      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 12:12      **Work Order:** AF03371  
**Project:** NASA KSC - Ransom Rd LF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 18:00	JMW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	46	1	50.0	91 %	41-142		2E16008	EPA 8260D	05/16/22 18:00	JMW	
<i>Dibromofluoromethane</i>	56	1	50.0	113 %	53-146		2E16008	EPA 8260D	05/16/22 18:00	JMW	
<i>Toluene-d8</i>	48	1	50.0	97 %	41-146		2E16008	EPA 8260D	05/16/22 18:00	JMW	

**Description:** RRLF-MW0040I-024.5-20220510      **Lab Sample ID:** AF03371-04      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 12:29      **Work Order:** AF03371  
**Project:** NASA KSC - Ransom Rd LF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	3.4		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 18:29	JMW	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	43	1	50.0	86 %	41-142		2E16008	EPA 8260D	05/16/22 18:29	JMW	
<i>Dibromofluoromethane</i>	54	1	50.0	107 %	53-146		2E16008	EPA 8260D	05/16/22 18:29	JMW	
<i>Toluene-d8</i>	47	1	50.0	93 %	41-146		2E16008	EPA 8260D	05/16/22 18:29	JMW	



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### ANALYTICAL RESULTS

**Description:** RRLF-TB-20220510

**Lab Sample ID:** AF03371-05

**Received:** 05/11/22 15:35

**Matrix:** Water

**Sampled:** 05/10/22 11:30

**Work Order:** AF03371

**Project:** NASA KSC - Ransom Rd LF

**Sampled By:** ENCO ORL

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 18:58	JMW	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	<i>44</i>	<i>1</i>	<i>50.0</i>	<i>88 %</i>	<i>41-142</i>	<i>2E16008</i>	<i>EPA 8260D</i>	<i>05/16/22 18:58</i>	<i>JMW</i>		
<i>Dibromofluoromethane</i>	<i>55</i>	<i>1</i>	<i>50.0</i>	<i>111 %</i>	<i>53-146</i>	<i>2E16008</i>	<i>EPA 8260D</i>	<i>05/16/22 18:58</i>	<i>JMW</i>		
<i>Toluene-d8</i>	<i>47</i>	<i>1</i>	<i>50.0</i>	<i>94 %</i>	<i>41-146</i>	<i>2E16008</i>	<i>EPA 8260D</i>	<i>05/16/22 18:58</i>	<i>JMW</i>		



**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E16008 - EPA 5030B\_MS**

**Blank (2E16008-BLK1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 09:21

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	55			ug/L	50.0		110	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**LCS (2E16008-BS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 08:23

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	29		1.0	ug/L	20.0		143	20-167			
4-Bromofluorobenzene	48			ug/L	50.0		97	41-142			
Dibromofluoromethane	57			ug/L	50.0		113	53-146			
Toluene-d8	50			ug/L	50.0		100	41-146			

**Matrix Spike (2E16008-MS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:16

Source: AF03369-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	31		1.0	ug/L	20.0	2.1	143	20-167			
4-Bromofluorobenzene	46			ug/L	50.0		92	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike Dup (2E16008-MSD1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:45

Source: AF03369-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	30		1.0	ug/L	20.0	2.1	139	20-167	2	24	
4-Bromofluorobenzene	44			ug/L	50.0		88	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AFO3371



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

COC No. \_\_\_\_\_ Page: 1 of 1  
 Project Name: NASA KSC PO No.138224 Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase:  
 Site Location: Ransom Road Landfill Send Invoice To: Instructions in MSA # 19S-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings  
 TO No.: 80KSC019F0071 AECOM Project Manager: Chris Marshall Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Amentt Jennings  
 Sampler/Phone # Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747 Deliver Samples To: ENCO Site-Specific WS#15 from QAPP: 15-29

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Vinyl chloride by SW8260B											Comments		
											Total No. of Containers												
	024.5-20220510 RRLF-MW0033-202205	RRLF-MW0033	20220510	1148	WG	N	G	3	3														
	024.5-20220510 RRLF-MW0038I-202205	RRLF-MW0038I	20220510	1137	WG	N	G	3	3														
	024.5-20220510 RRLF-MW0039I-202205	RRLF-MW0039I	20220510	1212	WG	N	G	3	3														
	024.5-20220510 RRLF-MW0040I-202205	RRLF-MW0040I	20220510	1229	WG	N	G	3	3														
	024.5-20220510 RRLF-TB-20220510	RRLF-TB01	20220510	1130	WQ	TB	G	3	3														

<b>Field Comments:</b> Report only per QAPP WS #15-29	<b>Lab Comments:</b>	<b>Sample Shipment and Delivery Details</b> Number of coolers in shipment: 1 Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Shipping Company: Tracking No: Date Shipped:
Relinquished by (Signature) _____ Date _____ Time _____	Received by (signature) _____ Date _____ Time _____	
1 <i>[Signature]</i> 05/04/22 14:00	1 <i>[Signature]</i> 5/14/22 0700	
2 <i>[Signature]</i> 5/11/22 1535	2 <i>[Signature]</i> 5.11.22 1535	
3	3	

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water  
 (2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk  
 (3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

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Orlando FL, 32824

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Friday, May 20, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - M7-505**

**ENCO Workorder(s): AF03369**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, May 11, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

<b>Client ID: M505-MW0013-025.5-20220511</b>		<b>Lab ID: AF03369-01</b>		<b>Sampled: 05/11/22 10:47</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 09:50		
<b>Client ID: M505-MW0032-035.0-20220511</b>		<b>Lab ID: AF03369-02</b>		<b>Sampled: 05/11/22 11:52</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 10:19		
<b>Client ID: M505-MW0033-025.0-20220511</b>		<b>Lab ID: AF03369-03</b>		<b>Sampled: 05/11/22 12:15</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 10:48		
<b>Client ID: M505-MW0039-032.5-20220511</b>		<b>Lab ID: AF03369-04</b>		<b>Sampled: 05/11/22 11:35</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 12:14		
<b>Client ID: M505-MW0049-009.0-20220511</b>		<b>Lab ID: AF03369-05</b>		<b>Sampled: 05/11/22 11:15</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 12:43		
<b>Client ID: M505-MW0051-025.0-20220511</b>		<b>Lab ID: AF03369-06</b>		<b>Sampled: 05/11/22 12:39</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 13:12		
<b>Client ID: M505-MW0055-025.0-20220511</b>		<b>Lab ID: AF03369-07</b>		<b>Sampled: 05/11/22 12:35</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 13:41		
<b>Client ID: M505-MW0059-025.0-20220511</b>		<b>Lab ID: AF03369-08</b>		<b>Sampled: 05/11/22 12:07</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 14:09		
<b>Client ID: M505-TB-20220511-01</b>		<b>Lab ID: AF03369-09</b>		<b>Sampled: 05/11/22 07:00</b>		<b>Received: 05/11/22 15:35</b>	
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>		
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00		05/16/22 14:38		

**SAMPLE DETECTION SUMMARY**

**Client ID: M505-MW0013-025.5-20220511** **Lab ID: AF03369-01**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	37		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	2.1		0.71	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0032-035.0-20220511** **Lab ID: AF03369-02**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	35		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	4.7		0.71	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0033-025.0-20220511** **Lab ID: AF03369-03**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	6.1		0.53	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0039-032.5-20220511** **Lab ID: AF03369-04**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	41		0.53	1.0	ug/L	EPA 8260D	
Trichloroethene	2.7		0.89	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0049-009.0-20220511** **Lab ID: AF03369-05**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	21		0.53	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0051-025.0-20220511** **Lab ID: AF03369-06**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	6.3		0.53	1.0	ug/L	EPA 8260D	

**Client ID: M505-MW0055-025.0-20220511** **Lab ID: AF03369-07**

Analyte	Results	Flag	MDL	PQL	Units	Method	Notes
cis-1,2-Dichloroethene	53		0.53	1.0	ug/L	EPA 8260D	
Vinyl chloride	9.3		0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** M505-MW0013-025.5-20220511

**Lab Sample ID:** AF03369-01

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 10:47

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	37		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 09:50	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 09:50	JMW	
Vinyl chloride [75-01-4]^	2.1		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 09:50	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	91 %	41-142	2E16008	EPA 8260D	05/16/22 09:50	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146	2E16008	EPA 8260D	05/16/22 09:50	JMW	
Toluene-d8	49	1	50.0	98 %	41-146	2E16008	EPA 8260D	05/16/22 09:50	JMW	

**Description:** M505-MW0032-035.0-20220511

**Lab Sample ID:** AF03369-02

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 11:52

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	35		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 10:19	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 10:19	JMW	
Vinyl chloride [75-01-4]^	4.7		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 10:19	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	44	1	50.0	88 %	41-142	2E16008	EPA 8260D	05/16/22 10:19	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146	2E16008	EPA 8260D	05/16/22 10:19	JMW	
Toluene-d8	48	1	50.0	97 %	41-146	2E16008	EPA 8260D	05/16/22 10:19	JMW	

**Description:** M505-MW0033-025.0-20220511

**Lab Sample ID:** AF03369-03

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 12:15

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	6.1		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 10:48	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 10:48	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 10:48	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	43	1	50.0	86 %	41-142	2E16008	EPA 8260D	05/16/22 10:48	JMW	
Dibromofluoromethane	54	1	50.0	108 %	53-146	2E16008	EPA 8260D	05/16/22 10:48	JMW	
Toluene-d8	47	1	50.0	95 %	41-146	2E16008	EPA 8260D	05/16/22 10:48	JMW	

**ANALYTICAL RESULTS**

**Description:** M505-MW0039-032.5-20220511      **Lab Sample ID:** AF03369-04      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/11/22 11:35      **Work Order:** AF03369  
**Project:** NASA KSC - M7-505      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	41		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 12:14	JMW	
Trichloroethene [79-01-6]^	2.7		ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 12:14	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 12:14	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	45	1	50.0	91 %	41-142		2E16008	EPA 8260D	05/16/22 12:14	JMW	
Dibromofluoromethane	56	1	50.0	112 %	53-146		2E16008	EPA 8260D	05/16/22 12:14	JMW	
Toluene-d8	49	1	50.0	98 %	41-146		2E16008	EPA 8260D	05/16/22 12:14	JMW	

**Description:** M505-MW0049-009.0-20220511      **Lab Sample ID:** AF03369-05      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/11/22 11:15      **Work Order:** AF03369  
**Project:** NASA KSC - M7-505      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	21		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 12:43	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 12:43	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 12:43	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	45	1	50.0	89 %	41-142		2E16008	EPA 8260D	05/16/22 12:43	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146		2E16008	EPA 8260D	05/16/22 12:43	JMW	
Toluene-d8	47	1	50.0	93 %	41-146		2E16008	EPA 8260D	05/16/22 12:43	JMW	

**Description:** M505-MW0051-025.0-20220511      **Lab Sample ID:** AF03369-06      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/11/22 12:39      **Work Order:** AF03369  
**Project:** NASA KSC - M7-505      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	6.3		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 13:12	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 13:12	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 13:12	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	44	1	50.0	88 %	41-142		2E16008	EPA 8260D	05/16/22 13:12	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146		2E16008	EPA 8260D	05/16/22 13:12	JMW	
Toluene-d8	47	1	50.0	94 %	41-146		2E16008	EPA 8260D	05/16/22 13:12	JMW	



**ANALYTICAL RESULTS**

**Description:** M505-MW0055-025.0-20220511

**Lab Sample ID:** AF03369-07

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 12:35

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	53		ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 13:41	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 13:41	JMW	
Vinyl chloride [75-01-4]^	9.3		ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 13:41	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	46	1	50.0	92 %	41-142		2E16008	EPA 8260D	05/16/22 13:41	JMW	
Dibromofluoromethane	57	1	50.0	113 %	53-146		2E16008	EPA 8260D	05/16/22 13:41	JMW	
Toluene-d8	48	1	50.0	97 %	41-146		2E16008	EPA 8260D	05/16/22 13:41	JMW	

**Description:** M505-MW0059-025.0-20220511

**Lab Sample ID:** AF03369-08

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 12:07

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 14:09	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 14:09	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 14:09	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	45	1	50.0	90 %	41-142		2E16008	EPA 8260D	05/16/22 14:09	JMW	
Dibromofluoromethane	56	1	50.0	111 %	53-146		2E16008	EPA 8260D	05/16/22 14:09	JMW	
Toluene-d8	47	1	50.0	94 %	41-146		2E16008	EPA 8260D	05/16/22 14:09	JMW	

**Description:** M505-TB-20220511-01

**Lab Sample ID:** AF03369-09

**Received:** 05/11/22 15:35

**Matrix:** Water

**Sampled:** 05/11/22 07:00

**Work Order:** AF03369

**Project:** NASA KSC - M7-505

**Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 14:38	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16008	EPA 8260D	05/16/22 14:38	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 14:38	JMW	
<b>Surrogates</b>											
4-Bromofluorobenzene	44	1	50.0	88 %	41-142		2E16008	EPA 8260D	05/16/22 14:38	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146		2E16008	EPA 8260D	05/16/22 14:38	JMW	
Toluene-d8	48	1	50.0	96 %	41-146		2E16008	EPA 8260D	05/16/22 14:38	JMW	

**QUALITY CONTROL DATA**
**Volatile Organic Compounds by GCMS - Quality Control**
**Batch 2E16008 - EPA 5030B\_MS**
**Blank (2E16008-BLK1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 09:21

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	55			ug/L	50.0		110	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**LCS (2E16008-BS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 08:23

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0		124	56-128			
Trichloroethene	23		1.0	ug/L	20.0		115	62-135			
Vinyl chloride	29		1.0	ug/L	20.0		143	20-167			
4-Bromofluorobenzene	48			ug/L	50.0		97	41-142			
Dibromofluoromethane	57			ug/L	50.0		113	53-146			
Toluene-d8	50			ug/L	50.0		100	41-146			

**Matrix Spike (2E16008-MS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:16

**Source: AF03369-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	61		1.0	ug/L	20.0	37	121	56-128			
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	123	62-135			
Vinyl chloride	31		1.0	ug/L	20.0	2.1	143	20-167			
4-Bromofluorobenzene	46			ug/L	50.0		92	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike Dup (2E16008-MSD1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:45

**Source: AF03369-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	61		1.0	ug/L	20.0	37	119	56-128	0.7	17	
Trichloroethene	24		1.0	ug/L	20.0	0.89 U	122	62-135	1	20	
Vinyl chloride	30		1.0	ug/L	20.0	2.1	139	20-167	2	24	
4-Bromofluorobenzene	44			ug/L	50.0		88	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1	
Project Name: NASA KSC				PO No. 138224		Project No. 60610905.Subs 2021-23-Subs 2021-23	
Site Location: M7-505 Treatment Tank Area				Send Invoice To: Instructions in MSA # 195-24548-GV03		Phase: EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings	
Sampler/Phone #		Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO		Site-Specific WS#15 from QAPP: 15-4	

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl											Comments
	M505-MW0013-202205-025.0-20220511	M505-MW0013	20220511	1047	WG	N	G	3	3	Select VOC by SW8260B										
	M505-MW0032-202205-035.0-20220511	M505-MW0032	20220511	1152	WG	N	G	3	3											
	M505-MW0033-202205-025.0-20220511	M505-MW0033	20220511	1215	WG	N	G	3	3											
	M505-MW0039-202205-032.5-20220511	M505-MW0039	20220511	1135	WG	N	G	3	3											
	M505-MW0049-202205-009.0-20220511	M505-MW0049	20220511	1115	WG	N	G	3	3											
	M505-MW0051-202205-025.0-20220511	M505-MW0051	20220511	1239	WG	N	G	3	3											
	M505-MW0055-202205-025.0-20220511	M505-MW0055	20220511	1235	WG	N	G	3	3											
	M505-MW0059-202205-025.0-20220511	M505-MW0059	20220511	1207	WG	N	G	3	3											
	M505-TB-20220511-01	M505-TB01	20220511	0700	WQ	TB	G	3	3											

<b>Field Comments:</b> Report only per QAPP WS #15			<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:		
1 <i>[Signature]</i>	05/10/22	12:30	1 <i>[Signature]</i>	5/11/22	0700	Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
2 <i>[Signature]</i>	5/11/22	1535	2 <i>[Signature]</i>	5.11.22	0835	Shipping Company:		
3			3 <i>[Signature]</i>	RS11.22	1535	Tracking No:		
						Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank

LG629 3.9°C



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Tuesday, May 17, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - O\_C**

**ENCO Workorder(s): AF03370**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Monday, May 9, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



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**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: O\_C-MW0005I-042.5-20220509      Lab ID: AF03370-01      Sampled: 05/09/22 14:18      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22	05/13/22 00:00	05/13/22 16:29

**Client ID: O\_C-MW0007I-042.5-20220509      Lab ID: AF03370-02      Sampled: 05/09/22 14:49      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22	05/13/22 00:00	05/13/22 16:58

**Client ID: O\_C-TB-20220509-01      Lab ID: AF03370-03      Sampled: 05/09/22 07:00      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22	05/13/22 00:00	05/13/22 17:27



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**SAMPLE DETECTION SUMMARY**

**Client ID:** O\_C-MW0005I-042.5-20220509      **Lab ID:** AF03370-01

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	3.0		0.71	1.0	ug/L	EPA 8260D	

**Client ID:** O\_C-MW0007I-042.5-20220509      **Lab ID:** AF03370-02

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	3.2		0.71	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** O\_C-MW0005I-042.5-20220509      **Lab Sample ID:** AF03370-01      **Received:** 05/09/22 16:30  
**Matrix:** Ground Water      **Sampled:** 05/09/22 14:18      **Work Order:** AF03370  
**Project:** NASA KSC - O\_C      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	3.0		ug/L	1	0.71	1.0	2E13004	EPA 8260D	05/13/22 16:29	nmc	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	43	1	50.0	86 %	41-142		2E13004	EPA 8260D	05/13/22 16:29	nmc	
<i>Dibromofluoromethane</i>	51	1	50.0	102 %	53-146		2E13004	EPA 8260D	05/13/22 16:29	nmc	
<i>Toluene-d8</i>	45	1	50.0	91 %	41-146		2E13004	EPA 8260D	05/13/22 16:29	nmc	

**Description:** O\_C-MW0007I-042.5-20220509      **Lab Sample ID:** AF03370-02      **Received:** 05/09/22 16:30  
**Matrix:** Ground Water      **Sampled:** 05/09/22 14:49      **Work Order:** AF03370  
**Project:** NASA KSC - O\_C      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	3.2		ug/L	1	0.71	1.0	2E13004	EPA 8260D	05/13/22 16:58	nmc	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	45	1	50.0	91 %	41-142		2E13004	EPA 8260D	05/13/22 16:58	nmc	
<i>Dibromofluoromethane</i>	54	1	50.0	108 %	53-146		2E13004	EPA 8260D	05/13/22 16:58	nmc	
<i>Toluene-d8</i>	48	1	50.0	96 %	41-146		2E13004	EPA 8260D	05/13/22 16:58	nmc	

**Description:** O\_C-TB-20220509-01      **Lab Sample ID:** AF03370-03      **Received:** 05/09/22 16:30  
**Matrix:** Water      **Sampled:** 05/09/22 07:00      **Work Order:** AF03370  
**Project:** NASA KSC - O\_C      **Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E13004	EPA 8260D	05/13/22 17:27	nmc	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	44	1	50.0	88 %	41-142		2E13004	EPA 8260D	05/13/22 17:27	nmc	
<i>Dibromofluoromethane</i>	52	1	50.0	104 %	53-146		2E13004	EPA 8260D	05/13/22 17:27	nmc	
<i>Toluene-d8</i>	46	1	50.0	92 %	41-146		2E13004	EPA 8260D	05/13/22 17:27	nmc	



**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E13004 - EPA 5030B\_MS**

**Blank (2E13004-BLK1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 10:14

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		91	41-142			
Dibromofluoromethane	53			ug/L	50.0		105	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**LCS (2E13004-BS1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 07:50

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	27		1.0	ug/L	20.0		137	20-167			
4-Bromofluorobenzene	42			ug/L	50.0		85	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**Matrix Spike (2E13004-MS1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 08:19

Source: AF03650-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	30		1.0	ug/L	20.0	0.71 U	149	20-167			
4-Bromofluorobenzene	43			ug/L	50.0		86	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Matrix Spike Dup (2E13004-MSD1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 08:48

Source: AF03650-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Vinyl chloride	28		1.0	ug/L	20.0	0.71 U	142	20-167	4	24	
4-Bromofluorobenzene	43			ug/L	50.0		85	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

COC No. \_\_\_\_\_ Page: 1 of 1  
 PO No. 138224 Project No. 60610905 Subs 2021-23 Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 19S-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Ament Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Ament Jennings  
 Deliver Samples To: ENCO Site-Specific WS#15 from QAPP: 15-31

Project Name: NASA KSC  
 Site Location: Operations and Checkout Building  
 TO No.: 80KSC019F0071 AECOM Project Manager: **Chris Marshall**  
 Sampler/Phone #: Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Sample Analysis Requested (Enter number of containers for each test)											Comments		
										Total No. of Containers	Vinyl chloride by SW8260B												
	O_C-MW00051-202205-042.5-30220509	O_C-MW00051	20220509	1418	WG	N	G	3	3														
	O_C-MW00071-202205-042.5-20220509	O_C-MW00071	20220509	1449	WG	N	G	3	3														
	O_C-TB-20220509-91	O_C-TB01	20220509	0700	WQ	TB	G	3	3														

<b>Field Comments:</b> Report only per QAPP WS #15-31			<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:		
1 <i>[Signature]</i>	05/04/22	14:30	1 <i>[Signature]</i>	5/9/22	0700	Samples Iced?(check) Yes ___ No ___		
2 <i>[Signature]</i>	5/9/22	16:30	2 <i>[Signature]</i>	5/9/22	1630	Shipping Company:		
3			3			Tracking No:		
						Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water  
 (2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk  
 (3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank  
 Rev 8/19

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Orlando FL, 32824

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Friday, May 20, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - VPF**

**ENCO Workorder(s): AF03375**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, May 12, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

<b>Client ID: VPF-IW0008I-020.0-20220512</b>		<b>Lab ID: AF03375-01</b>	<b>Sampled: 05/12/22 12:42</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/16/22 00:00	05/17/22 00:43
<b>Client ID: VPF-IW0008I-020.0-20220512</b>		<b>Lab ID: AF03375-01RE1</b>	<b>Sampled: 05/12/22 12:42</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 14:19
<b>Client ID: VPF-IW0018I-023.0-20220512</b>		<b>Lab ID: AF03375-02</b>	<b>Sampled: 05/12/22 11:20</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/16/22 00:00	05/17/22 01:12
<b>Client ID: VPF-IW0018I-023.0-20220512</b>		<b>Lab ID: AF03375-02RE1</b>	<b>Sampled: 05/12/22 11:20</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 14:48
<b>Client ID: VPF-MW0021-030.0-20220512</b>		<b>Lab ID: AF03375-03</b>	<b>Sampled: 05/12/22 10:52</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 15:16
<b>Client ID: VPF-MW0022-007.5-20220512</b>		<b>Lab ID: AF03375-04</b>	<b>Sampled: 05/12/22 10:50</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 15:45
<b>Client ID: VPF-MW0025-040.0-20220512</b>		<b>Lab ID: AF03375-05</b>	<b>Sampled: 05/12/22 11:29</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 16:14
<b>Client ID: VPF-MW0027-040.0-20220512</b>		<b>Lab ID: AF03375-06</b>	<b>Sampled: 05/12/22 12:05</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/18/22 03:16
<b>Client ID: VPF-TB-20220512-01</b>		<b>Lab ID: AF03375-07</b>	<b>Sampled: 05/12/22 07:00</b>	<b>Received: 05/12/22 14:52</b>
<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/18/22 03:45

**SAMPLE DETECTION SUMMARY**

<b>Client ID: VPF-IW0008I-020.0-20220512</b>		<b>Lab ID: AF03375-01</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	5.2		0.53	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-IW0008I-020.0-20220512</b>		<b>Lab ID: AF03375-01RE1</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	1.2		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-IW0018I-023.0-20220512</b>		<b>Lab ID: AF03375-02</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	6.0		0.53	1.0	ug/L	EPA 8260D	
Trichloroethene	1.6		0.89	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-IW0018I-023.0-20220512</b>		<b>Lab ID: AF03375-02RE1</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	1.5		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-MW0021-030.0-20220512</b>		<b>Lab ID: AF03375-03</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	18		0.53	1.0	ug/L	EPA 8260D	
Trichloroethene	8.3		0.89	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-MW0022-007.5-20220512</b>		<b>Lab ID: AF03375-04</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Vinyl chloride	5.1		0.71	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-MW0025-040.0-20220512</b>		<b>Lab ID: AF03375-05</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	10		0.53	1.0	ug/L	EPA 8260D	
Trichloroethene	4.1		0.89	1.0	ug/L	EPA 8260D	
<b>Client ID: VPF-MW0027-040.0-20220512</b>		<b>Lab ID: AF03375-06</b>					
<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	13		0.53	1.0	ug/L	EPA 8260D	
Trichloroethene	3.8		0.89	1.0	ug/L	EPA 8260D	

**ANALYTICAL RESULTS**

**Description:** VPF-IW0008I-020.0-20220512

**Lab Sample ID:** AF03375-01

**Received:** 05/12/22 14:52

**Matrix:** Ground Water

**Sampled:** 05/12/22 12:42

**Work Order:** AF03375

**Project:** NASA KSC - VPF

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	5.2		ug/L	1	0.53	1.0	2E16037	EPA 8260D	05/17/22 00:43	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E16037	EPA 8260D	05/17/22 00:43	JMW	
Vinyl chloride [75-01-4]^	1.2		ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 14:19	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	45	1	50.0	91 %	41-142	2E16037	EPA 8260D	05/17/22 00:43	JMW	
4-Bromofluorobenzene	42	1	50.0	85 %	41-142	2E17007	EPA 8260D	05/17/22 14:19	JMW	
Dibromofluoromethane	56	1	50.0	113 %	53-146	2E16037	EPA 8260D	05/17/22 00:43	JMW	
Dibromofluoromethane	56	1	50.0	111 %	53-146	2E17007	EPA 8260D	05/17/22 14:19	JMW	
Toluene-d8	48	1	50.0	96 %	41-146	2E16037	EPA 8260D	05/17/22 00:43	JMW	
Toluene-d8	45	1	50.0	90 %	41-146	2E17007	EPA 8260D	05/17/22 14:19	JMW	

**Description:** VPF-IW0018I-023.0-20220512

**Lab Sample ID:** AF03375-02

**Received:** 05/12/22 14:52

**Matrix:** Ground Water

**Sampled:** 05/12/22 11:20

**Work Order:** AF03375

**Project:** NASA KSC - VPF

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	6.0		ug/L	1	0.53	1.0	2E16037	EPA 8260D	05/17/22 01:12	JMW	
Trichloroethene [79-01-6]^	1.6		ug/L	1	0.89	1.0	2E16037	EPA 8260D	05/17/22 01:12	JMW	
Vinyl chloride [75-01-4]^	1.5		ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 14:48	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	43	1	50.0	85 %	41-142	2E16037	EPA 8260D	05/17/22 01:12	JMW	
4-Bromofluorobenzene	44	1	50.0	87 %	41-142	2E17007	EPA 8260D	05/17/22 14:48	JMW	
Dibromofluoromethane	54	1	50.0	107 %	53-146	2E16037	EPA 8260D	05/17/22 01:12	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146	2E17007	EPA 8260D	05/17/22 14:48	JMW	
Toluene-d8	47	1	50.0	94 %	41-146	2E16037	EPA 8260D	05/17/22 01:12	JMW	
Toluene-d8	46	1	50.0	92 %	41-146	2E17007	EPA 8260D	05/17/22 14:48	JMW	

**Description:** VPF-MW0021-030.0-20220512

**Lab Sample ID:** AF03375-03

**Received:** 05/12/22 14:52

**Matrix:** Ground Water

**Sampled:** 05/12/22 10:52

**Work Order:** AF03375

**Project:** NASA KSC - VPF

**Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	18		ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 15:16	JMW	
Trichloroethene [79-01-6]^	8.3		ug/L	1	0.89	1.0	2E17007	EPA 8260D	05/17/22 15:16	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 15:16	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	44	1	50.0	89 %	41-142	2E17007	EPA 8260D	05/17/22 15:16	JMW	
Dibromofluoromethane	56	1	50.0	113 %	53-146	2E17007	EPA 8260D	05/17/22 15:16	JMW	
Toluene-d8	48	1	50.0	95 %	41-146	2E17007	EPA 8260D	05/17/22 15:16	JMW	

**ANALYTICAL RESULTS**

**Description:** VPF-MW0022-007.5-20220512      **Lab Sample ID:** AF03375-04      **Received:** 05/12/22 14:52  
**Matrix:** Ground Water      **Sampled:** 05/12/22 10:50      **Work Order:** AF03375  
**Project:** NASA KSC - VPF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 15:45	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E17007	EPA 8260D	05/17/22 15:45	JMW	
Vinyl chloride [75-01-4]^	5.1		ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 15:45	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	43	1	50.0	86 %	41-142	2E17007	EPA 8260D	05/17/22 15:45	JMW	
Dibromofluoromethane	54	1	50.0	108 %	53-146	2E17007	EPA 8260D	05/17/22 15:45	JMW	
Toluene-d8	47	1	50.0	93 %	41-146	2E17007	EPA 8260D	05/17/22 15:45	JMW	

**Description:** VPF-MW0025-040.0-20220512      **Lab Sample ID:** AF03375-05      **Received:** 05/12/22 14:52  
**Matrix:** Ground Water      **Sampled:** 05/12/22 11:29      **Work Order:** AF03375  
**Project:** NASA KSC - VPF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	10		ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 16:14	JMW	
Trichloroethene [79-01-6]^	4.1		ug/L	1	0.89	1.0	2E17007	EPA 8260D	05/17/22 16:14	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 16:14	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	43	1	50.0	87 %	41-142	2E17007	EPA 8260D	05/17/22 16:14	JMW	
Dibromofluoromethane	57	1	50.0	114 %	53-146	2E17007	EPA 8260D	05/17/22 16:14	JMW	
Toluene-d8	48	1	50.0	95 %	41-146	2E17007	EPA 8260D	05/17/22 16:14	JMW	

**Description:** VPF-MW0027-040.0-20220512      **Lab Sample ID:** AF03375-06      **Received:** 05/12/22 14:52  
**Matrix:** Ground Water      **Sampled:** 05/12/22 12:05      **Work Order:** AF03375  
**Project:** NASA KSC - VPF      **Sampled By:** Greg Kusel/Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
cis-1,2-Dichloroethene [156-59-2]^	13		ug/L	1	0.53	1.0	2E17030	EPA 8260D	05/18/22 03:16	JMW	
Trichloroethene [79-01-6]^	3.8		ug/L	1	0.89	1.0	2E17030	EPA 8260D	05/18/22 03:16	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17030	EPA 8260D	05/18/22 03:16	JMW	QV-01

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	44	1	50.0	87 %	41-142	2E17030	EPA 8260D	05/18/22 03:16	JMW	
Dibromofluoromethane	55	1	50.0	110 %	53-146	2E17030	EPA 8260D	05/18/22 03:16	JMW	
Toluene-d8	47	1	50.0	94 %	41-146	2E17030	EPA 8260D	05/18/22 03:16	JMW	





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### ANALYTICAL RESULTS

**Description:** VPF-TB-20220512-01

**Lab Sample ID:** AF03375-07

**Received:** 05/12/22 14:52

**Matrix:** Water

**Sampled:** 05/12/22 07:00

**Work Order:** AF03375

**Project:** NASA KSC - VPF

**Sampled By:** ENCO ORL

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2E17030	EPA 8260D	05/18/22 03:45	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E17030	EPA 8260D	05/18/22 03:45	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17030	EPA 8260D	05/18/22 03:45	JMW	QV-01
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	<i>42</i>	<i>1</i>	<i>50.0</i>	<i>85 %</i>	<i>41-142</i>	<i>2E17030</i>	<i>EPA 8260D</i>	<i>05/18/22 03:45</i>	<i>JMW</i>		
<i>Dibromofluoromethane</i>	<i>54</i>	<i>1</i>	<i>50.0</i>	<i>109 %</i>	<i>53-146</i>	<i>2E17030</i>	<i>EPA 8260D</i>	<i>05/18/22 03:45</i>	<i>JMW</i>		
<i>Toluene-d8</i>	<i>46</i>	<i>1</i>	<i>50.0</i>	<i>93 %</i>	<i>41-146</i>	<i>2E17030</i>	<i>EPA 8260D</i>	<i>05/18/22 03:45</i>	<i>JMW</i>		

**QUALITY CONTROL DATA**
**Volatile Organic Compounds by GCMS - Quality Control**
**Batch 2E16037 - EPA 5030B\_MS**
**Blank (2E16037-BLK1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 22:48

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	55			ug/L	50.0		110	53-146			
Toluene-d8	47			ug/L	50.0		95	41-146			

**LCS (2E16037-BS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 20:24

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0		120	56-128			
Trichloroethene	23		1.0	ug/L	20.0		113	62-135			
Vinyl chloride	28		1.0	ug/L	20.0		139	20-167			
4-Bromofluorobenzene	43			ug/L	50.0		86	41-142			
Dibromofluoromethane	54			ug/L	50.0		107	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

**Matrix Spike (2E16037-MS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 20:53

**Source: AF03641-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0	0.53 U	121	56-128			
Trichloroethene	23		1.0	ug/L	20.0	0.89 U	115	62-135			
Vinyl chloride	29		1.0	ug/L	20.0	0.71 U	143	20-167			
4-Bromofluorobenzene	44			ug/L	50.0		87	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	49			ug/L	50.0		98	41-146			

**Matrix Spike Dup (2E16037-MSD1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 21:22

**Source: AF03641-01**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	26		1.0	ug/L	20.0	0.53 U	128	56-128	6	17	
Trichloroethene	24		1.0	ug/L	20.0	0.89 U	118	62-135	3	20	
Vinyl chloride	30		1.0	ug/L	20.0	0.71 U	149	20-167	4	24	
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	57			ug/L	50.0		113	53-146			
Toluene-d8	49			ug/L	50.0		98	41-146			

**Batch 2E17007 - EPA 5030B\_MS**
**Blank (2E17007-BLK1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 10:28

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	44			ug/L	50.0		88	41-142			
Dibromofluoromethane	55			ug/L	50.0		111	53-146			

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E17007 - EPA 5030B\_MS - Continued**

**Blank (2E17007-BLK1) Continued**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 10:28

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Toluene-d8	46			ug/L	50.0		93	41-146			

**LCS (2E17007-BS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 08:04

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0		126	56-128			
Trichloroethene	23		1.0	ug/L	20.0		116	62-135			
Vinyl chloride	30		1.0	ug/L	20.0		149	20-167			
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	56			ug/L	50.0		112	53-146			
Toluene-d8	49			ug/L	50.0		98	41-146			

**Matrix Spike (2E17007-MS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 08:33

Source: AF03703-05

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	27		1.0	ug/L	20.0	0.53 U	134	56-128			QM-07
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	127	62-135			
Vinyl chloride	30		1.0	ug/L	20.0	0.71 U	148	20-167			
4-Bromofluorobenzene	45			ug/L	50.0		89	41-142			
Dibromofluoromethane	56			ug/L	50.0		111	53-146			
Toluene-d8	48			ug/L	50.0		97	41-146			

**Matrix Spike Dup (2E17007-MSD1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 09:02

Source: AF03703-05

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	26		1.0	ug/L	20.0	0.53 U	131	56-128	2	17	QM-07
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	126	62-135	0.4	20	
Vinyl chloride	29		1.0	ug/L	20.0	0.71 U	144	20-167	3	24	
4-Bromofluorobenzene	43			ug/L	50.0		87	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	48			ug/L	50.0		95	41-146			

**Batch 2E17030 - EPA 5030B\_MS**

**Blank (2E17030-BLK1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 22:57

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
4-Bromofluorobenzene	44			ug/L	50.0		88	41-142			
Dibromofluoromethane	56			ug/L	50.0		112	53-146			
Toluene-d8	49			ug/L	50.0		97	41-146			

**LCS (2E17030-BS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 20:33

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E17030 - EPA 5030B\_MS - Continued**

**LCS (2E17030-BS1) Continued**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 20:33

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0		123	56-128			
Trichloroethene	23		1.0	ug/L	20.0		117	62-135			
Vinyl chloride	28		1.0	ug/L	20.0		141	20-167			
<i>4-Bromofluorobenzene</i>	<i>45</i>			<i>ug/L</i>	<i>50.0</i>		<i>90</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>55</i>			<i>ug/L</i>	<i>50.0</i>		<i>109</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>49</i>			<i>ug/L</i>	<i>50.0</i>		<i>98</i>	<i>41-146</i>			

**Matrix Spike (2E17030-MS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 21:02

**Source: AF03694-01**

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
cis-1,2-Dichloroethene	24		1.0	ug/L	20.0	0.53 U	121	56-128			
Trichloroethene	23		1.0	ug/L	20.0	0.89 U	114	62-135			
Vinyl chloride	26		1.0	ug/L	20.0	0.71 U	130	20-167			
<i>4-Bromofluorobenzene</i>	<i>44</i>			<i>ug/L</i>	<i>50.0</i>		<i>87</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>56</i>			<i>ug/L</i>	<i>50.0</i>		<i>111</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>48</i>			<i>ug/L</i>	<i>50.0</i>		<i>96</i>	<i>41-146</i>			

**Matrix Spike Dup (2E17030-MSD1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 21:31

**Source: AF03694-01**

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0	0.53 U	125	56-128		17	
Trichloroethene	23		1.0	ug/L	20.0	0.89 U	116	62-135		20	
Vinyl chloride	26		1.0	ug/L	20.0	0.71 U	132	20-167		24	
<i>4-Bromofluorobenzene</i>	<i>45</i>			<i>ug/L</i>	<i>50.0</i>		<i>90</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>56</i>			<i>ug/L</i>	<i>50.0</i>		<i>112</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>49</i>			<i>ug/L</i>	<i>50.0</i>		<i>98</i>	<i>41-146</i>			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.
- QM-07** The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
- QV-01** The associated continuing calibration verification standard exhibited high bias; since the result is ND, there is no impact.



CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD				COC No.		Page: 1 of 1			
Project Name: NASA KSC				PO No. 138224		Project No. 60610905 Subs 2021-23 Subs 2021-23			
Site Location: Vertical Processing Facility				Send Invoice To: Instructions in MSA # 195-24548-GV03				EDD to: Jennifer Chastain Cc: Teresa Ament Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: Chris Marshall		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando				Report to: Jennifer Chastain Cc: Teresa Ament Jennings	
Sampler/Phone #: Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747				Deliver Samples To: ENCO				Site-Specific WS#15 from QAPP: 15-6	

Lab Name: ENCO		Turnaround Time(specify): Standard 14 day		Sample Analysis Requested (Enter number of containers for each test)					
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Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl															Comments	
	VPF-IW00081- <del>20220512</del> <sup>0220.0- 20220512</sup>	VPF-IW00081	20220512	1242	WG	N	G	3	3																
	VPF-IW00181- <del>20220512</del> <sup>0230.0- 20220512</sup>	VPF-IW00181	20220512	1120	WG	N	G	3	3																
	VPF-MW0021- <del>20220512</del> <sup>030.0- 20220512</sup>	VPF-MW0021	20220512	1052	WG	N	G	3	3																
	VPF-MW0022- <del>20220512</del> <sup>007.5- 20220512</sup>	VPF-MW0022	20220512	1050	WG	N	G	3	3																
	VPF-MW0025- <del>20220512</del> <sup>040.0- 20220512</sup>	VPF-MW0025	20220512	1129	WG	N	G	3	3																
	VPF-MW0027- <del>20220512</del> <sup>040.0- 20220512</sup>	VPF-MW0027	20220512	1205	WG	N	G	3	3																
	VPF-TB-20220512-01	VPF-TB 01	20220512	0700	WQ	TB	G	3	3																

<b>Field Comments:</b> Report only per QAPP WS #15						<b>Lab Comments:</b>						<b>Sample Shipment and Delivery Details</b>					
Relinquished by (signature)			Date	Time	Received by (signature)			Date	Time	Number of coolers in shipment: Samples Iced?(check) Yes <input type="checkbox"/> No <input type="checkbox"/>							
1			05/04/22	12:40	1			5/12/22	0700	Shipping Company:							
2			5/12/22	1452	2			JUN 22	1452	Tracking No:							
3					3					Date Shipped:							

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate for 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19

L. W. O. J. P.



# ENCO Laboratories

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10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Tuesday, May 24, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - KARS Park 1**

**ENCO Workorder(s): AF03379**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, May 12, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



www.encolabs.com

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

<b>Client ID:</b> KP1-MW0022-004.5-20220512	<b>Lab ID:</b> AF03379-01	<b>Sampled:</b> 05/12/22 07:58	<b>Received:</b> 05/12/22 14:52	
<b>Parameter</b>	<b>Preparation</b>	<b>Hold Date/Time(s)</b>	<b>Prep Date/Time(s)</b>	<b>Analysis Date/Time(s)</b>
EPA 6020B	EPA 3005A	11/08/22	05/17/22 09:54	05/23/22 18:07



**SAMPLE DETECTION SUMMARY**

**No positive results detected.**



www.encolabs.com

**ANALYTICAL RESULTS**

<b>Description:</b> KP1-MW0022-004.5-20220512	<b>Lab Sample ID:</b> AF03379-01	<b>Received:</b> 05/12/22 14:52
<b>Matrix:</b> Ground Water	<b>Sampled:</b> 05/12/22 07:58	<b>Work Order:</b> AF03379
<b>Project:</b> NASA KSC - KARS Park 1	<b>Sampled By:</b> Greg Kusel, Dustin Slater	

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Lead [7439-92-1]^	2.50	U	ug/L	1	2.50	5.00	2E16054	EPA 6020B	05/23/22 18:07	JMA	

**QUALITY CONTROL DATA**

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

**Batch 2E16054 - EPA 3005A**

**Blank (2E16054-BLK1)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 12:22

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	2.50	U	5.00	ug/L							

**LCS (2E16054-BS1)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 12:25

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	498		5.00	ug/L	500		100	80-120			

**Matrix Spike (2E16054-MS2)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 14:58

Source: AF03651-01

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	488		25.0	ug/L	500	12.5 U	98	75-125			

**Matrix Spike Dup (2E16054-MSD2)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 15:05

Source: AF03651-01

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	487		25.0	ug/L	500	12.5 U	97	75-125	0.06	20	

**Post Spike (2E16054-PS2)**

Prepared: 05/23/2022 08:50 Analyzed: 05/23/2022 14:24

Source: AF03651-01

<u>Analyte</u>	<u>Result</u>	<u>Flag</u>	<u>PQL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Lead	47.5		0.500	ug/L	49.0	0.0530	97	75-125			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

<b>ENCO</b>	<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>						COC No.	Page: 1 of 1													
	Project Name: NASA KSC						PO No. 138224	Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase:													
	Site Location: KARS Park 1 LOC#9						Send Invoice To: Instructions in MSA # 195-24548-GV03						EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings								
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>				Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando						Report to: Jennifer Chastain Cc: Teresa Amentt Jennings									
Sampler/Phone #		Greg Kusel / (772) 631-7426				Dustin Slater / (407) 766-0747				Deliver Samples To: ENCO						Site-Specific WS#15 from QAPP: 15-35					

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HNO3 <2												Comments					
										Total No. of Containers	Lead by SW6010															
	KP1-MW0022-202205-001.5-20220512	KP1-MW0022	20220512	0758	WG	N	G	1	1																	

<b>Field Comments:</b> Report only per QAPP WS #15-35						<b>Lab Comments:</b>						<b>Sample Shipment and Delivery Details</b>					
Relinquished by (signature) _____ Date 05/04/22 Time 12:50						Received by (signature) _____ Date 5/12/22 Time 0600						Number of coolers in shipment: _____					
1 _____						2 _____						Samples Iced?(check) Yes _____ No _____					
2 _____						3 _____						Shipping Company: _____					
3 _____												Tracking No: _____					
												Date Shipped: _____					

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk  
 (3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH <2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH <2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH <2 with nitric acid, MeOH=Methanol preservation, Na2O3S2= Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH <2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH >12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

SM-43) 3, 50C



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Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Thursday, May 26, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - SSPF**

**ENCO Workorder(s): AF03374**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, May 11, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: SSPF-MW0004-009.5-20220510      Lab ID: AF03374-01RE1      Sampled: 05/10/22 15:20      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/07/22	05/12/22 11:00	05/13/22 10:48

**Client ID: SSPF-MW0006-010.0-20220510      Lab ID: AF03374-02RE1      Sampled: 05/10/22 14:42      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/07/22	05/12/22 11:00	05/13/22 10:49

**Client ID: SSPF-MW0013-021.0-20220510      Lab ID: AF03374-03      Sampled: 05/10/22 16:00      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/07/22	05/12/22 11:00	05/13/22 10:40

**Client ID: SSPF-MW0014-008.0-20220510      Lab ID: AF03374-04RE1      Sampled: 05/10/22 15:59      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/07/22	05/12/22 11:00	05/13/22 11:03

**Client ID: SSPF-MW0016-016.0-20220510      Lab ID: AF03374-05RE1      Sampled: 05/10/22 15:27      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/07/22	05/12/22 11:00	05/13/22 11:04



**SAMPLE DETECTION SUMMARY**

<b>Client ID: SSPF-MW0004-009.5-20220510</b>		<b>Lab ID: AF03374-01RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Ammonia as N	3100		49	100	ug/L	EPA 350.1	
<b>Client ID: SSPF-MW0006-010.0-20220510</b>		<b>Lab ID: AF03374-02RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Ammonia as N	4100		98	200	ug/L	EPA 350.1	
<b>Client ID: SSPF-MW0013-021.0-20220510</b>		<b>Lab ID: AF03374-03</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Ammonia as N	1300		9.8	20	ug/L	EPA 350.1	
<b>Client ID: SSPF-MW0014-008.0-20220510</b>		<b>Lab ID: AF03374-04RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Ammonia as N	8700		200	400	ug/L	EPA 350.1	
<b>Client ID: SSPF-MW0016-016.0-20220510</b>		<b>Lab ID: AF03374-05RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Ammonia as N	3800		98	200	ug/L	EPA 350.1	



**ANALYTICAL RESULTS**

**Description:** SSPF-MW0004-009.5-20220510      **Lab Sample ID:** AF03374-01      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 15:20      **Work Order:** AF03374  
**Project:** NASA KSC - SSPF      **Sampled By:** Greg Kusel, Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	3100		ug/L	5	49	100	2E12028	EPA 350.1	05/13/22 10:48	cbarr	

**Description:** SSPF-MW0006-010.0-20220510      **Lab Sample ID:** AF03374-02      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 14:42      **Work Order:** AF03374  
**Project:** NASA KSC - SSPF      **Sampled By:** Greg Kusel, Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	4100		ug/L	10	98	200	2E12028	EPA 350.1	05/13/22 10:49	cbarr	

**Description:** SSPF-MW0013-021.0-20220510      **Lab Sample ID:** AF03374-03      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 16:00      **Work Order:** AF03374  
**Project:** NASA KSC - SSPF      **Sampled By:** Greg Kusel, Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	1300		ug/L	1	9.8	20	2E12028	EPA 350.1	05/13/22 10:40	cbarr	

**Description:** SSPF-MW0014-008.0-20220510      **Lab Sample ID:** AF03374-04      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 15:59      **Work Order:** AF03374  
**Project:** NASA KSC - SSPF      **Sampled By:** Greg Kusel, Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	8700		ug/L	20	200	400	2E12028	EPA 350.1	05/13/22 11:03	cbarr	

**Description:** SSPF-MW0016-016.0-20220510      **Lab Sample ID:** AF03374-05      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/10/22 15:27      **Work Order:** AF03374  
**Project:** NASA KSC - SSPF      **Sampled By:** Greg Kusel, Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	3800		ug/L	10	98	200	2E12028	EPA 350.1	05/13/22 11:04	cbarr	

**QUALITY CONTROL DATA**

**Classical Chemistry Parameters - Quality Control**

**Batch 2E12028 - NO PREP**

**Blank (2E12028-BLK1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:25

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Ammonia as N	9.8	U	20	ug/L							

**LCS (2E12028-BS1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:27

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Ammonia as N	970		20	ug/L	1000		97	90-110			

**Matrix Spike (2E12028-MS1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:32

Source: AF03079-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Ammonia as N	930		20	ug/L	1000	9.8 U	93	90-110			

**Matrix Spike (2E12028-MS2)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:47

Source: AF03540-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Ammonia as N	1400		20	ug/L	1000	460	98	90-110			

**Matrix Spike Dup (2E12028-MSD1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:34

Source: AF03079-01

<u>Analyte</u>	<u>Result</u>	<u>Flaq</u>	<u>POL</u>	<u>Units</u>	<u>Spike Level</u>	<u>Source Result</u>	<u>%REC</u>	<u>%REC Limits</u>	<u>RPD</u>	<u>RPD Limit</u>	<u>Notes</u>
Ammonia as N	950		20	ug/L	1000	9.8 U	95	90-110	2	10	

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

<b>CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD</b>				COC No.		Page: 1 of 1	
Project Name: NASA KSC				PO No. 138224		Project No. 60610905.Subs 2021-23-Subs 2021-23	
Site Location: Space Station Processing Facility				Send Invoice To: Instructions in MSA # 195-24548-GV03		Phase: EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings	
Sampler/Phone #		Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO		Site-Specific WS# 15 from QAPP: 15-37	

Lab Name: ENCO		Turnaround Time(specify): Standard 14 day		<b>Sample Analysis Requested (Enter number of containers for each test)</b>																					
Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	H2SO4 <2											Comments					
										Total No. of Containers	Ammonia by EPA350.1														
	SSPF-MW0004- <del>202205</del> <i>GR 20220510</i>	SSPF-MW0004	20220510	1520	WG	N	G	1	1																
	SSPF-MW0006- <del>202205</del> <i>GR 20220510</i>	SSPF-MW0006	20220510	1442	WG	N	G	1	1																
	SSPF-MW0013- <del>202205</del> <i>GR 20220510</i>	SSPF-MW0013	20220510	1600	WG	N	G	1	1																
	SSPF-MW0014- <del>202205</del> <i>GR 20220510</i>	SSPF-MW0014	20220510	1559	WG	N	G	1	1																
	SSPF-MW0016- <del>202205</del> <i>GR 20220510</i>	SSPF-MW0016	20220510	1527	WG	N	G	1	1																

<b>Field Comments:</b> Report only per QAPP WS #15			<b>Lab Comments:</b>			<b>Sample Shipment and Delivery Details</b>		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Number of coolers in shipment:		
1 <i>[Signature]</i>	05/04/22	14:20	1 <i>[Signature]</i>	5/10/22	0700	Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
2 <i>[Signature]</i>	5/11/22	1535	2 <i>[Signature]</i>	5.11.22	1535	Shipping Company:		
3			3			Tracking No:		
						Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19  
Med 372 3.6°C



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Thursday, July 21, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - Citgo Service Station**

**ENCO Workorder(s): AF03366**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Wednesday, May 11, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



www.encolabs.com

## PROJECT NARRATIVE

Client: AECOM Technical Services, Inc. (SE004)  
Project: NASA KSC - Citgo Service Station  
ENCO Project ID: AF03366

### Overview

All samples submitted were analyzed by Environmental Conservation Laboratories, Inc. in accordance with the methods referenced in the laboratory report. Any particular difficulties encountered during sample handling and processing will be discussed in the Remarks section below.

### Remarks

Analysis: EPA 8260D

This is an amendment to the report dated 05/26/22 to include additional analytes requested after initial reporting.

---

Kaitlin Dylnicki  
Project Manager



**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: CGO-MW0006-025.0-20220511      Lab ID: AF03366-01      Sampled: 05/11/22 13:35      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00	05/16/22 15:07
EPA 8270E	EPA 3511_MS	05/18/22      06/26/22	05/17/22 14:39	05/18/22 21:53

**Client ID: CGO-MW0018-025.0-20220511      Lab ID: AF03366-02      Sampled: 05/11/22 13:27      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00	05/16/22 15:36

**Client ID: CGO-MW0019-025.0-20220511      Lab ID: AF03366-03      Sampled: 05/11/22 13:59      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00	05/16/22 16:05

**Client ID: CGO-TB-20220511-01      Lab ID: AF03366-04      Sampled: 05/11/22 07:00      Received: 05/11/22 15:35**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/25/22	05/16/22 00:00	05/16/22 16:34

**SAMPLE DETECTION SUMMARY****Client ID: CGO-MW0006-025.0-20220511****Lab ID: AF03366-01**

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
1-Methylnaphthalene	6.5		0.050	0.10	ug/L	EPA 8270E	
2-Methylnaphthalene	13		0.050	0.10	ug/L	EPA 8270E	
Naphthalene	1.9		0.050	0.10	ug/L	EPA 8270E	

**Client ID: CGO-MW0018-025.0-20220511****Lab ID: AF03366-02**

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
1,2,4-Trimethylbenzene	12		0.69	1.0	ug/L	EPA 8260D	
1,3,5-Trimethylbenzene	2.4		0.58	1.0	ug/L	EPA 8260D	
Methyl-tert-Butyl Ether	31		0.60	1.0	ug/L	EPA 8260D	
o-Xylene	0.64	I	0.53	1.0	ug/L	EPA 8260D	

**Client ID: CGO-MW0019-025.0-20220511****Lab ID: AF03366-03**

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Methyl-tert-Butyl Ether	7.9		0.60	1.0	ug/L	EPA 8260D	



**ANALYTICAL RESULTS**

**Description:** CGO-MW0006-025.0-20220511      **Lab Sample ID:** AF03366-01      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/11/22 13:35      **Work Order:** AF03366  
**Project:** NASA KSC - Citgo Service Station      **Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	0.69	U	ug/L	1	0.69	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
1,3,5-Trimethylbenzene [108-67-8]^	0.58	U	ug/L	1	0.58	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Methyl-tert-Butyl Ether [1634-04-4]^	0.60	U	ug/L	1	0.60	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
o-Xylene [95-47-6]^	0.53	U	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 15:07	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	92 %	41-142	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Dibromofluoromethane	57	1	50.0	115 %	53-146	2E16008	EPA 8260D	05/16/22 15:07	JMW	
Toluene-d8	49	1	50.0	98 %	41-146	2E16008	EPA 8260D	05/16/22 15:07	JMW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	6.5		ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 21:53	jfi	
2-Methylnaphthalene [91-57-6]^	13		ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 21:53	jfi	
Naphthalene [91-20-3]^	1.9		ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 21:53	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	5.4	1	5.71	94 %	50-150	2E17040	EPA 8270E	05/18/22 21:53	jfi	
Fluoranthene-d10	4.9	1	5.71	86 %	50-150	2E17040	EPA 8270E	05/18/22 21:53	jfi	

**Description:** CGO-MW0018-025.0-20220511      **Lab Sample ID:** AF03366-02      **Received:** 05/11/22 15:35  
**Matrix:** Ground Water      **Sampled:** 05/11/22 13:27      **Work Order:** AF03366  
**Project:** NASA KSC - Citgo Service Station      **Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	12		ug/L	1	0.69	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
1,3,5-Trimethylbenzene [108-67-8]^	2.4		ug/L	1	0.58	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Methyl-tert-Butyl Ether [1634-04-4]^	31		ug/L	1	0.60	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
o-Xylene [95-47-6]^	0.64	I	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 15:36	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	91 %	41-142	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Dibromofluoromethane	57	1	50.0	115 %	53-146	2E16008	EPA 8260D	05/16/22 15:36	JMW	
Toluene-d8	49	1	50.0	98 %	41-146	2E16008	EPA 8260D	05/16/22 15:36	JMW	

**ANALYTICAL RESULTS**

**Description:** CGO-MW0019-025.0-20220511

**Lab Sample ID:** AF03366-03

**Received:** 05/11/22 15:35

**Matrix:** Ground Water

**Sampled:** 05/11/22 13:59

**Work Order:** AF03366

**Project:** NASA KSC - Citgo Service Station

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	0.69	U	ug/L	1	0.69	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
1,3,5-Trimethylbenzene [108-67-8]^	0.58	U	ug/L	1	0.58	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
<b>Methyl-tert-Butyl Ether [1634-04-4]^</b>	<b>7.9</b>		ug/L	1	0.60	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
o-Xylene [95-47-6]^	0.53	U	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 16:05	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	45	1	50.0	89 %	41-142	2E16008	EPA 8260D	05/16/22 16:05	JMW	
Dibromofluoromethane	56	1	50.0	113 %	53-146	2E16008	EPA 8260D	05/16/22 16:05	JMW	
Toluene-d8	48	1	50.0	96 %	41-146	2E16008	EPA 8260D	05/16/22 16:05	JMW	

**Description:** CGO-TB-20220511-01

**Lab Sample ID:** AF03366-04

**Received:** 05/11/22 15:35

**Matrix:** Water

**Sampled:** 05/11/22 07:00

**Work Order:** AF03366

**Project:** NASA KSC - Citgo Service Station

**Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	0.69	U	ug/L	1	0.69	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
1,3,5-Trimethylbenzene [108-67-8]^	0.58	U	ug/L	1	0.58	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Methyl-tert-Butyl Ether [1634-04-4]^	0.60	U	ug/L	1	0.60	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
o-Xylene [95-47-6]^	0.53	U	ug/L	1	0.53	1.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E16008	EPA 8260D	05/16/22 16:34	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	46	1	50.0	92 %	41-142	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Dibromofluoromethane	56	1	50.0	113 %	53-146	2E16008	EPA 8260D	05/16/22 16:34	JMW	
Toluene-d8	49	1	50.0	98 %	41-146	2E16008	EPA 8260D	05/16/22 16:34	JMW	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E16008 - EPA 5030B\_MS**

**Blank (2E16008-BLK1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 09:21

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	0.69	U	1.0	ug/L							
1,3,5-Trimethylbenzene	0.58	U	1.0	ug/L							
Benzene	0.71	U	1.0	ug/L							
Isopropylbenzene	0.67	U	1.0	ug/L							
m,p-Xylenes	1.3	U	2.0	ug/L							
Methyl-tert-Butyl Ether	0.60	U	1.0	ug/L							
o-Xylene	0.53	U	1.0	ug/L							
Xylenes (Total)	1.3	U	2.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		90	41-142			
Dibromofluoromethane	55			ug/L	50.0		110	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**LCS (2E16008-BS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 08:23

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	20		1.0	ug/L	20.0		102	59-142			
1,3,5-Trimethylbenzene	20		1.0	ug/L	20.0		98	61-137			
Benzene	22		1.0	ug/L	20.0		108	56-136			
Isopropylbenzene	21		1.0	ug/L	20.0		105	60-132			
m,p-Xylenes	41		2.0	ug/L	40.0		104	64-133			
Methyl-tert-Butyl Ether	23		1.0	ug/L	20.0		115	51-145			
o-Xylene	21		1.0	ug/L	20.0		105	61-129			
4-Bromofluorobenzene	48			ug/L	50.0		97	41-142			
Dibromofluoromethane	57			ug/L	50.0		113	53-146			
Toluene-d8	50			ug/L	50.0		100	41-146			

**Matrix Spike (2E16008-MS1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:16

Source: AF03369-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	22		1.0	ug/L	20.0	0.69 U	109	59-142			
1,3,5-Trimethylbenzene	21		1.0	ug/L	20.0	0.58 U	105	61-137			
Benzene	23		1.0	ug/L	20.0	0.71 U	115	56-136			
Isopropylbenzene	23		1.0	ug/L	20.0	0.67 U	113	60-132			
m,p-Xylenes	43		2.0	ug/L	40.0	1.3 U	108	64-133			
Methyl-tert-Butyl Ether	23		1.0	ug/L	20.0	0.60 U	113	51-145			
o-Xylene	22		1.0	ug/L	20.0	0.53 U	110	61-129			
4-Bromofluorobenzene	46			ug/L	50.0		92	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	48			ug/L	50.0		96	41-146			

**Matrix Spike Dup (2E16008-MSD1)**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:45

Source: AF03369-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	21		1.0	ug/L	20.0	0.69 U	105	59-142	4	25	
1,3,5-Trimethylbenzene	20		1.0	ug/L	20.0	0.58 U	102	61-137	3	24	
Benzene	22		1.0	ug/L	20.0	0.71 U	112	56-136	3	14	
Isopropylbenzene	22		1.0	ug/L	20.0	0.67 U	111	60-132	2	23	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E16008 - EPA 5030B\_MS - Continued**

**Matrix Spike Dup (2E16008-MSD1) Continued**

Prepared: 05/16/2022 00:00 Analyzed: 05/16/2022 11:45

Source: AF03369-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
m,p-Xylenes	42		2.0	ug/L	40.0	1.3 U	106	64-133	2	18	
Methyl-tert-Butyl Ether	23		1.0	ug/L	20.0	0.60 U	114	51-145	0.6	22	
o-Xylene	21		1.0	ug/L	20.0	0.53 U	107	61-129	3	16	
4-Bromofluorobenzene	44			ug/L	50.0		88	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 2E17040 - EPA 3511\_MS**

**Blank (2E17040-BLK1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:05

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	4.7			ug/L	5.71		83	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		106	50-150			

**LCS (2E17040-BS1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:27

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.7		0.10	ug/L	5.71		83	59-120			
2-Methylnaphthalene	4.7		0.10	ug/L	5.71		82	43-120			
Naphthalene	5.3		0.10	ug/L	5.71		92	68-120			
2-Methylnaphthalene-d10	4.2			ug/L	5.71		74	50-150			
Fluoranthene-d10	5.4			ug/L	5.71		95	50-150			

**Matrix Spike (2E17040-MS1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:48

Source: AF03780-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.7		0.10	ug/L	5.71	0.050 U	82	59-120			
2-Methylnaphthalene	4.7		0.10	ug/L	5.71	0.050 U	83	43-120			
Naphthalene	4.8		0.10	ug/L	5.71	0.050 U	84	68-120			
2-Methylnaphthalene-d10	4.1			ug/L	5.71		72	50-150			
Fluoranthene-d10	5.9			ug/L	5.71		104	50-150			

**Matrix Spike Dup (2E17040-MSD1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 21:10

Source: AF03780-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.4		0.10	ug/L	5.71	0.050 U	94	59-120	14	25	
2-Methylnaphthalene	5.4		0.10	ug/L	5.71	0.050 U	94	43-120	13	25	
Naphthalene	5.0		0.10	ug/L	5.71	0.050 U	87	68-120	3	25	
2-Methylnaphthalene-d10	4.3			ug/L	5.71		74	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		106	50-150			

## FLAGS/NOTES AND DEFINITIONS

- PQL** PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
- B** Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
- I** The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
- J** Estimated value.
- K** Off-scale low; Actual value is known to be less than the value given.
- L** Off-scale high; Actual value is known to be greater than value given.
- M** Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
- N** Presumptive evidence of presence of material.
- O** Sampled, but analysis lost or not performed.
- Q** Sample exceeded the accepted holding time.
- T** Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
- U** Indicates that the compound was analyzed for but not detected.
- V** Indicates that the analyte was detected in both the sample and the associated method blank.
- Y** The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
- Z** Too many colonies were present (TNTC); the numeric value represents the filtration volume.
- ?** Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
- \*** Not reported due to interference.
- [CALC]** Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.

AF03306

CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD				COC No.		Page: 1 of 1	
<b>Project Name:</b> NASA KSC				PO No. 138224		Project No. 60610905.Subs 2021-23-Subs 2021-23	
<b>Site Location:</b> Citgo Service Station				Send Invoice To: Instructions in MSA # 195-24548-GV03		EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings	
TO No.: 80KSC019F0071		AECOM Project Manager: <b>Chris Marshall</b>		Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando		Report to: Jennifer Chastain Cc: Teresa Amentt Jennings	
<b>Sampler/Phone #</b>		Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747		Deliver Samples To: ENCO		Site-Specific WS#15 from QAPP: 15-38	

Lab Name: ENCO Turnaround Time(specify): Standard 14 day **Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCL	4 DEG C															Comments
	CGO-MW0006-202205-025.0-20220511	CGO-MW0006	202205 11	1335	WG	N	G	5	3	2															
	CGO-MW0018-202205-025.0-20220511	CGO-MW0018	202205 11	1327	WG	N	G	3	3																
	CGO-MW0019-202205-025.0-20220511	CGO-MW0019	202205 11	1359	WG	N	G	3	3																
	CGO-TB-202205 11-01	CGO-TB 01	202205 11	0700	WQ	TB	G	3	3																

Field Comments:			Lab Comments:			Sample Shipment and Delivery Details		
Report only per QAPP WS #15-38						Number of coolers in shipment:		
Relinquished by (signature)	Date	Time	Received by (signature)	Date	Time	Samples Iced?(check) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
1 <i>Greg Kusel</i>	05/04/22	12:15	1 <i>Dustin Slater</i>	5/11/22	07:00	Shipping Company:		
2 <i>Dustin Slater</i>	5/11/22	1535	2 <i>Greg Kusel</i>	5.11.22	1535	Tracking No:		
3			3			Date Shipped:		

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

med 217 3.0°C



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Tuesday, May 17, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - FSA1**

**ENCO Workorder(s): AF03365**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Monday, May 9, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID:** FSA1-MW0001-005.5-20220509      **Lab ID:** AF03365-01      **Sampled:** 05/09/22 12:01      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 10:57
EPA 8270E	EPA 3511_MS	05/16/22	06/25/22	05/16/22 11:00		05/16/22 15:05
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 20:07

**Client ID:** FSA1-MW0001-005.5-20220509      **Lab ID:** AF03365-01RE1      **Sampled:** 05/09/22 12:01      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8270E	EPA 3511_MS	05/16/22	06/25/22	05/16/22 11:00		05/17/22 10:40

**Client ID:** FSA1-MW0002-005.0-20220509      **Lab ID:** AF03365-02      **Sampled:** 05/09/22 12:34      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 15:16
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 16:26
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 20:35

**Client ID:** FSA1-MW0012R-006.0-20220509      **Lab ID:** AF03365-03      **Sampled:** 05/09/22 10:52      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 15:45
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 16:47
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 21:03

**Client ID:** FSA1-MW0014-006.0-20220509      **Lab ID:** AF03365-04      **Sampled:** 05/09/22 11:34      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 16:14
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 17:09
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 21:59

**Client ID:** FSA1-MW0017A-006.5-20220509      **Lab ID:** AF03365-05      **Sampled:** 05/09/22 10:13      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 16:43
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 17:30
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 22:27

**Client ID:** FSA1-MW0021-005.0-20220509      **Lab ID:** AF03365-06      **Sampled:** 05/09/22 11:57      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 17:12
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 17:52
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 22:55

**Client ID:** FSA1-MW0022R-006.5-20220509      **Lab ID:** AF03365-07      **Sampled:** 05/09/22 10:52      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 17:40
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 18:13
FL-PRO	EPA 3510C	05/16/22	06/20/22	05/11/22 07:10		05/11/22 23:23

**Client ID:** FSA1-MW0023-006.0-20220509      **Lab ID:** AF03365-08      **Sampled:** 05/09/22 12:27      **Received:** 05/09/22 16:30

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 18:09
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 18:35
FL-PRO	EPA 3510C	05/16/22	06/21/22	05/12/22 08:20		05/13/22 05:50





**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: FSA1-MW0027-020.0-20220509      Lab ID: AF03365-09      Sampled: 05/09/22 11:22      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/12/22 00:00		05/12/22 18:38
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 18:56
FL-PRO	EPA 3510C	05/16/22	06/21/22	05/12/22 08:20		05/13/22 06:18

**Client ID: FSA1-MW0028-020.0-20220509      Lab ID: AF03365-10      Sampled: 05/09/22 10:17      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/13/22 00:00		05/13/22 15:03
EPA 8270E	EPA 3511_MS	05/16/22	06/19/22	05/10/22 13:57		05/11/22 19:18

**Client ID: FSA1-MW0028-020.0-20220509      Lab ID: AF03365-10RE1      Sampled: 05/09/22 10:17      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
FL-PRO	EPA 3510C	05/16/22	06/25/22	05/16/22 08:25		05/16/22 13:05

**Client ID: FSA1-TB-20220509-01      Lab ID: AF03365-11      Sampled: 05/09/22 07:00      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/13/22 00:00		05/13/22 15:31

**Client ID: FSA1-TB-20220509-02      Lab ID: AF03365-12      Sampled: 05/09/22 07:00      Received: 05/09/22 16:30**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>		<u>Prep Date/Time(s)</u>		<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/23/22		05/13/22 00:00		05/13/22 16:00

**SAMPLE DETECTION SUMMARY**

<b>Client ID: FSA1-MW0001-005.5-20220509</b>		<b>Lab ID: AF03365-01</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Isopropylbenzene	14		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	14		0.050	0.10	ug/L	EPA 8270E	
TPH (C8-C40)	1600		100	680	ug/L	FL-PRO	

<b>Client ID: FSA1-MW0001-005.5-20220509</b>		<b>Lab ID: AF03365-01RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
1-Methylnaphthalene	33		0.10	0.20	ug/L	EPA 8270E	
2-Methylnaphthalene	34		0.10	0.20	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0002-005.0-20220509</b>		<b>Lab ID: AF03365-02</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
1-Methylnaphthalene	0.50		0.050	0.10	ug/L	EPA 8270E	
2-Methylnaphthalene	0.29		0.050	0.10	ug/L	EPA 8270E	
Isopropylbenzene	2.9		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	1.6		0.050	0.10	ug/L	EPA 8270E	
TPH (C8-C40)	1100		100	680	ug/L	FL-PRO	

<b>Client ID: FSA1-MW0014-006.0-20220509</b>		<b>Lab ID: AF03365-04</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
1-Methylnaphthalene	0.074	I	0.050	0.10	ug/L	EPA 8270E	
2-Methylnaphthalene	0.057	I	0.050	0.10	ug/L	EPA 8270E	
Naphthalene	0.080	I	0.050	0.10	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0017A-006.5-20220509</b>		<b>Lab ID: AF03365-05</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Isopropylbenzene	1.8		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	0.20		0.050	0.10	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0021-005.0-20220509</b>		<b>Lab ID: AF03365-06</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Isopropylbenzene	2.1		0.67	1.0	ug/L	EPA 8260D	
Naphthalene	0.11		0.050	0.10	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0023-006.0-20220509</b>		<b>Lab ID: AF03365-08</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Naphthalene	0.11		0.050	0.10	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0027-020.0-20220509</b>		<b>Lab ID: AF03365-09</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
Naphthalene	0.080	I	0.050	0.10	ug/L	EPA 8270E	

<b>Client ID: FSA1-MW0028-020.0-20220509</b>		<b>Lab ID: AF03365-10RE1</b>					
<b>Analyte</b>	<b>Results</b>	<b>Flag</b>	<b>MDL</b>	<b>PQL</b>	<b>Units</b>	<b>Method</b>	<b>Notes</b>
TPH (C8-C40)	490	I	100	680	ug/L	FL-PRO	

## ANALYTICAL RESULTS

**Description:** FSA1-MW0001-005.5-20220509

**Lab Sample ID:** AF03365-01

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 12:01

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	14		ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 10:57	nmc	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	45	1	50.0	89 %	41-142		2E12005	EPA 8260D	05/12/22 10:57	nmc	
<i>Dibromofluoromethane</i>	49	1	50.0	98 %	53-146		2E12005	EPA 8260D	05/12/22 10:57	nmc	
<i>Toluene-d8</i>	46	1	50.0	91 %	41-146		2E12005	EPA 8260D	05/12/22 10:57	nmc	

### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	33		ug/L	2	0.10	0.20	2E16005	EPA 8270E	05/17/22 10:40	jfi	
2-Methylnaphthalene [91-57-6]^	34		ug/L	2	0.10	0.20	2E16005	EPA 8270E	05/17/22 10:40	jfi	
Naphthalene [91-20-3]^	14		ug/L	1	0.050	0.10	2E16005	EPA 8270E	05/16/22 15:05	jfi	
<b>Surrogates</b>											
<i>2-Methylnaphthalene-d10</i>	5.4	1	5.71	95 %	50-150		2E16005	EPA 8270E	05/16/22 15:05	jfi	
<i>Fluoranthene-d10</i>	5.7	1	5.71	100 %	50-150		2E16005	EPA 8270E	05/16/22 15:05	jfi	

### FL Petroleum Range Organics

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	1600		ug/L	1	100	680	2E11003	FL-PRO	05/11/22 20:07	JJB	
<b>Surrogates</b>											
<i>n-Pentatriacontane</i>	460	1	400	115 %	40-129		2E11003	FL-PRO	05/11/22 20:07	JJB	
<i>o-Terphenyl</i>	200	1	200	101 %	66-139		2E11003	FL-PRO	05/11/22 20:07	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0002-005.0-20220509

**Lab Sample ID:** AF03365-02

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 12:34

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	2.9		ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 15:16	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	45	1	50.0	89 %	41-142	2E12005	EPA 8260D	05/12/22 15:16	nmc	
Dibromofluoromethane	52	1	50.0	104 %	53-146	2E12005	EPA 8260D	05/12/22 15:16	nmc	
Toluene-d8	46	1	50.0	91 %	41-146	2E12005	EPA 8260D	05/12/22 15:16	nmc	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.50		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:26	jfi	
2-Methylnaphthalene [91-57-6]^	0.29		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:26	jfi	
Naphthalene [91-20-3]^	1.6		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:26	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	6.6	1	5.71	115 %	50-150	2E10019	EPA 8270E	05/11/22 16:26	jfi	
Fluoranthene-d10	6.0	1	5.71	105 %	50-150	2E10019	EPA 8270E	05/11/22 16:26	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	1100		ug/L	1	100	680	2E11003	FL-PRO	05/11/22 20:35	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	470	1	400	118 %	40-129	2E11003	FL-PRO	05/11/22 20:35	JJB	
o-Terphenyl	180	1	200	91 %	66-139	2E11003	FL-PRO	05/11/22 20:35	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0012R-006.0-20220509

**Lab Sample ID:** AF03365-03

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 10:52

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 15:45	nmc	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
4-Bromofluorobenzene	45	1	50.0	91 %	41-142	2E12005	EPA 8260D	05/12/22 15:45	nmc		
Dibromofluoromethane	53	1	50.0	106 %	53-146	2E12005	EPA 8260D	05/12/22 15:45	nmc		
Toluene-d8	48	1	50.0	96 %	41-146	2E12005	EPA 8260D	05/12/22 15:45	nmc		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:47	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:47	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 16:47	jfi	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
2-Methylnaphthalene-d10	4.9	1	5.71	85 %	50-150	2E10019	EPA 8270E	05/11/22 16:47	jfi		
Fluoranthene-d10	6.7	1	5.71	118 %	50-150	2E10019	EPA 8270E	05/11/22 16:47	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E11003	FL-PRO	05/11/22 21:03	JJB	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
n-Pentatriacontane	540	1	400	135 %	40-129	2E11003	FL-PRO	05/11/22 21:03	JJB	QS-03	
o-Terphenyl	240	1	200	121 %	66-139	2E11003	FL-PRO	05/11/22 21:03	JJB		

## ANALYTICAL RESULTS

**Description:** FSA1-MW0014-006.0-20220509

**Lab Sample ID:** AF03365-04

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 11:34

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

### Volatile Organic Compounds by GCMS

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 16:14	nmc	
<b><u>Surrogates</u></b>											
<i>4-Bromofluorobenzene</i>	<i>45</i>	<i>1</i>	<i>50.0</i>	<i>91 %</i>	<i>41-142</i>		<i>2E12005</i>	<i>EPA 8260D</i>	<i>05/12/22 16:14</i>	<i>nmc</i>	
<i>Dibromofluoromethane</i>	<i>51</i>	<i>1</i>	<i>50.0</i>	<i>103 %</i>	<i>53-146</i>		<i>2E12005</i>	<i>EPA 8260D</i>	<i>05/12/22 16:14</i>	<i>nmc</i>	
<i>Toluene-d8</i>	<i>47</i>	<i>1</i>	<i>50.0</i>	<i>93 %</i>	<i>41-146</i>		<i>2E12005</i>	<i>EPA 8260D</i>	<i>05/12/22 16:14</i>	<i>nmc</i>	

### Semivolatile Organic Compounds by GCMS SIM

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.074	I	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:09	jfi	
2-Methylnaphthalene [91-57-6]^	0.057	I	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:09	jfi	
Naphthalene [91-20-3]^	0.080	I	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:09	jfi	
<b><u>Surrogates</u></b>											
<i>2-Methylnaphthalene-d10</i>	<i>6.3</i>	<i>1</i>	<i>5.71</i>	<i>110 %</i>	<i>50-150</i>		<i>2E10019</i>	<i>EPA 8270E</i>	<i>05/11/22 17:09</i>	<i>jfi</i>	
<i>Fluoranthene-d10</i>	<i>7.4</i>	<i>1</i>	<i>5.71</i>	<i>130 %</i>	<i>50-150</i>		<i>2E10019</i>	<i>EPA 8270E</i>	<i>05/11/22 17:09</i>	<i>jfi</i>	

### FL Petroleum Range Organics

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E11003	FL-PRO	05/11/22 21:59	JJB	
<b><u>Surrogates</u></b>											
<i>n-Pentatriacontane</i>	<i>490</i>	<i>1</i>	<i>400</i>	<i>121 %</i>	<i>40-129</i>		<i>2E11003</i>	<i>FL-PRO</i>	<i>05/11/22 21:59</i>	<i>JJB</i>	
<i>o-Terphenyl</i>	<i>210</i>	<i>1</i>	<i>200</i>	<i>106 %</i>	<i>66-139</i>		<i>2E11003</i>	<i>FL-PRO</i>	<i>05/11/22 21:59</i>	<i>JJB</i>	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0017A-006.5-20220509

**Lab Sample ID:** AF03365-05

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 10:13

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	1.8		ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 16:43	nmc	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	44	1	50.0	88 %	41-142	2E12005	EPA 8260D	05/12/22 16:43	nmc	
Dibromofluoromethane	51	1	50.0	103 %	53-146	2E12005	EPA 8260D	05/12/22 16:43	nmc	
Toluene-d8	47	1	50.0	94 %	41-146	2E12005	EPA 8260D	05/12/22 16:43	nmc	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:30	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:30	jfi	
Naphthalene [91-20-3]^	0.20		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:30	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	7.5	1	5.71	132 %	50-150	2E10019	EPA 8270E	05/11/22 17:30	jfi	
Fluoranthene-d10	7.1	1	5.71	125 %	50-150	2E10019	EPA 8270E	05/11/22 17:30	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E11003	FL-PRO	05/11/22 22:27	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	440	1	400	110 %	40-129	2E11003	FL-PRO	05/11/22 22:27	JJB	
o-Terphenyl	190	1	200	94 %	66-139	2E11003	FL-PRO	05/11/22 22:27	JJB	

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0021-005.0-20220509

**Lab Sample ID:** AF03365-06

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 11:57

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	2.1		ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 17:12	nmc	
<b>Surrogates</b>											
<i>4-Bromofluorobenzene</i>	44	1	50.0	88 %	41-142		2E12005	EPA 8260D	05/12/22 17:12	nmc	
<i>Dibromofluoromethane</i>	53	1	50.0	106 %	53-146		2E12005	EPA 8260D	05/12/22 17:12	nmc	
<i>Toluene-d8</i>	46	1	50.0	93 %	41-146		2E12005	EPA 8260D	05/12/22 17:12	nmc	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:52	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:52	jfi	
Naphthalene [91-20-3]^	0.11		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 17:52	jfi	
<b>Surrogates</b>											
<i>2-Methylnaphthalene-d10</i>	5.9	1	5.71	102 %	50-150		2E10019	EPA 8270E	05/11/22 17:52	jfi	
<i>Fluoranthene-d10</i>	6.6	1	5.71	115 %	50-150		2E10019	EPA 8270E	05/11/22 17:52	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E11003	FL-PRO	05/11/22 22:55	JJB	
<b>Surrogates</b>											
<i>n-Pentatriacontane</i>	610	1	400	152 %	40-129		2E11003	FL-PRO	05/11/22 22:55	JJB	E, QS-03
<i>o-Terphenyl</i>	210	1	200	106 %	66-139		2E11003	FL-PRO	05/11/22 22:55	JJB	



**ANALYTICAL RESULTS**

**Description:** FSA1-MW0022R-006.5-20220509

**Lab Sample ID:** AF03365-07

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 10:52

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 17:40	nmc	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
4-Bromofluorobenzene	43	1	50.0	86 %	41-142	2E12005	EPA 8260D	05/12/22 17:40	nmc		
Dibromofluoromethane	51	1	50.0	102 %	53-146	2E12005	EPA 8260D	05/12/22 17:40	nmc		
Toluene-d8	45	1	50.0	90 %	41-146	2E12005	EPA 8260D	05/12/22 17:40	nmc		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:13	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:13	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:13	jfi	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
2-Methylnaphthalene-d10	5.9	1	5.71	103 %	50-150	2E10019	EPA 8270E	05/11/22 18:13	jfi		
Fluoranthene-d10	7.4	1	5.71	129 %	50-150	2E10019	EPA 8270E	05/11/22 18:13	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E11003	FL-PRO	05/11/22 23:23	JJB	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
n-Pentatriacontane	570	1	400	142 %	40-129	2E11003	FL-PRO	05/11/22 23:23	JJB	QS-03	
o-Terphenyl	210	1	200	105 %	66-139	2E11003	FL-PRO	05/11/22 23:23	JJB		

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0023-006.0-20220509

**Lab Sample ID:** AF03365-08

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 12:27

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 18:09	nmc	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
4-Bromofluorobenzene	43	1	50.0	86 %	41-142	2E12005	EPA 8260D	05/12/22 18:09	nmc		
Dibromofluoromethane	53	1	50.0	105 %	53-146	2E12005	EPA 8260D	05/12/22 18:09	nmc		
Toluene-d8	46	1	50.0	93 %	41-146	2E12005	EPA 8260D	05/12/22 18:09	nmc		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:35	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:35	jfi	
<b>Naphthalene [91-20-3]^</b>	<b>0.11</b>		ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:35	jfi	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
2-Methylnaphthalene-d10	6.0	1	5.71	104 %	50-150	2E10019	EPA 8270E	05/11/22 18:35	jfi		
Fluoranthene-d10	6.9	1	5.71	120 %	50-150	2E10019	EPA 8270E	05/11/22 18:35	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E12007	FL-PRO	05/13/22 05:50	JJB	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
n-Pentatriacontane	570	1	392	147 %	40-129	2E12007	FL-PRO	05/13/22 05:50	JJB	QS-03	
o-Terphenyl	230	1	196	118 %	66-139	2E12007	FL-PRO	05/13/22 05:50	JJB		

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0027-020.0-20220509

**Lab Sample ID:** AF03365-09

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 11:22

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E12005	EPA 8260D	05/12/22 18:38	nmc	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
4-Bromofluorobenzene	44	1	50.0	89 %	41-142	2E12005	EPA 8260D	05/12/22 18:38	nmc		
Dibromofluoromethane	53	1	50.0	106 %	53-146	2E12005	EPA 8260D	05/12/22 18:38	nmc		
Toluene-d8	46	1	50.0	92 %	41-146	2E12005	EPA 8260D	05/12/22 18:38	nmc		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:56	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:56	jfi	
<b>Naphthalene [91-20-3]^</b>	<b>0.080</b>	<b>I</b>	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 18:56	jfi	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
2-Methylnaphthalene-d10	5.1	1	5.71	89 %	50-150	2E10019	EPA 8270E	05/11/22 18:56	jfi		
Fluoranthene-d10	7.0	1	5.71	122 %	50-150	2E10019	EPA 8270E	05/11/22 18:56	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E12007	FL-PRO	05/13/22 06:18	JJB	
<b>Surrogates</b>											
<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>	
n-Pentatriacontane	510	1	400	128 %	40-129	2E12007	FL-PRO	05/13/22 06:18	JJB		
o-Terphenyl	210	1	200	107 %	66-139	2E12007	FL-PRO	05/13/22 06:18	JJB		

**ANALYTICAL RESULTS**

**Description:** FSA1-MW0028-020.0-20220509

**Lab Sample ID:** AF03365-10

**Received:** 05/09/22 16:30

**Matrix:** Ground Water

**Sampled:** 05/09/22 10:17

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E13004	EPA 8260D	05/13/22 15:03	nmc	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	45	1	50.0	90 %	41-142	2E13004	EPA 8260D	05/13/22 15:03	nmc		
Dibromofluoromethane	55	1	50.0	110 %	53-146	2E13004	EPA 8260D	05/13/22 15:03	nmc		
Toluene-d8	49	1	50.0	97 %	41-146	2E13004	EPA 8260D	05/13/22 15:03	nmc		

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 19:18	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 19:18	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	2E10019	EPA 8270E	05/11/22 19:18	jfi	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
2-Methylnaphthalene-d10	5.0	1	5.71	87 %	50-150	2E10019	EPA 8270E	05/11/22 19:18	jfi		
Fluoranthene-d10	6.6	1	5.71	116 %	50-150	2E10019	EPA 8270E	05/11/22 19:18	jfi		

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	490	I	ug/L	1	100	680	2E16007	FL-PRO	05/16/22 13:05	JJB	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
n-Pentatriacontane	470	1	400	118 %	40-129	2E16007	FL-PRO	05/16/22 13:05	JJB		
o-Terphenyl	220	1	200	108 %	66-139	2E16007	FL-PRO	05/16/22 13:05	JJB		

**Description:** FSA1-TB-20220509-01

**Lab Sample ID:** AF03365-11

**Received:** 05/09/22 16:30

**Matrix:** Water

**Sampled:** 05/09/22 07:00

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E13004	EPA 8260D	05/13/22 15:31	nmc	
<b>Surrogates</b>											
Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes	
4-Bromofluorobenzene	43	1	50.0	87 %	41-142	2E13004	EPA 8260D	05/13/22 15:31	nmc		
Dibromofluoromethane	53	1	50.0	105 %	53-146	2E13004	EPA 8260D	05/13/22 15:31	nmc		
Toluene-d8	46	1	50.0	92 %	41-146	2E13004	EPA 8260D	05/13/22 15:31	nmc		



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**ANALYTICAL RESULTS**

**Description:** FSA1-TB-20220509-02

**Lab Sample ID:** AF03365-12

**Received:** 05/09/22 16:30

**Matrix:** Water

**Sampled:** 05/09/22 07:00

**Work Order:** AF03365

**Project:** NASA KSC - FSA1

**Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

<u>Analyte [CAS Number]</u>	<u>Results</u>	<u>Flag</u>	<u>Units</u>	<u>DF</u>	<u>MDL</u>	<u>PQL</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E13004	EPA 8260D	05/13/22 16:00	nmc	

<u>Surrogates</u>	<u>Results</u>	<u>DF</u>	<u>Spike Lvl</u>	<u>% Rec</u>	<u>% Rec Limits</u>	<u>Batch</u>	<u>Method</u>	<u>Analyzed</u>	<u>By</u>	<u>Notes</u>
4-Bromofluorobenzene	44	1	50.0	88 %	41-142	2E13004	EPA 8260D	05/13/22 16:00	nmc	
Dibromofluoromethane	53	1	50.0	106 %	53-146	2E13004	EPA 8260D	05/13/22 16:00	nmc	
Toluene-d8	47	1	50.0	93 %	41-146	2E13004	EPA 8260D	05/13/22 16:00	nmc	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E12005 - EPA 5030B\_MS**

**Blank (2E12005-BLK1)**

Prepared: 05/12/2022 00:00 Analyzed: 05/12/2022 10:28

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	0.67	U	1.0	ug/L							
4-Bromofluorobenzene	43			ug/L	50.0		86	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**LCS (2E12005-BS1)**

Prepared: 05/12/2022 00:00 Analyzed: 05/12/2022 08:04

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	21		1.0	ug/L	20.0		106	60-132			
4-Bromofluorobenzene	45			ug/L	50.0		89	41-142			
Dibromofluoromethane	53			ug/L	50.0		107	53-146			
Toluene-d8	49			ug/L	50.0		98	41-146			

**Matrix Spike (2E12005-MS1)**

Prepared: 05/12/2022 00:00 Analyzed: 05/12/2022 08:33

Source: AF03365-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	37		1.0	ug/L	20.0	14	115	60-132			
4-Bromofluorobenzene	43			ug/L	50.0		87	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Matrix Spike Dup (2E12005-MSD1)**

Prepared: 05/12/2022 00:00 Analyzed: 05/12/2022 09:02

Source: AF03365-01

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	37		1.0	ug/L	20.0	14	115	60-132	0.2	23	
4-Bromofluorobenzene	44			ug/L	50.0		89	41-142			
Dibromofluoromethane	51			ug/L	50.0		103	53-146			
Toluene-d8	47			ug/L	50.0		94	41-146			

**Batch 2E13004 - EPA 5030B\_MS**

**Blank (2E13004-BLK1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 10:14

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	0.67	U	1.0	ug/L							
4-Bromofluorobenzene	45			ug/L	50.0		91	41-142			
Dibromofluoromethane	53			ug/L	50.0		105	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**LCS (2E13004-BS1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 07:50

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	20		1.0	ug/L	20.0		99	60-132			
4-Bromofluorobenzene	42			ug/L	50.0		85	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	45			ug/L	50.0		91	41-146			

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E13004 - EPA 5030B\_MS - Continued**

**Matrix Spike (2E13004-MS1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 08:19

Source: AF03650-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	118	60-132			
4-Bromofluorobenzene	43			ug/L	50.0		86	41-142			
Dibromofluoromethane	51			ug/L	50.0		102	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Matrix Spike Dup (2E13004-MSD1)**

Prepared: 05/13/2022 00:00 Analyzed: 05/13/2022 08:48

Source: AF03650-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Isopropylbenzene	23		1.0	ug/L	20.0	0.67 U	113	60-132	4	23	
4-Bromofluorobenzene	43			ug/L	50.0		85	41-142			
Dibromofluoromethane	50			ug/L	50.0		100	53-146			
Toluene-d8	46			ug/L	50.0		93	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 2E10019 - EPA 3511\_MS**

**Blank (2E10019-BLK1)**

Prepared: 05/10/2022 13:57 Analyzed: 05/11/2022 12:29

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	4.9			ug/L	5.71		86	50-150			
Fluoranthene-d10	8.0			ug/L	5.71		140	50-150			

**LCS (2E10019-BS1)**

Prepared: 05/10/2022 13:57 Analyzed: 05/11/2022 12:51

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.3		0.10	ug/L	5.71		92	59-120			
2-Methylnaphthalene	5.4		0.10	ug/L	5.71		94	43-120			
Naphthalene	5.7		0.10	ug/L	5.71		99	68-120			
2-Methylnaphthalene-d10	5.2			ug/L	5.71		91	50-150			
Fluoranthene-d10	6.9			ug/L	5.71		120	50-150			

**Matrix Spike (2E10019-MS1)**

Prepared: 05/10/2022 13:57 Analyzed: 05/11/2022 13:12

Source: AF03574-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.1		0.10	ug/L	5.71	0.050 U	89	59-120			
2-Methylnaphthalene	5.1		0.10	ug/L	5.71	0.050 U	90	43-120			
Naphthalene	5.3		0.10	ug/L	5.71	0.050 U	93	68-120			
2-Methylnaphthalene-d10	4.9			ug/L	5.71		86	50-150			
Fluoranthene-d10	6.5			ug/L	5.71		114	50-150			

**Matrix Spike Dup (2E10019-MSD1)**

Prepared: 05/10/2022 13:57 Analyzed: 05/11/2022 13:34

Source: AF03574-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
FINAL											

**QUALITY CONTROL DATA**

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 2E10019 - EPA 3511\_MS - Continued**

**Matrix Spike Dup (2E10019-MSD1) Continued**

Prepared: 05/10/2022 13:57 Analyzed: 05/11/2022 13:34

Source: AF03574-02

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.1		0.10	ug/L	5.71	0.050 U	72	59-120	20	25	
2-Methylnaphthalene	4.1		0.10	ug/L	5.71	0.050 U	72	43-120	22	25	
Naphthalene	4.2		0.10	ug/L	5.71	0.050 U	74	68-120	23	25	
2-Methylnaphthalene-d10	4.4			ug/L	5.71		77	50-150			
Fluoranthene-d10	7.1			ug/L	5.71		125	50-150			

**Batch 2E16005 - EPA 3511\_MS**

**Blank (2E16005-BLK1)**

Prepared: 05/16/2022 11:00 Analyzed: 05/16/2022 13:17

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	5.3			ug/L	5.71		92	50-150			
Fluoranthene-d10	6.2			ug/L	5.71		109	50-150			

**LCS (2E16005-BS1)**

Prepared: 05/16/2022 11:00 Analyzed: 05/16/2022 13:39

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.7		0.10	ug/L	5.71		100	59-120			
2-Methylnaphthalene	5.7		0.10	ug/L	5.71		100	43-120			
Naphthalene	4.9		0.10	ug/L	5.71		85	68-120			
2-Methylnaphthalene-d10	5.6			ug/L	5.71		98	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		106	50-150			

**Matrix Spike (2E16005-MS1)**

Prepared: 05/16/2022 11:00 Analyzed: 05/16/2022 14:01

Source: AF03780-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.9		0.10	ug/L	5.71	0.050 U	86	59-120			
2-Methylnaphthalene	4.9		0.10	ug/L	5.71	0.050 U	86	43-120			
Naphthalene	4.0		0.10	ug/L	5.71	0.050 U	70	68-120			
2-Methylnaphthalene-d10	5.4			ug/L	5.71		94	50-150			
Fluoranthene-d10	6.6			ug/L	5.71		115	50-150			

**Matrix Spike Dup (2E16005-MSD1)**

Prepared: 05/16/2022 11:00 Analyzed: 05/16/2022 14:22

Source: AF03780-01

Analyte	Result	Flaq	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.1		0.10	ug/L	5.71	0.050 U	89	59-120	3	25	
2-Methylnaphthalene	5.0		0.10	ug/L	5.71	0.050 U	88	43-120	3	25	
Naphthalene	4.1		0.10	ug/L	5.71	0.050 U	72	68-120	4	25	
2-Methylnaphthalene-d10	4.7			ug/L	5.71		82	50-150			
Fluoranthene-d10	6.7			ug/L	5.71		117	50-150			

**FL Petroleum Range Organics - Quality Control**

**Batch 2E11003 - EPA 3510C**



**QUALITY CONTROL DATA**

**FL Petroleum Range Organics - Quality Control**

**Batch 2E11003 - EPA 3510C - Continued**

**Blank (2E11003-BLK1)**

Prepared: 05/11/2022 07:10 Analyzed: 05/11/2022 11:43

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	100	U	680	ug/L							
<i>n</i> -Pentatriacontane	530			ug/L	400		132	40-129			QS-03
<i>o</i> -Terphenyl	210			ug/L	200		106	66-139			

**LCS (2E11003-BS1)**

Prepared: 05/11/2022 07:10 Analyzed: 05/11/2022 12:11

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7200		680	ug/L	6800		106	66-119			
<i>n</i> -Pentatriacontane	420			ug/L	400		104	40-129			
<i>o</i> -Terphenyl	230			ug/L	200		115	66-139			

**Matrix Spike (2E11003-MS1)**

Prepared: 05/11/2022 07:10 Analyzed: 05/11/2022 12:39

Source: AF03574-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	8200		680	ug/L	6800	100 U	121	65-123			
<i>n</i> -Pentatriacontane	550			ug/L	400		138	40-129			QS-03
<i>o</i> -Terphenyl	230			ug/L	200		115	66-139			

**Matrix Spike Dup (2E11003-MSD1)**

Prepared: 05/11/2022 07:10 Analyzed: 05/11/2022 13:07

Source: AF03574-02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7600		680	ug/L	6800	100 U	112	65-123	8	20	
<i>n</i> -Pentatriacontane	500			ug/L	400		124	40-129			
<i>o</i> -Terphenyl	240			ug/L	200		120	66-139			

**Batch 2E12007 - EPA 3510C**

**Blank (2E12007-BLK1)**

Prepared: 05/12/2022 08:20 Analyzed: 05/13/2022 02:34

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	1200		680	ug/L							QB-02
<i>n</i> -Pentatriacontane	490			ug/L	400		122	40-129			
<i>o</i> -Terphenyl	190			ug/L	200		95	66-139			

**LCS (2E12007-BS1)**

Prepared: 05/12/2022 08:20 Analyzed: 05/13/2022 03:02

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	7000		680	ug/L	6800		103	66-119			
<i>n</i> -Pentatriacontane	330			ug/L	400		83	40-129			
<i>o</i> -Terphenyl	230			ug/L	200		116	66-139			

**Matrix Spike (2E12007-MS1)**

Prepared: 05/12/2022 08:20 Analyzed: 05/13/2022 03:30

Source: AF03574-03

Analyte	Result	Flag	POL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6500		680	ug/L	6800	100 U	96	65-123			

**QUALITY CONTROL DATA**

**FL Petroleum Range Organics - Quality Control**

**Batch 2E12007 - EPA 3510C - Continued**

**Matrix Spike (2E12007-MS1) Continued**

Prepared: 05/12/2022 08:20 Analyzed: 05/13/2022 03:30

Source: AF03574-03

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<i>n</i> -Pentatriacontane	370			ug/L	400		93	40-129			
<i>o</i> -Terphenyl	210			ug/L	200		107	66-139			

**Matrix Spike Dup (2E12007-MSD1)**

Prepared: 05/12/2022 08:20 Analyzed: 05/13/2022 03:58

Source: AF03574-03

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6900		680	ug/L	6800	100 U	102	65-123	6	20	
<i>n</i> -Pentatriacontane	420			ug/L	400		104	40-129			
<i>o</i> -Terphenyl	230			ug/L	200		115	66-139			

**Batch 2E16007 - EPA 3510C**

**Blank (2E16007-BLK1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 10:45

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	100	U	680	ug/L							
<i>n</i> -Pentatriacontane	500			ug/L	400		125	40-129			
<i>o</i> -Terphenyl	180			ug/L	200		92	66-139			

**LCS (2E16007-BS1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 11:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	5200		680	ug/L	6800		77	66-119			
<i>n</i> -Pentatriacontane	390			ug/L	400		96	40-129			
<i>o</i> -Terphenyl	160			ug/L	200		82	66-139			

**Matrix Spike (2E16007-MS1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 11:41

Source: AF03780-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	5600		680	ug/L	6800	100 U	83	65-123			
<i>n</i> -Pentatriacontane	440			ug/L	400		111	40-129			
<i>o</i> -Terphenyl	180			ug/L	200		89	66-139			

**Matrix Spike Dup (2E16007-MSD1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 12:09

Source: AF03780-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6100		680	ug/L	6800	100 U	89	65-123	8	20	
<i>n</i> -Pentatriacontane	400			ug/L	400		101	40-129			
<i>o</i> -Terphenyl	200			ug/L	200		101	66-139			

## FLAGS/NOTES AND DEFINITIONS

<b>PQL</b>	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
<b>B</b>	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
<b>I</b>	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
<b>J</b>	Estimated value.
<b>K</b>	Off-scale low; Actual value is known to be less than the value given.
<b>L</b>	Off-scale high; Actual value is known to be greater than value given.
<b>M</b>	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
<b>N</b>	Presumptive evidence of presence of material.
<b>O</b>	Sampled, but analysis lost or not performed.
<b>Q</b>	Sample exceeded the accepted holding time.
<b>T</b>	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
<b>U</b>	Indicates that the compound was analyzed for but not detected.
<b>V</b>	Indicates that the analyte was detected in both the sample and the associated method blank.
<b>Y</b>	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
<b>Z</b>	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
<b>?</b>	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
<b>*</b>	Not reported due to interference.
<b>[CALC]</b>	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.
<b>E</b>	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate (CLP E-flag).
<b>QB-02</b>	The method blank contains analyte at a concentration above the MDL and/or greater than one-half the MRL. The analyte was not detected in the sample.
<b>QS-03</b>	Surrogate recovery outside acceptance limits



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

COC No. Page: 1 of 1

Project Name: NASA KSC PO No. 138224 Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase:

Site Location: Fuel Storage Area #1 Underground Storage Tank Send Invoice To: Instructions in MSA # 195-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings

TO No.: 80KSC019F0071 AECOM Project Manager: Chris Marshall Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Amentt Jennings

Sampler/Phone #: Greg Kusel / (772) 631-7426 Dustin Slater / 407-766-0747 Deliver Samples To: ENCO Site-Specific WS#15 from QAPP: 15-5

Lab Name: ENCO Turnaround Time(specify): Standard 14 day Sample Analysis Requested (Enter number of containers for each test)

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	4 DEG C	H2SO4 <2														Comments	
																										Total No. of Containers
	FSA1-MW0001-202205-005.5- GK-20220509	FSA1-MW0001	20220509	1201	WG	N	G	7	3	2	2															
	FSA1-MW0002-202205-005.0- GK-20220509	FSA1-MW0002	20220509	1234	WG	N	G	7	3	2	2															
	FSA1-MW0012R-202205-006.0- GK-20220509	FSA1-MW0012R	20220509	1052	WG	N	G	7	3	2	2															
	FSA1-MW0014-202205-006.0- GK-20220509	FSA1-MW0014	20220509	1134	WG	N	G	7	3	2	2															
	FSA1-MW0017A-202205-006.5- GK-20220509	FSA1-MW0017A	20220509	1013	WG	N	G	7	3	2	2															
	FSA1-MW0021-202205-005.0- GK-20220509	FSA1-MW0021	20220509	1157	WG	N	G	7	3	2	2															
	FSA1-MW0022R-202205-006.5- GK-20220509	FSA1-MW0022R	20220509	1052	WG	N	G	7	3	2	2															
	FSA1-MW0023-202205-006.0- GK-20220509	FSA1-MW0023	20220509	1227	WG	N	G	7	3	2	2															
	FSA1-MW0027-202205-020.0- GK-20220509	FSA1-MW0027	20220509	1122	WG	N	G	7	3	2	2															
	FSA1-MW0028-202205-020.0- GK-20220509	FSA1-MW0028	20220509	1017	WG	N	G	7	3	2	2															
	FSA1-TB-20220509-01	FSA1-TB01	20220509	0700	WQ	TB	G	2	2																	
	FSA1-TB-20220509-02	FSA1-TB02	20220509	0700	WQ	TB	G	2	2																	

<b>Field Comments:</b> Report only per QAPP WS #15-5	<b>Lab Comments:</b>	<b>Sample Shipment and Delivery Details</b>
Relinquished by (signature) <span style="margin-left: 150px;">Date</span> <span style="margin-left: 50px;">Time</span>	Received by (signature) <span style="margin-left: 150px;">Date</span> <span style="margin-left: 50px;">Time</span>	Number of coolers in shipment:
1 <i>[Signature]</i> <span style="margin-left: 150px;">05/04/22</span> <span style="margin-left: 50px;">15:00</span>	1 <i>[Signature]</i> <span style="margin-left: 150px;">5/9/22</span> <span style="margin-left: 50px;">0700</span>	Samples Iced?(check) Yes ___ No ___
2 <i>[Signature]</i> <span style="margin-left: 150px;">5/9/22</span> <span style="margin-left: 50px;">1630</span>	2 <i>[Signature]</i> <span style="margin-left: 150px;">5/9/22</span> <span style="margin-left: 50px;">1630</span>	Shipping Company:
3	3	Tracking No:
		Date Shipped:

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2= Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per l-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

Rev 8/19

LQ-390 0.3°C, Method 4.0°C



# ENCO Laboratories

*Accurate. Timely. Responsive. Innovative.*

10775 Central Port Drive

Orlando FL, 32824

Phone: 407.826.5314 FAX: 407.850.6945

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Thursday, May 26, 2022

AECOM Technical Services, Inc. (SE004)

Attn: Teresa Amentt Jennings

150 N. Orange Ave, Suite 200

Orlando, FL 32801

**RE: Laboratory Results for**

**Project Number: 60610905, Project Name/Desc: NASA KSC - Industrial Area**

**ENCO Workorder(s): AF03378**

Dear Teresa Amentt Jennings,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Thursday, May 12, 2022.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative if applicable. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Orlando. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Kaitlin Dylnicki

Project Manager

Enclosure(s)



www.encolabs.com

**SAMPLE SUMMARY/LABORATORY CHRONICLE**

**Client ID: IA-IDW01-20220512      Lab ID: AF03378-01      Sampled: 05/12/22 13:15      Received: 05/12/22 14:52**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 6020B	EPA 3005A	11/08/22	05/17/22 09:54	05/23/22 18:00
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 12:24
EPA 8270E	EPA 3511_MS	05/19/22      06/26/22	05/17/22 14:39	05/18/22 22:14
FL-PRO	EPA 3510C	05/19/22      06/25/22	05/16/22 08:25	05/16/22 13:33

**Client ID: IA-IDW01-20220512      Lab ID: AF03378-01RE1      Sampled: 05/12/22 13:15      Received: 05/12/22 14:52**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 350.1	NO PREP	06/09/22	05/13/22 07:00	05/13/22 11:08

**Client ID: IA-TB01-20220512      Lab ID: AF03378-02      Sampled: 05/12/22 13:00      Received: 05/12/22 14:52**

<u>Parameter</u>	<u>Preparation</u>	<u>Hold Date/Time(s)</u>	<u>Prep Date/Time(s)</u>	<u>Analysis Date/Time(s)</u>
EPA 8260D	EPA 5030B_MS	05/26/22	05/17/22 00:00	05/17/22 12:52



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**SAMPLE DETECTION SUMMARY**

**Client ID: IA-IDW01-20220512** **Lab ID: AF03378-01**

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
cis-1,2-Dichloroethene	1.4		0.53	1.0	ug/L	EPA 8260D	

**Client ID: IA-IDW01-20220512** **Lab ID: AF03378-01RE1**

<u>Analyte</u>	<u>Results</u>	<u>Flag</u>	<u>MDL</u>	<u>PQL</u>	<u>Units</u>	<u>Method</u>	<u>Notes</u>
Ammonia as N	2400		20	40	ug/L	EPA 350.1	

**ANALYTICAL RESULTS**

**Description:** IA-IDW01-20220512

**Lab Sample ID:** AF03378-01

**Received:** 05/12/22 14:52

**Matrix:** Ground Water

**Sampled:** 05/12/22 13:15

**Work Order:** AF03378

**Project:** NASA KSC - Industrial Area

**Sampled By:** Greg Kusel /Dustin Slater

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	0.69	U	ug/L	1	0.69	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
<b>cis-1,2-Dichloroethene [156-59-2]^</b>	<b>1.4</b>		ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Methyl-tert-Butyl Ether [1634-04-4]^	0.60	U	ug/L	1	0.60	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
o-Xylene [95-47-6]^	0.53	U	ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E17007	EPA 8260D	05/17/22 12:24	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	45	1	50.0	89 %	41-142	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Dibromofluoromethane	57	1	50.0	114 %	53-146	2E17007	EPA 8260D	05/17/22 12:24	JMW	
Toluene-d8	48	1	50.0	96 %	41-146	2E17007	EPA 8260D	05/17/22 12:24	JMW	

**Semivolatile Organic Compounds by GCMS SIM**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1-Methylnaphthalene [90-12-0]^	0.050	U	ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 22:14	jfi	
2-Methylnaphthalene [91-57-6]^	0.050	U	ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 22:14	jfi	
Naphthalene [91-20-3]^	0.050	U	ug/L	1	0.050	0.10	2E17040	EPA 8270E	05/18/22 22:14	jfi	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
2-Methylnaphthalene-d10	6.1	1	5.71	107 %	50-150	2E17040	EPA 8270E	05/18/22 22:14	jfi	
Fluoranthene-d10	6.5	1	5.71	114 %	50-150	2E17040	EPA 8270E	05/18/22 22:14	jfi	

**FL Petroleum Range Organics**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
TPH (C8-C40)^	100	U	ug/L	1	100	680	2E16007	FL-PRO	05/16/22 13:33	JJB	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
n-Pentatriacontane	520	1	400	130 %	40-129	2E16007	FL-PRO	05/16/22 13:33	JJB	QS-03
o-Terphenyl	210	1	200	107 %	66-139	2E16007	FL-PRO	05/16/22 13:33	JJB	

**Metals (total recoverable) by EPA 6000/7000 Series Methods**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Lead [7439-92-1]^	2.50	U	ug/L	1	2.50	5.00	2E16054	EPA 6020B	05/23/22 18:00	JMA	



**ANALYTICAL RESULTS**

**Description:** IA-IDW01-20220512      **Lab Sample ID:** AF03378-01      **Received:** 05/12/22 14:52  
**Matrix:** Ground Water      **Sampled:** 05/12/22 13:15      **Work Order:** AF03378  
**Project:** NASA KSC - Industrial Area      **Sampled By:** Greg Kusel /Dustin Slater

**Classical Chemistry Parameters**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
Ammonia as N [7664-41-7]^	2400		ug/L	2	20	40	2E12028	EPA 350.1	05/13/22 11:08	cbarr	

**Description:** IA-TB01-20220512      **Lab Sample ID:** AF03378-02      **Received:** 05/12/22 14:52  
**Matrix:** Water      **Sampled:** 05/12/22 13:00      **Work Order:** AF03378  
**Project:** NASA KSC - Industrial Area      **Sampled By:** ENCO ORL

**Volatile Organic Compounds by GCMS**

^ - ENCO Orlando certified analyte [NELAC E83182]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	PQL	Batch	Method	Analyzed	By	Notes
1,2,4-Trimethylbenzene [95-63-6]^	0.69	U	ug/L	1	0.69	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Benzene [71-43-2]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
cis-1,2-Dichloroethene [156-59-2]^	0.53	U	ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Isopropylbenzene [98-82-8]^	0.67	U	ug/L	1	0.67	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
m,p-Xylenes [108-38-3/106-42-3]^	1.3	U	ug/L	1	1.3	2.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Methyl-tert-Butyl Ether [1634-04-4]^	0.60	U	ug/L	1	0.60	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
o-Xylene [95-47-6]^	0.53	U	ug/L	1	0.53	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Trichloroethene [79-01-6]^	0.89	U	ug/L	1	0.89	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Vinyl chloride [75-01-4]^	0.71	U	ug/L	1	0.71	1.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Xylenes (Total) [1330-20-7]^	1.3	U	ug/L	1	1.3	2.0	2E17007	EPA 8260D	05/17/22 12:52	JMW	

Surrogates	Results	DF	Spike Lvl	% Rec	% Rec Limits	Batch	Method	Analyzed	By	Notes
4-Bromofluorobenzene	44	1	50.0	88 %	41-142	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Dibromofluoromethane	56	1	50.0	112 %	53-146	2E17007	EPA 8260D	05/17/22 12:52	JMW	
Toluene-d8	47	1	50.0	95 %	41-146	2E17007	EPA 8260D	05/17/22 12:52	JMW	

**QUALITY CONTROL DATA**

**Volatile Organic Compounds by GCMS - Quality Control**

**Batch 2E17007 - EPA 5030B\_MS**

**Blank (2E17007-BLK1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 10:28

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	0.69	U	1.0	ug/L							
Benzene	0.71	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.53	U	1.0	ug/L							
Isopropylbenzene	0.67	U	1.0	ug/L							
m,p-Xylenes	1.3	U	2.0	ug/L							
Methyl-tert-Butyl Ether	0.60	U	1.0	ug/L							
o-Xylene	0.53	U	1.0	ug/L							
Trichloroethene	0.89	U	1.0	ug/L							
Vinyl chloride	0.71	U	1.0	ug/L							
Xylenes (Total)	1.3	U	2.0	ug/L							
<i>4-Bromofluorobenzene</i>	<i>44</i>			<i>ug/L</i>	<i>50.0</i>		<i>88</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>55</i>			<i>ug/L</i>	<i>50.0</i>		<i>111</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>46</i>			<i>ug/L</i>	<i>50.0</i>		<i>93</i>	<i>41-146</i>			

**LCS (2E17007-BS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 08:04

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	21		1.0	ug/L	20.0		104	59-142			
Benzene	22		1.0	ug/L	20.0		108	56-136			
cis-1,2-Dichloroethene	25		1.0	ug/L	20.0		126	56-128			
Isopropylbenzene	21		1.0	ug/L	20.0		105	60-132			
m,p-Xylenes	42		2.0	ug/L	40.0		105	64-133			
Methyl-tert-Butyl Ether	23		1.0	ug/L	20.0		115	51-145			
o-Xylene	21		1.0	ug/L	20.0		105	61-129			
Trichloroethene	23		1.0	ug/L	20.0		116	62-135			
Vinyl chloride	30		1.0	ug/L	20.0		149	20-167			
<i>4-Bromofluorobenzene</i>	<i>45</i>			<i>ug/L</i>	<i>50.0</i>		<i>90</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>56</i>			<i>ug/L</i>	<i>50.0</i>		<i>112</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>49</i>			<i>ug/L</i>	<i>50.0</i>		<i>98</i>	<i>41-146</i>			

**Matrix Spike (2E17007-MS1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 08:33

**Source: AF03703-05**

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	22		1.0	ug/L	20.0	0.69 U	111	59-142			
Benzene	24		1.0	ug/L	20.0	0.71 U	118	56-136			
cis-1,2-Dichloroethene	27		1.0	ug/L	20.0	0.53 U	134	56-128			QM-07
Isopropylbenzene	24		1.0	ug/L	20.0	0.67 U	118	60-132			
m,p-Xylenes	45		2.0	ug/L	40.0	1.3 U	113	64-133			
Methyl-tert-Butyl Ether	24		1.0	ug/L	20.0	0.60 U	121	51-145			
o-Xylene	23		1.0	ug/L	20.0	0.53 U	114	61-129			
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	127	62-135			
Vinyl chloride	30		1.0	ug/L	20.0	0.71 U	148	20-167			
<i>4-Bromofluorobenzene</i>	<i>45</i>			<i>ug/L</i>	<i>50.0</i>		<i>89</i>	<i>41-142</i>			
<i>Dibromofluoromethane</i>	<i>56</i>			<i>ug/L</i>	<i>50.0</i>		<i>111</i>	<i>53-146</i>			
<i>Toluene-d8</i>	<i>48</i>			<i>ug/L</i>	<i>50.0</i>		<i>97</i>	<i>41-146</i>			

**QUALITY CONTROL DATA**
**Volatile Organic Compounds by GCMS - Quality Control**
**Batch 2E17007 - EPA 5030B\_MS - Continued**
**Matrix Spike Dup (2E17007-MSD1)**

Prepared: 05/17/2022 00:00 Analyzed: 05/17/2022 09:02

Source: AF03703-05

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,2,4-Trimethylbenzene	21		1.0	ug/L	20.0	0.69 U	107	59-142	4	25	
Benzene	23		1.0	ug/L	20.0	0.71 U	115	56-136	2	14	
cis-1,2-Dichloroethene	26		1.0	ug/L	20.0	0.53 U	131	56-128	2	17	QM-07
Isopropylbenzene	23		1.0	ug/L	20.0	0.67 U	114	60-132	3	23	
m,p-Xylenes	44		2.0	ug/L	40.0	1.3 U	111	64-133	2	18	
Methyl-tert-Butyl Ether	24		1.0	ug/L	20.0	0.60 U	118	51-145	3	22	
o-Xylene	22		1.0	ug/L	20.0	0.53 U	111	61-129	3	16	
Trichloroethene	25		1.0	ug/L	20.0	0.89 U	126	62-135	0.4	20	
Vinyl chloride	29		1.0	ug/L	20.0	0.71 U	144	20-167	3	24	
4-Bromofluorobenzene	43			ug/L	50.0		87	41-142			
Dibromofluoromethane	54			ug/L	50.0		108	53-146			
Toluene-d8	48			ug/L	50.0		95	41-146			

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**
**Batch 2E17040 - EPA 3511\_MS**
**Blank (2E17040-BLK1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:05

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene	0.050	U	0.10	ug/L							
Naphthalene	0.050	U	0.10	ug/L							
2-Methylnaphthalene-d10	4.7			ug/L	5.71		83	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		106	50-150			

**LCS (2E17040-BS1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:27

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.7		0.10	ug/L	5.71		83	59-120			
2-Methylnaphthalene	4.7		0.10	ug/L	5.71		82	43-120			
Naphthalene	5.3		0.10	ug/L	5.71		92	68-120			
2-Methylnaphthalene-d10	4.2			ug/L	5.71		74	50-150			
Fluoranthene-d10	5.4			ug/L	5.71		95	50-150			

**Matrix Spike (2E17040-MS1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 20:48

Source: AF03780-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	4.7		0.10	ug/L	5.71	0.050 U	82	59-120			
2-Methylnaphthalene	4.7		0.10	ug/L	5.71	0.050 U	83	43-120			
Naphthalene	4.8		0.10	ug/L	5.71	0.050 U	84	68-120			
2-Methylnaphthalene-d10	4.1			ug/L	5.71		72	50-150			
Fluoranthene-d10	5.9			ug/L	5.71		104	50-150			

**Matrix Spike Dup (2E17040-MSD1)**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 21:10

Source: AF03780-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**QUALITY CONTROL DATA**

**Semivolatile Organic Compounds by GCMS SIM - Quality Control**

**Batch 2E17040 - EPA 3511\_MS - Continued**

**Matrix Spike Dup (2E17040-MSD1) Continued**

Prepared: 05/17/2022 14:39 Analyzed: 05/18/2022 21:10

Source: AF03780-02

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1-Methylnaphthalene	5.4		0.10	ug/L	5.71	0.050 U	94	59-120	14	25	
2-Methylnaphthalene	5.4		0.10	ug/L	5.71	0.050 U	94	43-120	13	25	
Naphthalene	5.0		0.10	ug/L	5.71	0.050 U	87	68-120	3	25	
2-Methylnaphthalene-d10	4.3			ug/L	5.71		74	50-150			
Fluoranthene-d10	6.0			ug/L	5.71		106	50-150			

**FL Petroleum Range Organics - Quality Control**

**Batch 2E16007 - EPA 3510C**

**Blank (2E16007-BLK1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 10:45

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	100	U	680	ug/L							
n-Pentatriacontane	500			ug/L	400		125	40-129			
o-Terphenyl	180			ug/L	200		92	66-139			

**LCS (2E16007-BS1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 11:13

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	5200		680	ug/L	6800		77	66-119			
n-Pentatriacontane	390			ug/L	400		96	40-129			
o-Terphenyl	160			ug/L	200		82	66-139			

**Matrix Spike (2E16007-MS1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 11:41

Source: AF03780-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	5600		680	ug/L	6800	100 U	83	65-123			
n-Pentatriacontane	440			ug/L	400		111	40-129			
o-Terphenyl	180			ug/L	200		89	66-139			

**Matrix Spike Dup (2E16007-MSD1)**

Prepared: 05/16/2022 08:25 Analyzed: 05/16/2022 12:09

Source: AF03780-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
TPH (C8-C40)	6100		680	ug/L	6800	100 U	89	65-123	8	20	
n-Pentatriacontane	400			ug/L	400		101	40-129			
o-Terphenyl	200			ug/L	200		101	66-139			

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

**Batch 2E16054 - EPA 3005A**

**Blank (2E16054-BLK1)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 12:22

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	2.50	U	5.00	ug/L							

**QUALITY CONTROL DATA**

**Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control**

*Batch 2E16054 - EPA 3005A - Continued*

**LCS (2E16054-BS1)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 12:25

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	498		5.00	ug/L	500		100	80-120			

**Matrix Spike (2E16054-MS2)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 14:58

Source: AF03651-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	488		25.0	ug/L	500	12.5 U	98	75-125			

**Matrix Spike Dup (2E16054-MSD2)**

Prepared: 05/17/2022 09:54 Analyzed: 05/23/2022 15:05

Source: AF03651-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	487		25.0	ug/L	500	12.5 U	97	75-125	0.06	20	

**Post Spike (2E16054-PS2)**

Prepared: 05/23/2022 08:50 Analyzed: 05/23/2022 14:24

Source: AF03651-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Lead	47.5		0.500	ug/L	49.0	0.0530	97	75-125			

**Classical Chemistry Parameters - Quality Control**

*Batch 2E12028 - NO PREP*

**Blank (2E12028-BLK1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:25

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	9.8	U	20	ug/L							

**LCS (2E12028-BS1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:27

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	970		20	ug/L	1000		97	90-110			

**Matrix Spike (2E12028-MS1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:32

Source: AF03079-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	930		20	ug/L	1000	9.8 U	93	90-110			

**Matrix Spike (2E12028-MS2)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:47

Source: AF03540-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	1400		20	ug/L	1000	460	98	90-110			

**Matrix Spike Dup (2E12028-MSD1)**

Prepared: 05/12/2022 11:00 Analyzed: 05/13/2022 10:34

Source: AF03079-01

Analyte	Result	Flag	PQL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Ammonia as N	950		20	ug/L	1000	9.8 U	95	90-110	2	10	

**FLAGS/NOTES AND DEFINITIONS**

<b>PQL</b>	PQL: Practical Quantitation Limit. The PQL presented is the laboratory MRL.
<b>B</b>	Results are based upon membrane filter colony counts that are outside the method indicated ideal range.
<b>I</b>	The reported value is between the laboratory method detection limit (MDL) and the practical quantitation limit (PQL).
<b>J</b>	Estimated value.
<b>K</b>	Off-scale low; Actual value is known to be less than the value given.
<b>L</b>	Off-scale high; Actual value is known to be greater than value given.
<b>M</b>	Presence of analyte is verified but not quantified; the actual value is less than the MRL but greater than the MDL.
<b>N</b>	Presumptive evidence of presence of material.
<b>O</b>	Sampled, but analysis lost or not performed.
<b>Q</b>	Sample exceeded the accepted holding time.
<b>T</b>	Value reported is less than the laboratory method detection limit. The value is reported for informational purposes only and shall not be used in statistical analysis.
<b>U</b>	Indicates that the compound was analyzed for but not detected.
<b>V</b>	Indicates that the analyte was detected in both the sample and the associated method blank.
<b>Y</b>	The laboratory analysis was from an improperly preserved sample. The data may not be accurate.
<b>Z</b>	Too many colonies were present (TNTC); the numeric value represents the filtration volume.
<b>?</b>	Data are rejected and should not be used. Some or all of the quality control data for the analyte were outside criteria, and the presence or absence of the analyte cannot be determined from the data.
<b>*</b>	Not reported due to interference.
<b>[CALC]</b>	Calculated analyte - MDL/MRL reported to the highest reporting limit of the component analyses.
<b>QM-07</b>	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
<b>QS-03</b>	Surrogate recovery outside acceptance limits

Adam Slater

AF03378



CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD

COC No. \_\_\_\_\_ Page: 1 of 1  
 PO No. 138224 Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase: \_\_\_\_\_  
 Send Invoice To: Instructions in MSA # 195-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Amentt Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Amentt Jennings  
 Deliver Samples To: ENCO Site-Specific WS #15 from QAPP: 15-39

Project Name: NASA KSC  
 Site Location: Industrial Area IDW  
 TO No.: 80KSC019F0071 AECOM Project Manager: Chris Marshall  
 Sampler/Phone #: Greg Kusel / (772) 631-7426 Dustin Slater / (407) 766-0747  
 Lab Name: ENCO Turnaround Time(specify): Standard 14 day

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Sample Analysis Requested (Enter number of containers for each test)							Comments
								(3)	HCL	4 DEG C	H2SO4 <2	4 DEG C	HNO3 <2	H2SO4 <2	
	IA-IDW01-20220512	IA-IDW01	20220512	1315	IDW	IDW	G	11	3	2	2	2	1	1	
	IA-TB01-20220512	IA-TB01	20220512	1300	WQ	TB	G	2	2						

Field Comments:	Lab Comments:	Sample Shipment and Delivery Details
Report only per QAPP WS #15-39		Number of coolers in shipment: _____
Relinquished by (signature)	Received by (signature)	Samples Iced?(check) Yes ___ No ___
1 <i>[Signature]</i>	1 <i>[Signature]</i>	Shipping Company: _____
2 <i>[Signature]</i>	2 <i>[Signature]</i>	Tracking No: _____
3	3	Date Shipped: _____

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water  
 (2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk  
 (3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4=Phosphoric acid, H3PO4 <2=Adjust to pH <2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=Sodium thiosulfate, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH >9 with sodium hydroxide, VitC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C If NO preservative added leave blank

SMA-413 O.3pc

June 02, 2022

Kaitlin Dylnicki  
Environmental Conservation Laboratories, Inc.  
10775 Central Port Drive  
Orlando, Florida 32824

Re: NASA PFAS - Dylnicki  
Work Order: 579915  
SDG: AF03378

Dear Kaitlin Dylnicki:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on May 13, 2022. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Test results for NELAP or ISO 17025 accredited tests are verified to meet the requirements of those standards, with any exceptions noted. The results reported relate only to the items tested and to the sample as received by the laboratory. These results may not be reproduced except as full reports without approval by the laboratory. Copies of GEL's accreditations and certifications can be found on our website at [www.gel.com](http://www.gel.com).

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 1614.

Sincerely,

Delaney Stone  
Project Manager

Purchase Order: GELP20-0372  
Enclosures



## GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

### Certificate of Analysis Report for

ENCL001 Environmental Conservation Laboratories

Client SDG: AF03378 GEL Work Order: 579915

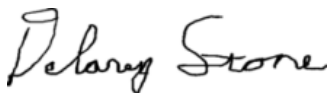
**The Qualifiers in this report are defined as follows:**

- \* A quality control analyte recovery is outside of specified acceptance criteria
- \*\* Analyte is a Tracer compound
- \*\* Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Delaney Stone.



Reviewed by \_\_\_\_\_

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: June 2, 2022

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW01-20220512      Project: ENCL00421  
Sample ID: 579915001      Client ID: ENCL001  
Matrix: Water  
Collect Date: 12-MAY-22 13:15  
Receive Date: 13-MAY-22  
Collector: Client

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
<b>LCMSMS PFCs</b>												
<b>EPA 537.1 Mod PFCs by LC-MS/MS "As Received"</b>												
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	U	ND	0.000620	0.00177	ug/L	0.0188	1	JLS	05/19/22	2037	2266747	1
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	U	ND	0.000620	0.00188	ug/L	0.0188	1					
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	U	ND	0.000620	0.00175	ug/L	0.0188	1					
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	U	ND	0.00124	0.00376	ug/L	0.0188	1					
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	U	ND	0.00124	0.00376	ug/L	0.0188	1					
Perfluorobutane sulfonic acid (PFBS)		0.00232	0.000620	0.00167	ug/L	0.0188	1					
Perfluorodecanoic acid (PFDA)	U	ND	0.000732	0.00188	ug/L	0.0188	1					
Perfluorododecanoic acid (PFDOA)	U	ND	0.000620	0.00188	ug/L	0.0188	1					
Perfluoroheptanoic acid (PFHpA)		0.00462	0.000620	0.00188	ug/L	0.0188	1					
Perfluorohexane sulfonic acid (PFHxS)		0.0128	0.000620	0.00171	ug/L	0.0188	1					
Perfluorohexanoic acid (PFHxA)		0.00725	0.000751	0.00188	ug/L	0.0188	1					
Perfluorononanoic acid (PFNA)	U	ND	0.000620	0.00188	ug/L	0.0188	1					
Perfluorooctane sulfonic acid (PFOS)		0.0208	0.000751	0.00188	ug/L	0.0188	1					
Perfluorooctanoic acid (PFOA)		0.0154	0.000751	0.00188	ug/L	0.0188	1					
Perfluorotetradecanoic acid (PFTDA)	U	ND	0.000751	0.00188	ug/L	0.0188	1					
Perfluorotridecanoic acid (PFTTrDA)	U	ND	0.000620	0.00188	ug/L	0.0188	1					
Perfluoroundecanoic acid (PFUnDA)	U	ND	0.000620	0.00188	ug/L	0.0188	1					
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	U	ND	0.000620	0.00188	ug/L	0.0188	1					

The following Prep Methods were performed:

Method	Description	Analyst	Date	Time	Prep Batch
EPA 537.1 Mod, PFAS, Compl PFCs Extraction in Liquid		MM3	05/17/22	1102	2266743

# GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

## Certificate of Analysis

Report Date: June 2, 2022

Company : Environmental Conservation Laboratories, Inc.  
Address : 10775 Central Port Drive

Orlando, Florida 32824  
Contact: Kaitlin Dylnicki  
Project: NASA PFAS - Dylnicki

Client Sample ID: IA-IDW01-20220512  
Sample ID: 579915001

Project: ENCL00421  
Client ID: ENCL001

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time Batch	Method
The following Analytical Methods were performed:											
Method	Description		Analyst Comments								
1	EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15										

### Notes:

#### Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

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## QC Summary

Report Date: June 2, 2022

Page 1 of 5

Environmental Conservation Laboratories, Inc.

10775 Central Port Drive

Orlando, Florida

Contact: Kaitlin Dylnicki

Workorder: 579915

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2266747										
QC1205093480	LCS										
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0198			0.0200	ug/L		101	(59%-144%)	JLS	05/19/22	15:56
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0210			0.0203	ug/L		97	(67%-136%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0195			0.0187	ug/L		96	(68%-135%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0210			0.0216	ug/L		103	(67%-144%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0210			0.0230	ug/L		109	(57%-139%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0210			0.0220	ug/L		105	(59%-145%)			
Perfluorobutane sulfonic acid (PFBS)	0.0186			0.0189	ug/L		102	(70%-144%)			
Perfluorodecanoic acid (PFDA)	0.0210			0.0198	ug/L		94	(65%-145%)			
Perfluorododecanoic acid (PFDOA)	0.0210			0.0218	ug/L		104	(65%-137%)			
Perfluoroheptanoic acid (PFHpA)	0.0210			0.0213	ug/L		101	(71%-133%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0191			0.0234	ug/L		123	(67%-145%)			
Perfluorohexanoic acid (PFHxA)	0.0210			0.0242	ug/L		115	(70%-138%)			
Perfluorononanoic acid (PFNA)	0.0210			0.0212	ug/L		101	(69%-133%)			
Perfluorooctane sulfonic acid (PFOS)	0.0210			0.0213	ug/L		101	(65%-145%)			

# GEL LABORATORIES LLC

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## QC Summary

Workorder: 579915

Page 2 of 5

Parname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2266747										
Perfluorooctanoic acid (PFOA)	0.0210			0.0221	ug/L		105	(66%-139%)	JLS	05/19/22	15:56
Perfluorotetradecanoic acid (PFTDA)	0.0210			0.0207	ug/L		99	(66%-138%)			
Perfluorotridecanoic acid (PFTTrDA)	0.0210			0.0220	ug/L		105	(58%-140%)			
Perfluoroundecanoic acid (PFUnDA)	0.0210			0.0207	ug/L		99	(63%-135%)			
QC1205093481 LCSD											
11-Chloroeicosfluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)	0.0196			0.0169	ug/L	17	86	(0%-27%)		05/19/22	16:23
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	0.0208			0.0186	ug/L	9	90	(0%-26%)			
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)	0.0194			0.0172	ug/L	8	89	(0%-26%)			
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)	0.0208			0.0229	ug/L	6	110	(0%-25%)			
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)	0.0208			0.0213	ug/L	8	102	(0%-27%)			
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)	0.0208			0.0201	ug/L	9	97	(0%-27%)			
Perfluorobutane sulfonic acid (PFBS)	0.0184			0.0179	ug/L	5	98	(0%-35%)			
Perfluorodecanoic acid (PFDA)	0.0208			0.0211	ug/L	6	102	(0%-26%)			
Perfluorododecanoic acid (PFDOA)	0.0208			0.0214	ug/L	2	103	(0%-26%)			
Perfluoroheptanoic acid (PFHpA)	0.0208			0.0237	ug/L	11	114	(0%-23%)			
Perfluorohexane sulfonic acid (PFHxS)	0.0190			0.0209	ug/L	11	110	(0%-27%)			

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## QC Summary

Workorder: 579915

Page 3 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2266747										
Perfluorohexanoic acid (PFHxA)	0.0208			0.0221	ug/L	9	106	(0%-27%)	JLS	05/19/22	16:23
Perfluorononanoic acid (PFNA)	0.0208			0.0216	ug/L	2	104	(0%-25%)			
Perfluorooctane sulfonic acid (PFOS)	0.0208			0.0185	ug/L	14	89	(0%-25%)			
Perfluorooctanoic acid (PFOA)	0.0208			0.0217	ug/L	2	104	(0%-27%)			
Perfluorotetradecanoic acid (PFTDA)	0.0208			0.0220	ug/L	6	106	(0%-26%)			
Perfluorotridecanoic acid (PFTTrDA)	0.0208			0.0220	ug/L	0	106	(0%-31%)			
Perfluoroundecanoic acid (PFUnDA)	0.0208			0.0227	ug/L	9	109	(0%-30%)			
QC1205093479 MB											
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11-Cl-PF3OUdS)			U	ND	ug/L					05/19/22	15:47
4,8-Dioxa-3H-perfluorononanoic acid (DONA)			U	ND	ug/L						
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9-Cl-PF3ONS)			U	ND	ug/L						
Hexafluoropropyleneoxide dimer acid (HFPO-DA)(Gen-X)			U	ND	ug/L						
N-Ethylperfluorooctane sulfonamido acetic acid (NEtFOSAA)			U	ND	ug/L						
N-Methylperfluorooctane sulfonamido acetic acid (NMeFOSAA)			U	ND	ug/L						
Perfluorobutane sulfonic acid (PFBS)			U	ND	ug/L						
Perfluorodecanoic acid (PFDA)			U	ND	ug/L						

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## QC Summary

Workorder: 579915

Page 4 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
<b>Perfluorinated Compounds</b>											
Batch	2266747										
Perfluorododecanoic acid (PFDOA)			U	ND	ug/L				JLS	05/19/22	15:47
Perfluoroheptanoic acid (PFHpA)			U	ND	ug/L						
Perfluorohexane sulfonic acid (PFHxS)			U	ND	ug/L						
Perfluorohexanoic acid (PFHxA)			U	ND	ug/L						
Perfluorononanoic acid (PFNA)			U	ND	ug/L						
Perfluorooctane sulfonic acid (PFOS)			U	ND	ug/L						
Perfluorooctanoic acid (PFOA)			U	ND	ug/L						
Perfluorotetradecanoic acid (PFTDA)			U	ND	ug/L						
Perfluorotridecanoic acid (PFTTrDA)			U	ND	ug/L						
Perfluoroundecanoic acid (PFUnDA)			U	ND	ug/L						

### Notes:

The Qualifiers in this report are defined as follows:

- \*\* Analyte is a surrogate compound
- < Result is less than value reported
- > Result is greater than value reported
- A The TIC is a suspected aldol-condensation product
- B The target analyte was detected in the associated blank.
- C Analyte has been confirmed by GC/MS analysis
- D Results are reported from a diluted aliquot of the sample
- E Concentration of the target analyte exceeds the instrument calibration range
- I The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.
- J The reported value is greater than or equal to the laboratory method detection limit but less than the laboratory practical quantitation limit.

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## QC Summary

Workorder: 579915

Page 5 of 5

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
JNX	Non Calibrated Compound										
N	Organics--Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor										
N	Presumptive evidence based on mass spectral library search to make a tentative identification of the analyte (TIC). Quantitation is based on nearest internal standard response factor										
N/A	RPD or %Recovery limits do not apply.										
N1	See case narrative										
ND	Analyte concentration is not detected above the detection limit										
NJ	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
P	Organics--The concentrations between the primary and confirmation columns/detectors is >40% different. For HPLC, the difference is >70%.										
Q	One or more quality control criteria have not been met. Refer to the applicable narrative or DER.										
Q	Sample held beyond the accepted holding time. This code shall be used if the value is derived from a sample that was prepared or analyzed after the approved holding time restrictions for sample preparation or analysis.										
R	Sample results are rejected										
U	Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.										
UJ	Compound cannot be extracted										
X	Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier										
Y	QC Samples were not spiked with this compound										
^	RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.										

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.

^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where the duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

\* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.



**LCMSMS-Misc  
Technical Case Narrative  
Environmental Conservation Laboratories  
SDG #: AF03378  
Work Order #: 579915**

**Product:** The Extraction and Analysis of Per and Polyfluoroalkyl Substances Using LCMSMS

**Analytical Method:** EPA 537.1 Mod, PFAS, Compliant with QSM Table B-15

**Analytical Procedure:** GL-OA-E-076 REV# 12

**Analytical Batches:** 2266747 and 2266743

The following samples were analyzed using the above methods and analytical procedure(s).

<b><u>GEL Sample ID#</u></b>	<b><u>Client Sample Identification</u></b>
579915001	IA-IDW01-20220512
1205093479	Method Blank (MB)
1205093480	Laboratory Control Sample (LCS)
1205093481	Laboratory Control Sample Duplicate (LCSD)

The samples in this SDG were analyzed on an "as received" basis.

**Data Summary:**

All sample data provided in this report met the acceptance criteria specified in the analytical methods and procedures for initial calibration, continuing calibration, instrument controls and process controls where applicable, with the following exceptions.

**Miscellaneous Information**

**Additional Comments**

Additional sample was not provided for matrix QC.

**Certification Statement**

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless otherwise noted in the analytical case narrative.

SUBCONTRACT ORDER

ENCO Orlando

AF03378

Standard GEL TAT  
579915  
Oko Shaka

**SENDING LABORATORY:**




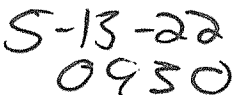
ENCO Orlando  
10775 Central Port Drive  
Orlando, FL 32824  
Phone: 407.826.5314  
Fax: 407.850.6945  
Project Manager: Kaitlin Dylnicki

**RECEIVING LABORATORY:**

GEL Laboratories, Inc. (SC)  
2040 Savage Road  
Charleston, SC 29407  
Phone :(843) 556-8171  
Fax: (843) 766-1178  
Project State of Origin: Florida

Sub Lab ID	Originating Lab ID	Client Matrix	Date Sampled	Sample Comments
	IA-IDW01-20220512	Ground Water	12-May-22 13:15	

Analysis	Due	Expires	Analysis Comments
PFAS	19-May-22 15:00	26-May-22 13:15	14 analyte 537 GELP21-0027
<i>Containers Supplied:</i>			
250mLP (J)	250mLP (K)	5mLV (L)	

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Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_

---

Released By \_\_\_\_\_ Date \_\_\_\_\_ Received By \_\_\_\_\_ Date \_\_\_\_\_



Laboratories LLC

### SAMPLE RECEIPT & REVIEW FORM

<b>Client:</b> <u>LNCL</u>		<b>SDG/AR/COC/Work Order:</b> <u>579915/579923</u>			
<b>Received By:</b> <u>BE</u>		<b>Date Received:</b> <u>5/13/22</u>			
<b>Carrier and Tracking Number</b>		Circle Applicable: FedEx Express <input checked="" type="checkbox"/> FedEx Ground <input type="checkbox"/> UPS <input type="checkbox"/> Field Services <input type="checkbox"/> Courier <input type="checkbox"/> Other <input type="checkbox"/>			
		<u>5583 3250 9070</u>			
<b>Suspected Hazard Information</b>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.			
A) Shipped as a DOT Hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Hazard Class Shipped: _____ UN#: _____ If UN2910, Is the Radioactive Shipment Survey Compliant? Yes___ No___			
B) Did the client designate the samples are to be received as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	COC notation or radioactive stickers on containers equal client designation.			
C) Did the RSO classify the samples as radioactive?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>00</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3			
D) Did the client designate samples are hazardous?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	COC notation or hazard labels on containers equal client designation.			
E) Did the RSO identify possible hazards?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If D or E is yes, select Hazards below: PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:			
Sample Receipt Criteria		Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1	Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2	Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Client contacted and provided COC COC created upon receipt
3	Samples requiring cold preservation within (0 ≤ 6 deg. C)?*	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Preservation Method: <u>Wet Ice</u> <input checked="" type="checkbox"/> Ice Packs Dry ice None Other: *all temperatures are recorded in Celsius <span style="float: right;">TEMP: <u>I</u></span>
4	Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Temperature Device Serial #: <u>IR2-21</u> Secondary Temperature Device Serial # (If Applicable): _____
5	Sample containers intact and sealed?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6	Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Sample ID's and Containers Affected: If Preservation added, Lot#: _____
7	Do any samples require Volatile Analysis?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If Yes, are Encores or Soil Kits present for solids? Yes___ No___ NA___ (If yes, take to VOA Freezer) Do liquid VOA vials contain acid preservation? Yes___ No___ NA___ (If unknown, select No) Are liquid VOA vials free of headspace? Yes___ No___ NA___ Sample ID's and containers affected: _____
8	Samples received within holding time?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and tests affected: _____
9	Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	ID's and containers affected: _____
10	Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No dates on containers No times on containers COC missing info Other (describe)
11	Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: No container count on COC Other (describe)
12	Are sample containers identifiable as GEL provided by use of GEL labels?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Circle Applicable: Not relinquished Other (describe)
Comments (Use Continuation Form if needed):					

PM (or PMA) review: Initials JML Date 5/17/22 Page 1 of 1

**List of current GEL Certifications as of 02 June 2022**

<b>State</b>	<b>Certification</b>
Alabama	42200
Alaska	17-018
Alaska Drinking Water	SC00012
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana Drinking Water	LA024
Louisiana NELAP	03046 (AI33904)
Maine	2019020
Maryland	270
Massachusetts	M-SC012
Massachusetts PFAS Approv	Letter
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122022-4
New Hampshire NELAP	2054
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	2019-165
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S. Carolina Radiochem	10120002
Sanitation Districts of L	9255651
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-22-20
Utah NELAP	SC000122021-36
Vermont	VT87156
Virginia NELAP	460202
Washington	C780



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 11/29/2022 6:46:42 PM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER EHF

## JOB NUMBER

670-9611-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



Generated  
11/29/2022 6:46:42 PM

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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

## Qualifiers

### GC/MS VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count



# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

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**Job ID: 670-9611-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

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**Job Narrative  
670-9611-1**

**Comments**

No additional comments.

**Receipt**

The samples were received on 11/15/2022 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.5° C.

**GC/MS VOA**

Method 8260B: The continuing calibration verification (CCV) associated with batch 670-12318 recovered above the upper control limit for Vinyl chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data has been reported. The associated sample is impacted: (CCVIS 670-12318/3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**VOA Prep**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

**Client Sample ID: EHF-MW0001-025.0-20221115**

**Lab Sample ID: 670-9611-1**

No Detections.

**Client Sample ID: EHF-MW0004-017.5-20221115**

**Lab Sample ID: 670-9611-2**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	5.4		1.0	0.50	ug/L	1		8260B	Total/NA

**Client Sample ID: EHF-MW0005-020.0-20221115**

**Lab Sample ID: 670-9611-3**

No Detections.

**Client Sample ID: EHF-TB01-20221115**

**Lab Sample ID: 670-9611-4**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

**Client Sample ID: EHF-MW0001-025.0-20221115**

**Lab Sample ID: 670-9611-1**

Date Collected: 11/15/22 10:31

Matrix: Water

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 22:57	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		80 - 120		11/23/22 22:57	1
4-Bromofluorobenzene (Surr)	97		80 - 120		11/23/22 22:57	1
Dibromofluoromethane (Surr)	98		80 - 120		11/23/22 22:57	1

**Client Sample ID: EHF-MW0004-017.5-20221115**

**Lab Sample ID: 670-9611-2**

Date Collected: 11/15/22 11:49

Matrix: Water

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	5.4		1.0	0.50	ug/L			11/28/22 15:52	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		80 - 120		11/28/22 15:52	1
4-Bromofluorobenzene (Surr)	97		80 - 120		11/28/22 15:52	1
Dibromofluoromethane (Surr)	93		80 - 120		11/28/22 15:52	1

**Client Sample ID: EHF-MW0005-020.0-20221115**

**Lab Sample ID: 670-9611-3**

Date Collected: 11/15/22 11:10

Matrix: Water

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 23:37	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		11/23/22 23:37	1
4-Bromofluorobenzene (Surr)	97		80 - 120		11/23/22 23:37	1
Dibromofluoromethane (Surr)	99		80 - 120		11/23/22 23:37	1

**Client Sample ID: EHF-TB01-20221115**

**Lab Sample ID: 670-9611-4**

Date Collected: 11/15/22 10:00

Matrix: Water

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 23:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/23/22 23:58	1
4-Bromofluorobenzene (Surr)	97		80 - 120		11/23/22 23:58	1
Dibromofluoromethane (Surr)	100		80 - 120		11/23/22 23:58	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

**Method: 8260B - Volatile Organic Compounds (GC/MS)**

**Matrix: Water**

**Prep Type: Total/NA**

## Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (80-120)	BFB (80-120)	DBFM (80-120)
670-9547-P-1 MS	Matrix Spike	101	98	99
670-9611-1	EHF-MW0001-025.0-20221115	99	97	98
670-9611-2	EHF-MW0004-017.5-20221115	97	97	93
670-9611-3	EHF-MW0005-020.0-20221115	100	97	99
670-9611-4	EHF-TB01-20221115	101	97	100
670-9772-C-1 DU	Duplicate	100	99	97
670-9963-D-1 MS	Matrix Spike	98	95	94
670-9963-D-1 MSD	Matrix Spike Duplicate	99	97	95
LCS 670-12318/4	Lab Control Sample	101	97	99
LCS 670-12445/4	Lab Control Sample	99	98	92
MB 670-12318/6	Method Blank	100	97	99
MB 670-12445/6	Method Blank	96	94	93

### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 670-12318/6**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120					11/23/22 17:31	1
4-Bromofluorobenzene (Surr)	97		80 - 120					11/23/22 17:31	1
Dibromofluoromethane (Surr)	99		80 - 120					11/23/22 17:31	1

**Lab Sample ID: LCS 670-12318/4**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	25.6		ug/L		128	50 - 150
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	101		80 - 120				
4-Bromofluorobenzene (Surr)	97		80 - 120				
Dibromofluoromethane (Surr)	99		80 - 120				

**Lab Sample ID: 670-9547-P-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.50	U	20.0	27.5		ug/L		137	50 - 150
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	101		80 - 120						
4-Bromofluorobenzene (Surr)	98		80 - 120						
Dibromofluoromethane (Surr)	99		80 - 120						

**Lab Sample ID: 670-9772-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 12318**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Vinyl chloride	0.50	U	0.50	U	ug/L		NC	
Surrogate	DU %Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	100		80 - 120					
4-Bromofluorobenzene (Surr)	99		80 - 120					
Dibromofluoromethane (Surr)	97		80 - 120					

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 670-12445/6**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
Toluene-d8 (Surr)	96		80 - 120				11/28/22 11:08	1	
4-Bromofluorobenzene (Surr)	94		80 - 120				11/28/22 11:08	1	
Dibromofluoromethane (Surr)	93		80 - 120				11/28/22 11:08	1	

**Lab Sample ID: LCS 670-12445/4**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Vinyl chloride	20.0	23.7		ug/L		118	50 - 150
Surrogate	%Recovery	Qualifier	Limits				
Toluene-d8 (Surr)	99		80 - 120				
4-Bromofluorobenzene (Surr)	98		80 - 120				
Dibromofluoromethane (Surr)	92		80 - 120				

**Lab Sample ID: 670-9963-D-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample Sample		Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Vinyl chloride	0.50	U	20.0	24.2		ug/L		121	50 - 150
Surrogate	%Recovery	Qualifier	Limits						
Toluene-d8 (Surr)	98		80 - 120						
4-Bromofluorobenzene (Surr)	95		80 - 120						
Dibromofluoromethane (Surr)	94		80 - 120						

**Lab Sample ID: 670-9963-D-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample Sample		Spike Added	MSD MSD		Unit	D	%Rec	%Rec Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Vinyl chloride	0.50	U	20.0	22.8		ug/L		114	50 - 150	6	30
Surrogate	%Recovery	Qualifier	Limits								
Toluene-d8 (Surr)	99		80 - 120								
4-Bromofluorobenzene (Surr)	97		80 - 120								
Dibromofluoromethane (Surr)	95		80 - 120								

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

## GC/MS VOA

### Analysis Batch: 12318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9611-1	EHF-MW0001-025.0-20221115	Total/NA	Water	8260B	
670-9611-3	EHF-MW0005-020.0-20221115	Total/NA	Water	8260B	
670-9611-4	EHF-TB01-20221115	Total/NA	Water	8260B	
MB 670-12318/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12318/4	Lab Control Sample	Total/NA	Water	8260B	
670-9547-P-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9772-C-1 DU	Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 12445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9611-2	EHF-MW0004-017.5-20221115	Total/NA	Water	8260B	
MB 670-12445/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12445/4	Lab Control Sample	Total/NA	Water	8260B	
670-9963-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9963-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

**Client Sample ID: EHF-MW0001-025.0-20221115**

**Lab Sample ID: 670-9611-1**

Date Collected: 11/15/22 10:31

Matrix: Water

Date Received: 11/15/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 22:57

**Client Sample ID: EHF-MW0004-017.5-20221115**

**Lab Sample ID: 670-9611-2**

Date Collected: 11/15/22 11:49

Matrix: Water

Date Received: 11/15/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12445	K1P	EET ORL	11/28/22 15:52

**Client Sample ID: EHF-MW0005-020.0-20221115**

**Lab Sample ID: 670-9611-3**

Date Collected: 11/15/22 11:10

Matrix: Water

Date Received: 11/15/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 23:37

**Client Sample ID: EHF-TB01-20221115**

**Lab Sample ID: 670-9611-4**

Date Collected: 11/15/22 10:00

Matrix: Water

Date Received: 11/15/22 15:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 23:58

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9611-1  
SDG: EHF

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-9611-1	EHF-MW0001-025.0-20221115	Water	11/15/22 10:31	11/15/22 15:30
670-9611-2	EHF-MW0004-017.5-20221115	Water	11/15/22 11:49	11/15/22 15:30
670-9611-3	EHF-MW0005-020.0-20221115	Water	11/15/22 11:10	11/15/22 15:30
670-9611-4	EHF-TB01-20221115	Water	11/15/22 10:00	11/15/22 15:30

1

2

3

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15

# Chain of Custody Record



<b>Client Information</b>		Lab PM: <u>Dylnicki, Kaitlin</u>		Carrier Tracking No(s): <u>670-2831-1007.1</u>	
Client Contact: <u>Teresa Ament Jennings</u>		E-Mail: <u>kaitlin.dylnicki@et.eurofins.com</u>		State of Origin:	
Company: <u>AECOM Technical Services Inc.</u>		PWSID:		Page: <u>1 of 1</u>	
Address: <u>150 North Orange Avenue Suite 200</u>		Due Date Requested:		Job #:	
City: <u>Orlando</u>		TAT Requested (days):		Preservation Codes:	
State, Zip: <u>FL, 32801</u>		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Y - Trizma Z - other (specify)	
Phone: <u>919-461-1282(Tel)</u>		PO #: <u>138224</u>		Other:	
Email: <u>teresa.ament.jennings@aecom.com</u>		W/O #: <u>60610905</u>			
Project Name: <u>NASA KSC Industrial Area</u>		Project #: <u>67001282</u>			
Site:		SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, AAU)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) VC	Total Number of Containers	Special Instructions/Note:
EHF-MW0001-025.0-20221115	11/15/22	1031	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A		
EHF-MW0004-017.5-20221115	11/15/22	1149	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 3		
EHF-MW0005-020.0-20221115	11/15/22	1110	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 3		
EHF-TB41-20221115	11/15/22	1000	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 2		

670-9611 Chain of Custody

<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological	
Deliverable Requested: I, II, III, IV, Other (specify)	
Empty Kit Relinquished by:	
Relinquished by: <u>Dylnicki, Kaitlin</u>	Date: <u>11/15/22 @ 1550</u>
Relinquished by:	Date/Time:
Relinquished by:	Date/Time:
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	
Cooler Temperature(s) °C and Other Remarks: <u>4.5</u>	

Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month ) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Special Instructions/QC Requirements:	
Method of Shipment:	
Received by: <u>AV</u>	Date/Time: <u>11/15/22 1530</u>
Received by:	Date/Time:
Received by:	Date/Time:
Cooler Temperature(s) °C and Other Remarks:	



# Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-9611-1

SDG Number: EHF

**Login Number: 9611**

**List Number: 1**

**Creator: Hartley, Tyler**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is < /= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is < 6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 11/29/2022 1:42:36 PM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER Engineering Delvelopment Laboratory

## JOB NUMBER

670-9604-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



Generated  
11/29/2022 1:42:36 PM

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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

## Qualifiers

### GC/MS VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

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**Job ID: 670-9604-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative**  
**670-9604-1**

**Comments**

No additional comments.

**Receipt**

The samples were received on 11/15/2022 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.5° C.

**GC/MS VOA**

Method 8260B: The continuing calibration verification (CCV) associated with batch 670-12318 recovered above the upper control limit for Vinyl chloride. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data has been reported. The associated sample is impacted: (CCVIS 670-12318/3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

**VOA Prep**

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.



# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

## Client Sample ID: EDL-MW0004-035.0-20221115

## Lab Sample ID: 670-9604-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.1		1.0	0.50	ug/L	1		8260B	Total/NA

## Client Sample ID: EDL-MW0006R-035.0-20221115

## Lab Sample ID: 670-9604-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	1.5		1.0	0.50	ug/L	1		8260B	Total/NA

## Client Sample ID: EDL-TB-202211

## Lab Sample ID: 670-9604-3

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-MW0004-035.0-20221115**

**Lab Sample ID: 670-9604-1**

Date Collected: 11/15/22 13:00

Matrix: WG

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	2.1		1.0	0.50	ug/L			11/28/22 15:01	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		80 - 120		11/28/22 15:01	1
4-Bromofluorobenzene (Surr)	95		80 - 120		11/28/22 15:01	1
Dibromofluoromethane (Surr)	93		80 - 120		11/28/22 15:01	1

**Client Sample ID: EDL-MW0006R-035.0-20221115**

**Lab Sample ID: 670-9604-2**

Date Collected: 11/15/22 13:36

Matrix: WG

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.5		1.0	0.50	ug/L			11/28/22 15:18	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	96		80 - 120		11/28/22 15:18	1
4-Bromofluorobenzene (Surr)	95		80 - 120		11/28/22 15:18	1
Dibromofluoromethane (Surr)	95		80 - 120		11/28/22 15:18	1

**Client Sample ID: EDL-TB-202211**

**Lab Sample ID: 670-9604-3**

Date Collected: 11/15/22 12:30

Matrix: WQ

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 20:14	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		80 - 120		11/23/22 20:14	1
4-Bromofluorobenzene (Surr)	99		80 - 120		11/23/22 20:14	1
Dibromofluoromethane (Surr)	99		80 - 120		11/23/22 20:14	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (80-120)	BFB (80-120)	DBFM (80-120)
670-9547-P-1 MS	Matrix Spike	101	98	99
670-9772-C-1 DU	Duplicate	100	99	97
670-9963-D-1 MS	Matrix Spike	98	95	94
670-9963-D-1 MSD	Matrix Spike Duplicate	99	97	95
LCS 670-12318/4	Lab Control Sample	101	97	99
LCS 670-12445/4	Lab Control Sample	99	98	92
MB 670-12318/6	Method Blank	100	97	99
MB 670-12445/6	Method Blank	96	94	93

#### Surrogate Legend

TOL = Toluene-d8 (Surr)  
BFB = 4-Bromofluorobenzene (Surr)  
DBFM = Dibromofluoromethane (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: WG

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (80-120)	BFB (80-120)	DBFM (80-120)
670-9604-1	EDL-MW0004-035.0-20221115	99	95	93
670-9604-2	EDL-MW0006R-035.0-20221115	96	95	95

#### Surrogate Legend

TOL = Toluene-d8 (Surr)  
BFB = 4-Bromofluorobenzene (Surr)  
DBFM = Dibromofluoromethane (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: WQ

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (80-120)	BFB (80-120)	DBFM (80-120)
670-9604-3	EDL-TB-202211	99	99	99

#### Surrogate Legend

TOL = Toluene-d8 (Surr)  
BFB = 4-Bromofluorobenzene (Surr)  
DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Delvelopment Laboratory

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 670-12318/6**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120					11/23/22 17:31	1
4-Bromofluorobenzene (Surr)	97		80 - 120					11/23/22 17:31	1
Dibromofluoromethane (Surr)	99		80 - 120					11/23/22 17:31	1

**Lab Sample ID: LCS 670-12318/4**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	25.6		ug/L		128	50 - 150
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	101		80 - 120				
4-Bromofluorobenzene (Surr)	97		80 - 120				
Dibromofluoromethane (Surr)	99		80 - 120				

**Lab Sample ID: 670-9547-P-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.50	U	20.0	27.5		ug/L		137	50 - 150
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	101		80 - 120						
4-Bromofluorobenzene (Surr)	98		80 - 120						
Dibromofluoromethane (Surr)	99		80 - 120						

**Lab Sample ID: 670-9772-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 12318**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Vinyl chloride	0.50	U	0.50	U	ug/L		NC	
Surrogate	DU %Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	100		80 - 120					
4-Bromofluorobenzene (Surr)	99		80 - 120					
Dibromofluoromethane (Surr)	97		80 - 120					

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Delvelopment Laboratory

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: MB 670-12445/6**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	96		80 - 120					11/28/22 11:08	1
4-Bromofluorobenzene (Surr)	94		80 - 120					11/28/22 11:08	1
Dibromofluoromethane (Surr)	93		80 - 120					11/28/22 11:08	1

**Lab Sample ID: LCS 670-12445/4**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	23.7		ug/L		118	50 - 150
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	99		80 - 120				
4-Bromofluorobenzene (Surr)	98		80 - 120				
Dibromofluoromethane (Surr)	92		80 - 120				

**Lab Sample ID: 670-9963-D-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.50	U	20.0	24.2		ug/L		121	50 - 150
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	98		80 - 120						
4-Bromofluorobenzene (Surr)	95		80 - 120						
Dibromofluoromethane (Surr)	94		80 - 120						

**Lab Sample ID: 670-9963-D-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	Limit
Vinyl chloride	0.50	U	20.0	22.8		ug/L		114	50 - 150	6	30
Surrogate	MSD %Recovery	MSD Qualifier	Limits								
Toluene-d8 (Surr)	99		80 - 120								
4-Bromofluorobenzene (Surr)	97		80 - 120								
Dibromofluoromethane (Surr)	95		80 - 120								

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Delvelopment Laboratory

## GC/MS VOA

### Analysis Batch: 12318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9604-3	EDL-TB-202211	Total/NA	WQ	8260B	
MB 670-12318/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12318/4	Lab Control Sample	Total/NA	Water	8260B	
670-9547-P-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9772-C-1 DU	Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 12445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9604-1	EDL-MW0004-035.0-20221115	Total/NA	WG	8260B	
670-9604-2	EDL-MW0006R-035.0-20221115	Total/NA	WG	8260B	
MB 670-12445/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12445/4	Lab Control Sample	Total/NA	Water	8260B	
670-9963-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9963-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	



# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-MW0004-035.0-20221115**

**Lab Sample ID: 670-9604-1**

**Date Collected: 11/15/22 13:00**

**Matrix: WG**

**Date Received: 11/15/22 15:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12445	K1P	EET ORL	11/28/22 15:01

**Client Sample ID: EDL-MW0006R-035.0-20221115**

**Lab Sample ID: 670-9604-2**

**Date Collected: 11/15/22 13:36**

**Matrix: WG**

**Date Received: 11/15/22 15:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12445	K1P	EET ORL	11/28/22 15:18

**Client Sample ID: EDL-TB-202211**

**Lab Sample ID: 670-9604-3**

**Date Collected: 11/15/22 12:30**

**Matrix: WQ**

**Date Received: 11/15/22 15:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 20:14

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

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# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9604-1  
SDG: Engineering Development Laboratory

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-9604-1	EDL-MW0004-035.0-20221115	WG	11/15/22 13:00	11/15/22 15:30
670-9604-2	EDL-MW0006R-035.0-20221115	WG	11/15/22 13:36	11/15/22 15:30
670-9604-3	EDL-TB-202211	WQ	11/15/22 12:30	11/15/22 15:30

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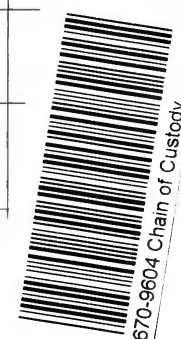
15

**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Engineering Development Laboratory  
 TO No.: 80KSC019F0071  
 AECOM Project Manager: **Chris Marshall cc: Greg Kusel**  
 Greg Kusel / (772) 631-7426

COC No. \_\_\_\_\_ Page: 1 of 1  
 Project No. 60610905.Subs 2021-23-Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Samples To: Eurofins Orlando Site-Specific WS# 15 from QAPP: 15-36

**Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Comments
EDL-MW0004-035.0-20221115	EDL-MW0004		20221115	1300	WG	N	G	3		
EDL-MW0006R-035.0-20221115	EDL-MW0006R		20221115	1336	WG	N	G	3		
EDL-TB-202211	EDL-TB		20221115	1330	WQ	TB	G	2	Vinyl chloride by SW8260B	
										

**Field Comments:**  
 Report only per QAPP WS #15-36

**Lab Comments:**  
 4.5  
 Received by (signature) \_\_\_\_\_  
 Date 11/15/22 Time 1550  
 Date 11/15/22 Time 1530  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW Water, IDW=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Tissue quality control, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2 3/gal=Add 3 mL 10% sodium thiosulfate per gal, Na2O3S2 4/4oz=4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12=Adjust to pH > 12 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VRC 0.6/500=0.6 g of ascorbic acid to 500mL, ZnAct 2/500=Add 2 mL of zinc acetate to 500mL, ZnAct+NaOH >9=Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank

Rev 8/19

## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-9604-1

SDG Number: Engineering Development Laboratory

**Login Number: 9604**

**List Number: 1**

**Creator: Hartley, Tyler**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 11/23/2022 11:06:33 AM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER GSSP

## JOB NUMBER

670-9210-1



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

### GC/MS Semi VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
⌘	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

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**Job ID: 670-9210-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative  
670-9210-1**

**Receipt**

The samples were received on 11/9/2022 8:20 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.3°C

**GC/MS VOA**

Method 8260B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-11690 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

Method 8260B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-11756 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

**GC/MS Semi VOA**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0034-006.0-20221108**

**Lab Sample ID: 670-9210-1**

No Detections.

**Client Sample ID: GSSP-MW0035-020-20221108**

**Lab Sample ID: 670-9210-2**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.9		1.0	0.50	ug/L	1		8260B	Total/NA

**Client Sample ID: GSSP-MW0053-020.0-20221108**

**Lab Sample ID: 670-9210-3**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	75		1.0	0.50	ug/L	1		8260B	Total/NA

**Client Sample ID: GSSP-MW0059-018.5-20221108**

**Lab Sample ID: 670-9210-4**

No Detections.

**Client Sample ID: GSSP-MW0060-012.5-20221108**

**Lab Sample ID: 670-9210-5**

No Detections.

**Client Sample ID: GSSP-MW0061-018.5-20221108**

**Lab Sample ID: 670-9210-6**

No Detections.

**Client Sample ID: GSSP-MW0062-012.5-20221108**

**Lab Sample ID: 670-9210-7**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	5.6		1.0	0.50	ug/L	1		8260B	Total/NA

**Client Sample ID: GSSP-MW0063-018.5-20221108**

**Lab Sample ID: 670-9210-8**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.74	I	1.0	0.50	ug/L	1		8260B	Total/NA

**Client Sample ID: GSSP- TB01-20221108**

**Lab Sample ID: 670-9210-9**

No Detections.

**Client Sample ID: GSSP-MW0036-035.0-20221108**

**Lab Sample ID: 670-9210-10**

No Detections.

**Client Sample ID: GSSP-MW0024R-020.0-20221108**

**Lab Sample ID: 670-9210-11**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Naphthalene	18		0.18	0.091	ug/L	1		8270D SIM	Total/NA

**Client Sample ID: GSSP-MW0013-003.5-20221108**

**Lab Sample ID: 670-9210-12**

No Detections.

**Client Sample ID: GSSP-MW0019-020.0-20221108**

**Lab Sample ID: 670-9210-13**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
cis-1,2-Dichloroethene	0.78	I	1.0	0.50	ug/L	1		8260B	Total/NA
trans-1,2-Dichloroethene	0.74	I	1.0	0.50	ug/L	1		8260B	Total/NA
Vinyl chloride	93		1.0	0.50	ug/L	1		8260B	Total/NA

This Detection Summary does not include radiochemical test results.

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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0020-030.0-20221108**

**Lab Sample ID: 670-9210-14**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
trans-1,2-Dichloroethene	1.5		1.0	0.50	ug/L	1		8260B	Total/NA
Vinyl chloride	230		5.0	2.5	ug/L	5		8260B	Total/NA

**Client Sample ID: GSSP-MW0044R-030.0-20221108**

**Lab Sample ID: 670-9210-15**

No Detections.

This Detection Summary does not include radiochemical test results.

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0034-006.0-20221108**

**Lab Sample ID: 670-9210-1**

Date Collected: 11/08/22 12:30

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:29	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:29	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:29	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:29	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 20:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		11/18/22 20:29	1

**Client Sample ID: GSSP-MW0035-020-20221108**

**Lab Sample ID: 670-9210-2**

Date Collected: 11/08/22 12:56

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:46	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:46	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:46	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 20:46	1
Vinyl chloride	2.9		1.0	0.50	ug/L			11/18/22 20:46	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	96		80 - 120		11/18/22 20:46	1

**Method: SW846 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.091	U	0.18	0.091	ug/L		11/09/22 15:33	11/20/22 12:15	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-methylnaphthalene-d10	73		50 - 170	11/09/22 15:33	11/20/22 12:15	1
Fluoranthene-d10 (Surr)	67		50 - 170	11/09/22 15:33	11/20/22 12:15	1

**Client Sample ID: GSSP-MW0053-020.0-20221108**

**Lab Sample ID: 670-9210-3**

Date Collected: 11/08/22 14:11

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:03	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:03	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:03	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:03	1
Vinyl chloride	75		1.0	0.50	ug/L			11/18/22 21:03	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		80 - 120		11/18/22 21:03	1

**Method: SW846 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.091	U	0.18	0.091	ug/L		11/09/22 15:33	11/20/22 12:34	1

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Client Sample ID: GSSP-MW0053-020.0-20221108

Date Collected: 11/08/22 14:11  
Date Received: 11/09/22 08:20

## Lab Sample ID: 670-9210-3

Matrix: Ground Water

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-methylnaphthalene-d10	103		50 - 170	11/09/22 15:33	11/20/22 12:34	1
Fluoranthene-d10 (Surr)	89		50 - 170	11/09/22 15:33	11/20/22 12:34	1

## Client Sample ID: GSSP-MW0059-018.5-20221108

Date Collected: 11/08/22 12:54  
Date Received: 11/09/22 08:20

## Lab Sample ID: 670-9210-4

Matrix: Ground Water

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 20:53	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 20:53	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 20:53	1
Trichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 20:53	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L	-		11/18/22 20:53	1
<hr/>									
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
Toluene-d8 (Surr)	101		80 - 120		11/18/22 20:53	1			

## Client Sample ID: GSSP-MW0060-012.5-20221108

Date Collected: 11/08/22 13:30  
Date Received: 11/09/22 08:20

## Lab Sample ID: 670-9210-5

Matrix: Ground Water

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:11	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:11	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:11	1
Trichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:11	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:11	1
<hr/>									
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
Toluene-d8 (Surr)	102		80 - 120		11/18/22 21:11	1			

## Client Sample ID: GSSP-MW0061-018.5-20221108

Date Collected: 11/08/22 14:04  
Date Received: 11/09/22 08:20

## Lab Sample ID: 670-9210-6

Matrix: Ground Water

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:28	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:28	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:28	1
Trichloroethene	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:28	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L	-		11/18/22 21:28	1
<hr/>									
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
Toluene-d8 (Surr)	102		80 - 120		11/18/22 21:28	1			

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0062-012.5-20221108**

**Lab Sample ID: 670-9210-7**

Date Collected: 11/08/22 11:05

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:45	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:45	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:45	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 21:45	1
<b>Vinyl chloride</b>	<b>5.6</b>		1.0	0.50	ug/L			11/18/22 21:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/18/22 21:45	1

**Client Sample ID: GSSP-MW0063-018.5-20221108**

**Lab Sample ID: 670-9210-8**

Date Collected: 11/08/22 12:13

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:02	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:02	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:02	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:02	1
<b>Vinyl chloride</b>	<b>0.74</b>	<b>I</b>	1.0	0.50	ug/L			11/18/22 22:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120		11/18/22 22:02	1

**Client Sample ID: GSSP- TB01-20221108**

**Lab Sample ID: 670-9210-9**

Date Collected: 11/08/22 07:00

Matrix: Trip Blank

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:19	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:19	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:19	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:19	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 22:19	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/18/22 22:19	1

**Client Sample ID: GSSP-MW0036-035.0-20221108**

**Lab Sample ID: 670-9210-10**

Date Collected: 11/08/22 12:07

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:36	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:36	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:36	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:36	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 22:36	1

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0036-035.0-20221108**

**Lab Sample ID: 670-9210-10**

Date Collected: 11/08/22 12:07

Matrix: Ground Water

Date Received: 11/09/22 08:20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/18/22 22:36	1

**Client Sample ID: GSSP-MW0024R-020.0-20221108**

**Lab Sample ID: 670-9210-11**

Date Collected: 11/08/22 13:37

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:54	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:54	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:54	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 22:54	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 22:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/18/22 22:54	1

**Method: SW846 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	18		0.18	0.091	ug/L		11/09/22 15:33	11/20/22 12:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-methylnaphthalene-d10	132		50 - 170	11/09/22 15:33	11/20/22 12:54	1
Fluoranthene-d10 (Surr)	123		50 - 170	11/09/22 15:33	11/20/22 12:54	1

**Client Sample ID: GSSP-MW0013-003.5-20221108**

**Lab Sample ID: 670-9210-12**

Date Collected: 11/08/22 14:41

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:11	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:11	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:11	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:11	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 23:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		11/18/22 23:11	1

**Client Sample ID: GSSP-MW0019-020.0-20221108**

**Lab Sample ID: 670-9210-13**

Date Collected: 11/08/22 15:25

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.78	I	1.0	0.50	ug/L			11/18/22 23:28	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:28	1
trans-1,2-Dichloroethene	0.74	I	1.0	0.50	ug/L			11/18/22 23:28	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:28	1
Vinyl chloride	93		1.0	0.50	ug/L			11/18/22 23:28	1

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0019-020.0-20221108**

**Lab Sample ID: 670-9210-13**

Date Collected: 11/08/22 15:25

Matrix: Ground Water

Date Received: 11/09/22 08:20

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		80 - 120		11/18/22 23:28	1

**Client Sample ID: GSSP-MW0020-030.0-20221108**

**Lab Sample ID: 670-9210-14**

Date Collected: 11/08/22 14:56

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:45	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:45	1
<b>trans-1,2-Dichloroethene</b>	<b>1.5</b>		1.0	0.50	ug/L			11/18/22 23:45	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 23:45	1
<b>Vinyl chloride</b>	<b>230</b>		5.0	2.5	ug/L			11/21/22 16:17	5

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/18/22 23:45	1
Toluene-d8 (Surr)	102		80 - 120		11/21/22 16:17	5

**Client Sample ID: GSSP-MW0044R-030.0-20221108**

**Lab Sample ID: 670-9210-15**

Date Collected: 11/08/22 15:14

Matrix: Ground Water

Date Received: 11/09/22 08:20

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/19/22 00:02	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/19/22 00:02	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/19/22 00:02	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/19/22 00:02	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/19/22 00:02	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		80 - 120		11/19/22 00:02	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Ground Water

Prep Type: Total/NA

			Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	TOL (80-120)				
670-9210-1	GSSP-MW0034-006.0-20221108	98				
670-9210-2	GSSP-MW0035-020-20221108	96				
670-9210-3	GSSP-MW0053-020.0-20221108	98				
670-9210-4	GSSP-MW0059-018.5-20221108	101				
670-9210-5	GSSP-MW0060-012.5-20221108	102				
670-9210-6	GSSP-MW0061-018.5-20221108	102				
670-9210-7	GSSP-MW0062-012.5-20221108	101				
670-9210-8	GSSP-MW0063-018.5-20221108	100				
670-9210-10	GSSP-MW0036-035.0-20221108	101				
670-9210-11	GSSP-MW0024R-020.0-20221108	101				
670-9210-12	GSSP-MW0013-003.5-20221108	102				
670-9210-13	GSSP-MW0019-020.0-20221108	103				
670-9210-14	GSSP-MW0020-030.0-20221108	101				
670-9210-14	GSSP-MW0020-030.0-20221108	102				
670-9210-15	GSSP-MW0044R-030.0-20221108	101				

**Surrogate Legend**

TOL = Toluene-d8 (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Trip Blank

Prep Type: Total/NA

			Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	TOL (80-120)				
670-9210-9	GSSP- TB01-20221108	101				

**Surrogate Legend**

TOL = Toluene-d8 (Surr)

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

			Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	TOL (80-120)				
660-125053-C-4 MS	Matrix Spike	97				
660-125053-C-4 MSD	Matrix Spike Duplicate	98				
670-9256-B-1 MS	Matrix Spike	96				
670-9256-B-1 MSD	Matrix Spike Duplicate	90				
670-9976-B-1 MS	Matrix Spike	102				
670-9976-B-1 MSD	Matrix Spike Duplicate	101				

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# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL (80-120)
LCS 670-11690/4	Lab Control Sample	100
LCS 670-11756/7	Lab Control Sample	98
LCS 670-11879/4	Lab Control Sample	101
MB 670-11690/6	Method Blank	101
MB 670-11756/9	Method Blank	95
MB 670-11879/6	Method Blank	100

#### Surrogate Legend

TOL = Toluene-d8 (Surr)

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Ground Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	2MN (50-170)	FLN10 (50-170)
670-9210-2	GSSP-MW0035-020-20221108	73	67
670-9210-3	GSSP-MW0053-020.0-20221108	103	89
670-9210-11	GSSP-MW0024R-020.0-20221108	132	123

#### Surrogate Legend

2MN = 2-methylnaphthalene-d10

FLN10 = Fluoranthene-d10 (Surr)

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	2MN (50-170)	FLN10 (50-170)
LCS 670-10751/1-A	Lab Control Sample	110	109
LCSD 670-10751/2-A	Lab Control Sample Dup	113	111
MB 670-10751/3-A	Method Blank	122	127

#### Surrogate Legend

2MN = 2-methylnaphthalene-d10

FLN10 = Fluoranthene-d10 (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 670-11690/6**  
**Matrix: Water**  
**Analysis Batch: 11690**

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

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 18:02	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 18:02	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 18:02	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 18:02	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 18:02	1
<b>MB MB</b>									
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
Toluene-d8 (Surr)	101		80 - 120				11/18/22 18:02	1	

**Lab Sample ID: LCS 670-11690/4**  
**Matrix: Water**  
**Analysis Batch: 11690**

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

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
cis-1,2-Dichloroethene	20.0	21.7		ug/L		109	50 - 150
Tetrachloroethene	20.0	22.0		ug/L		110	50 - 150
trans-1,2-Dichloroethene	20.0	21.3		ug/L		106	50 - 150
Trichloroethene	20.0	21.5		ug/L		108	50 - 150
Vinyl chloride	20.0	20.4		ug/L		102	50 - 150
<b>LCS LCS</b>							
Surrogate	%Recovery	Qualifier	Limits				
Toluene-d8 (Surr)	100		80 - 120				

**Lab Sample ID: 670-9256-B-1 MS**  
**Matrix: Water**  
**Analysis Batch: 11690**

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

Analyte	Sample Sample		Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
cis-1,2-Dichloroethene	0.50	U	20.0	21.2		ug/L		106	50 - 150
Tetrachloroethene	0.50	U	20.0	20.3		ug/L		101	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	19.3		ug/L		97	50 - 150
Trichloroethene	0.50	U	20.0	20.4		ug/L		102	50 - 150
Vinyl chloride	0.50	U	20.0	21.6		ug/L		108	50 - 150
<b>MS MS</b>									
Surrogate	%Recovery	Qualifier	Limits						
Toluene-d8 (Surr)	96		80 - 120						

**Lab Sample ID: 670-9256-B-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 11690**

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

Analyte	Sample Sample		Spike Added	MSD MSD		Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
	Result	Qualifier		Result	Qualifier						
cis-1,2-Dichloroethene	0.50	U	20.0	26.5		ug/L		133	50 - 150	22	30
Tetrachloroethene	0.50	U	20.0	25.4		ug/L		127	50 - 150	23	30
trans-1,2-Dichloroethene	0.50	U	20.0	25.8		ug/L		129	50 - 150	29	30
Trichloroethene	0.50	U	20.0	26.9		ug/L		135	50 - 150	27	30
Vinyl chloride	0.50	U	20.0	25.4		ug/L		127	50 - 150	16	30

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 670-9256-B-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 11690**

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

<u>Surrogate</u>	<u>%Recovery</u>	<u>MSD Qualifier</u>	<u>MSD Limits</u>
Toluene-d8 (Surr)	90		80 - 120

**Lab Sample ID: MB 670-11756/9**  
**Matrix: Water**  
**Analysis Batch: 11756**

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

<u>Analyte</u>	<u>MB Result</u>	<u>MB Qualifier</u>	<u>PQL</u>	<u>MDL</u>	<u>Unit</u>	<u>D</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 17:23	1
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 17:23	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 17:23	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/18/22 17:23	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/18/22 17:23	1

<u>Surrogate</u>	<u>%Recovery</u>	<u>MB Qualifier</u>	<u>MB Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
Toluene-d8 (Surr)	95		80 - 120		11/18/22 17:23	1

**Lab Sample ID: LCS 670-11756/7**  
**Matrix: Water**  
**Analysis Batch: 11756**

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

<u>Analyte</u>	<u>Spike Added</u>	<u>LCS Result</u>	<u>LCS Qualifier</u>	<u>Unit</u>	<u>D</u>	<u>%Rec</u>	<u>%Rec Limits</u>
cis-1,2-Dichloroethene	20.0	18.8		ug/L		94	50 - 150
Tetrachloroethene	20.0	17.6		ug/L		88	50 - 150
trans-1,2-Dichloroethene	20.0	16.6		ug/L		83	50 - 150
Trichloroethene	20.0	18.2		ug/L		91	50 - 150
Vinyl chloride	20.0	20.2		ug/L		101	50 - 150

<u>Surrogate</u>	<u>%Recovery</u>	<u>LCS Qualifier</u>	<u>LCS Limits</u>
Toluene-d8 (Surr)	98		80 - 120

**Lab Sample ID: 660-125053-C-4 MS**  
**Matrix: Water**  
**Analysis Batch: 11756**

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

<u>Analyte</u>	<u>Sample Result</u>	<u>Sample Qualifier</u>	<u>Spike Added</u>	<u>MS Result</u>	<u>MS Qualifier</u>	<u>Unit</u>	<u>D</u>	<u>%Rec</u>	<u>%Rec Limits</u>
Tetrachloroethene	0.50	U	20.0	21.8		ug/L		109	50 - 150
trans-1,2-Dichloroethene	1.0		20.0	21.8		ug/L		104	50 - 150
Trichloroethene	0.50	U	20.0	23.2		ug/L		116	50 - 150

<u>Surrogate</u>	<u>%Recovery</u>	<u>MS Qualifier</u>	<u>MS Limits</u>
Toluene-d8 (Surr)	97		80 - 120

**Lab Sample ID: 660-125053-C-4 MSD**  
**Matrix: Water**  
**Analysis Batch: 11756**

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

<u>Analyte</u>	<u>Sample Result</u>	<u>Sample Qualifier</u>	<u>Spike Added</u>	<u>MSD Result</u>	<u>MSD Qualifier</u>	<u>Unit</u>	<u>D</u>	<u>%Rec</u>	<u>%Rec Limits</u>	<u>RPD</u>	<u>RPD Limit</u>
Tetrachloroethene	0.50	U	20.0	21.7		ug/L		108	50 - 150	1	30

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 660-125053-C-4 MSD**

**Client Sample ID: Matrix Spike Duplicate**

**Matrix: Water**

**Prep Type: Total/NA**

**Analysis Batch: 11756**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
trans-1,2-Dichloroethene	1.0		20.0	21.0		ug/L		100	50 - 150	4	30
Trichloroethene	0.50	U	20.0	22.9		ug/L		115	50 - 150	1	30
		<b>MSD</b>	<b>MSD</b>								
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>								
Toluene-d8 (Surr)	98		80 - 120								

**Lab Sample ID: MB 670-11879/6**

**Client Sample ID: Method Blank**

**Matrix: Water**

**Prep Type: Total/NA**

**Analysis Batch: 11879**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/21/22 10:45	1	
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/21/22 10:45	1	
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/21/22 10:45	1	
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/21/22 10:45	1	
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/21/22 10:45	1	
		<b>MB</b>	<b>MB</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>				
Toluene-d8 (Surr)	100		80 - 120		11/21/22 10:45	1				

**Lab Sample ID: LCS 670-11879/4**

**Client Sample ID: Lab Control Sample**

**Matrix: Water**

**Prep Type: Total/NA**

**Analysis Batch: 11879**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	20.0	22.3		ug/L		112	50 - 150
Tetrachloroethene	20.0	21.9		ug/L		109	50 - 150
trans-1,2-Dichloroethene	20.0	21.7		ug/L		108	50 - 150
Trichloroethene	20.0	22.3		ug/L		112	50 - 150
Vinyl chloride	20.0	19.3		ug/L		96	50 - 150
		<b>LCS</b>	<b>LCS</b>				
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
Toluene-d8 (Surr)	101		80 - 120				

**Lab Sample ID: 670-9976-B-1 MS**

**Client Sample ID: Matrix Spike**

**Matrix: Water**

**Prep Type: Total/NA**

**Analysis Batch: 11879**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	0.50	U	20.0	26.4		ug/L		132	50 - 150
Tetrachloroethene	0.50	U	20.0	25.9		ug/L		129	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	25.6		ug/L		128	50 - 150
Trichloroethene	0.50	U	20.0	27.0		ug/L		135	50 - 150
Vinyl chloride	0.50	U	20.0	23.8		ug/L		119	50 - 150
		<b>MS</b>	<b>MS</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
Toluene-d8 (Surr)	102		80 - 120						

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 670-9976-B-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 11879**

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

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
cis-1,2-Dichloroethene	0.50	U	20.0	25.2		ug/L		126	50 - 150	5	30
Tetrachloroethene	0.50	U	20.0	25.7		ug/L		129	50 - 150	1	30
trans-1,2-Dichloroethene	0.50	U	20.0	25.4		ug/L		127	50 - 150	1	30
Trichloroethene	0.50	U	20.0	26.1		ug/L		130	50 - 150	3	30
Vinyl chloride	0.50	U	20.0	23.5		ug/L		118	50 - 150	1	30
		<b>MSD</b>	<b>MSD</b>								
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>								
<i>Toluene-d8 (Surr)</i>	101		80 - 120								

## Method: 8270D SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 670-10751/3-A**  
**Matrix: Water**  
**Analysis Batch: 11836**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 10751**

Analyte	MB	MB	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Naphthalene	0.091	U	0.18	0.091	ug/L		11/09/22 15:33	11/20/22 10:56	1	
		<b>MB</b>	<b>MB</b>							
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>	<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>				
<i>2-methylnaphthalene-d10</i>	122		50 - 170	11/09/22 15:33	11/20/22 10:56	1				
<i>Fluoranthene-d10 (Surr)</i>	127		50 - 170	11/09/22 15:33	11/20/22 10:56	1				

**Lab Sample ID: LCS 670-10751/1-A**  
**Matrix: Water**  
**Analysis Batch: 11836**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 10751**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec	RPD	Limit
							Limits		
Naphthalene	3.64	3.55		ug/L		98	50 - 170		
		<b>LCS</b>	<b>LCS</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>2-methylnaphthalene-d10</i>	110		50 - 170						
<i>Fluoranthene-d10 (Surr)</i>	109		50 - 170						

**Lab Sample ID: LCSD 670-10751/2-A**  
**Matrix: Water**  
**Analysis Batch: 11836**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 10751**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec	RPD	Limit
							Limits		
Naphthalene	3.64	3.64		ug/L		100	50 - 170	2	30
		<b>LCSD</b>	<b>LCSD</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
<i>2-methylnaphthalene-d10</i>	113		50 - 170						
<i>Fluoranthene-d10 (Surr)</i>	111		50 - 170						

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## GC/MS VOA

### Analysis Batch: 11690

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9210-4	GSSP-MW0059-018.5-20221108	Total/NA	Ground Water	8260B	
670-9210-5	GSSP-MW0060-012.5-20221108	Total/NA	Ground Water	8260B	
670-9210-6	GSSP-MW0061-018.5-20221108	Total/NA	Ground Water	8260B	
670-9210-7	GSSP-MW0062-012.5-20221108	Total/NA	Ground Water	8260B	
670-9210-8	GSSP-MW0063-018.5-20221108	Total/NA	Ground Water	8260B	
670-9210-9	GSSP- TB01-20221108	Total/NA	Trip Blank	8260B	
670-9210-10	GSSP-MW0036-035.0-20221108	Total/NA	Ground Water	8260B	
670-9210-11	GSSP-MW0024R-020.0-20221108	Total/NA	Ground Water	8260B	
670-9210-12	GSSP-MW0013-003.5-20221108	Total/NA	Ground Water	8260B	
670-9210-13	GSSP-MW0019-020.0-20221108	Total/NA	Ground Water	8260B	
670-9210-14	GSSP-MW0020-030.0-20221108	Total/NA	Ground Water	8260B	
670-9210-15	GSSP-MW0044R-030.0-20221108	Total/NA	Ground Water	8260B	
MB 670-11690/6	Method Blank	Total/NA	Water	8260B	
LCS 670-11690/4	Lab Control Sample	Total/NA	Water	8260B	
670-9256-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9256-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 11756

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9210-1	GSSP-MW0034-006.0-20221108	Total/NA	Ground Water	8260B	
670-9210-2	GSSP-MW0035-020-20221108	Total/NA	Ground Water	8260B	
670-9210-3	GSSP-MW0053-020.0-20221108	Total/NA	Ground Water	8260B	
MB 670-11756/9	Method Blank	Total/NA	Water	8260B	
LCS 670-11756/7	Lab Control Sample	Total/NA	Water	8260B	
660-125053-C-4 MS	Matrix Spike	Total/NA	Water	8260B	
660-125053-C-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 11879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9210-14	GSSP-MW0020-030.0-20221108	Total/NA	Ground Water	8260B	
MB 670-11879/6	Method Blank	Total/NA	Water	8260B	
LCS 670-11879/4	Lab Control Sample	Total/NA	Water	8260B	
670-9976-B-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9976-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

## GC/MS Semi VOA

### Prep Batch: 10751

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9210-2	GSSP-MW0035-020-20221108	Total/NA	Ground Water	3511	
670-9210-3	GSSP-MW0053-020.0-20221108	Total/NA	Ground Water	3511	
670-9210-11	GSSP-MW0024R-020.0-20221108	Total/NA	Ground Water	3511	
MB 670-10751/3-A	Method Blank	Total/NA	Water	3511	
LCS 670-10751/1-A	Lab Control Sample	Total/NA	Water	3511	
LCSD 670-10751/2-A	Lab Control Sample Dup	Total/NA	Water	3511	

### Analysis Batch: 11836

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9210-2	GSSP-MW0035-020-20221108	Total/NA	Ground Water	8270D SIM	10751
670-9210-3	GSSP-MW0053-020.0-20221108	Total/NA	Ground Water	8270D SIM	10751
670-9210-11	GSSP-MW0024R-020.0-20221108	Total/NA	Ground Water	8270D SIM	10751

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# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## GC/MS Semi VOA (Continued)

### Analysis Batch: 11836 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 670-10751/3-A	Method Blank	Total/NA	Water	8270D SIM	10751
LCS 670-10751/1-A	Lab Control Sample	Total/NA	Water	8270D SIM	10751
LCSD 670-10751/2-A	Lab Control Sample Dup	Total/NA	Water	8270D SIM	10751

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0034-006.0-20221108**

**Lab Sample ID: 670-9210-1**

Date Collected: 11/08/22 12:30

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11756	K1P	EET ORL	11/18/22 20:29

**Client Sample ID: GSSP-MW0035-020-20221108**

**Lab Sample ID: 670-9210-2**

Date Collected: 11/08/22 12:56

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11756	K1P	EET ORL	11/18/22 20:46
Total/NA	Prep	3511			10751	OH	EET ORL	11/09/22 15:33
Total/NA	Analysis	8270D SIM		1	11836	JI	EET ORL	11/20/22 12:15

**Client Sample ID: GSSP-MW0053-020.0-20221108**

**Lab Sample ID: 670-9210-3**

Date Collected: 11/08/22 14:11

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11756	K1P	EET ORL	11/18/22 21:03
Total/NA	Prep	3511			10751	OH	EET ORL	11/09/22 15:33
Total/NA	Analysis	8270D SIM		1	11836	JI	EET ORL	11/20/22 12:34

**Client Sample ID: GSSP-MW0059-018.5-20221108**

**Lab Sample ID: 670-9210-4**

Date Collected: 11/08/22 12:54

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 20:53

**Client Sample ID: GSSP-MW0060-012.5-20221108**

**Lab Sample ID: 670-9210-5**

Date Collected: 11/08/22 13:30

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 21:11

**Client Sample ID: GSSP-MW0061-018.5-20221108**

**Lab Sample ID: 670-9210-6**

Date Collected: 11/08/22 14:04

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 21:28

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0062-012.5-20221108**

**Lab Sample ID: 670-9210-7**

Date Collected: 11/08/22 11:05

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 21:45

**Client Sample ID: GSSP-MW0063-018.5-20221108**

**Lab Sample ID: 670-9210-8**

Date Collected: 11/08/22 12:13

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 22:02

**Client Sample ID: GSSP- TB01-20221108**

**Lab Sample ID: 670-9210-9**

Date Collected: 11/08/22 07:00

Matrix: Trip Blank

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 22:19

**Client Sample ID: GSSP-MW0036-035.0-20221108**

**Lab Sample ID: 670-9210-10**

Date Collected: 11/08/22 12:07

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 22:36

**Client Sample ID: GSSP-MW0024R-020.0-20221108**

**Lab Sample ID: 670-9210-11**

Date Collected: 11/08/22 13:37

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 22:54
Total/NA	Prep	3511			10751	OH	EET ORL	11/09/22 15:33
Total/NA	Analysis	8270D SIM		1	11836	JI	EET ORL	11/20/22 12:54

**Client Sample ID: GSSP-MW0013-003.5-20221108**

**Lab Sample ID: 670-9210-12**

Date Collected: 11/08/22 14:41

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 23:11

**Client Sample ID: GSSP-MW0019-020.0-20221108**

**Lab Sample ID: 670-9210-13**

Date Collected: 11/08/22 15:25

Matrix: Ground Water

Date Received: 11/09/22 08:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 23:28

Eurofins Orlando

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

**Client Sample ID: GSSP-MW0020-030.0-20221108**

**Lab Sample ID: 670-9210-14**

**Date Collected: 11/08/22 14:56**

**Matrix: Ground Water**

**Date Received: 11/09/22 08:20**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/18/22 23:45
Total/NA	Analysis	8260B		5	11879	K1P	EET ORL	11/21/22 16:17

**Client Sample ID: GSSP-MW0044R-030.0-20221108**

**Lab Sample ID: 670-9210-15**

**Date Collected: 11/08/22 15:14**

**Matrix: Ground Water**

**Date Received: 11/09/22 08:20**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	11690	K1P	EET ORL	11/19/22 00:02

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

## Laboratory: Eurofins Orlando

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8270D SIM	3511	Ground Water	Naphthalene



# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
8270D SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	EET ORL
3511	Microextraction of Organic Compounds	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

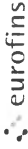
Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9210-1  
SDG: GSSP

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-9210-1	GSSP-MW0034-006.0-20221108	Ground Water	11/08/22 12:30	11/09/22 08:20
670-9210-2	GSSP-MW0035-020-20221108	Ground Water	11/08/22 12:56	11/09/22 08:20
670-9210-3	GSSP-MW0053-020.0-20221108	Ground Water	11/08/22 14:11	11/09/22 08:20
670-9210-4	GSSP-MW0059-018.5-20221108	Ground Water	11/08/22 12:54	11/09/22 08:20
670-9210-5	GSSP-MW0060-012.5-20221108	Ground Water	11/08/22 13:30	11/09/22 08:20
670-9210-6	GSSP-MW0061-018.5-20221108	Ground Water	11/08/22 14:04	11/09/22 08:20
670-9210-7	GSSP-MW0062-012.5-20221108	Ground Water	11/08/22 11:05	11/09/22 08:20
670-9210-8	GSSP-MW0063-018.5-20221108	Ground Water	11/08/22 12:13	11/09/22 08:20
670-9210-9	GSSP- TB01-20221108	Trip Blank	11/08/22 07:00	11/09/22 08:20
670-9210-10	GSSP-MW0036-035.0-20221108	Ground Water	11/08/22 12:07	11/09/22 08:20
670-9210-11	GSSP-MW0024R-020.0-20221108	Ground Water	11/08/22 13:37	11/09/22 08:20
670-9210-12	GSSP-MW0013-003.5-20221108	Ground Water	11/08/22 14:41	11/09/22 08:20
670-9210-13	GSSP-MW0019-020.0-20221108	Ground Water	11/08/22 15:25	11/09/22 08:20
670-9210-14	GSSP-MW0020-030.0-20221108	Ground Water	11/08/22 14:56	11/09/22 08:20
670-9210-15	GSSP-MW0044R-030.0-20221108	Ground Water	11/08/22 15:14	11/09/22 08:20



# Chain of Custody Record



<b>Client Information</b>		Lab PM: Dynnicki, Kaitlin		Carrier Tracking No(s):		COC No: 670-2831-1002.1	
Client Contact: Teresa Arment Jennings		E-Mail: kaitlin.dynnicki@et.eurofins.com		State of Origin:		Page: Page 1 of 1	
Company: AECOM Technical Services Inc.		PWSID:		Analysis Requested		Job #:	
Address: 150 North Orange Avenue, Suite 200		Due Date Requested:		TAT Requested (days):		Preservation Codes:	
City: Orlando		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Barcode: 670-9210 Chain of Custody		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: FL, 32801		PO #: 138224		Matrix (N=water, S=solid, O=water/soil, BT=TISSUE, A=Air)		M - Hexane N - None O - AshNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
Phone: 919-461-1282(Tel)		WO #: 60610905		Project #:		Total Number of containers	
Email: teresa.armentjennings@aecom.com		Project #: 67001282		SSOW#:		Special Instructions/Note:	
Address: NASA KSC Industrial Area		Site: KSC - IA LTM		Field Filtered Sample		8260B - (MOD) NASA KSC	
<b>Sample Identification</b>		Sample Date		Sample Time		Sample Type (C=Comp, G=grab)	
GSSP-MW0034-020.0-20221108		11/4/22		1230		G	
GSSP-MW0035-020.0-20221108		11/8/22		1256		Water	
GSSP-MW0053-020.0-20221108		1411		1411		Water	
GSSP-MW0059-018.5-20221108		1254		1254		Water	
GSSP-MW0060-012.5-20221108		1330		1330		Water	
GSSP-MW0061-018.5-20221108		1404		1404		Water	
GSSP-MW0062-012.5-20221108		1105		1105		Water	
GSSP-MW0063-018.5-20221108		1213		1213		Water	
GSSP-TB 01 - 20221108		0700		0700		QC	
GSSP-MW0036-020.0-20221108		11/8/22		1207		6	
GSSP-MW0048-020.0-20221108		11/8/22		1337		6	
<b>Possible Hazard Identification</b>		Date:		Time:		Method of Shipment:	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Date/Time:		Company:		Received by:	
Deliverable Requested: I, II, III, IV, Other (specify)		Date/Time:		Company:		Received by:	
Empty Kit Relinquished by:		Date/Time:		Company:		Received by:	
Relinquished by:		Date/Time:		Company:		Cooler Temperature(s) °C and Other Remarks:	
Relinquished by:		Date/Time:		Company:		Custody Seal No.: <input type="checkbox"/> Yes <input type="checkbox"/> No	





# Chain of Custody Record



<b>Client Information</b>		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s): 670-2831-1006.1																																																																																									
Client Contact: Teresa Amendt Jennings		E-Mail: kaitlin.dylnicki@et.eurofins.us.com		Page: Page 1 of 1																																																																																									
Company: AECOM Technical Services Inc.		PWSID:		Job #:																																																																																									
Address: 150 North Orange Avenue Suite 200		Due Date Requested:		Preservation Codes:																																																																																									
City: Orlando		TAT Requested (days):		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - NaHSO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Y - Trizma Z - other (specify)																																																																																									
State, Zip: FL, 32801		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:																																																																																									
Phone: 919-461-1282(Tel)		PO #: 138224		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Sample Identification</th> <th>Sample Date</th> <th>Sample Time</th> <th>Sample Type (C=Comp, G=grab)</th> <th>Matrix (Water, Solid, Oil)</th> <th>Preservation Code:</th> <th>Field Filtered Sample (Yes or No)</th> <th>Perform MS/MSD (Yes or No)</th> <th>8260B - (MOD) VC</th> <th>Total Number of Containers</th> <th>Special Instructions/Note:</th> </tr> <tr> <td>EDL-MW0004-055-0-202211</td> <td></td> <td></td> <td></td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>A</td> <td></td> <td></td> </tr> <tr> <td>EDL-MW0006R-035-0-202211</td> <td></td> <td></td> <td></td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> <td></td> </tr> <tr> <td>EDL-TB -202211</td> <td></td> <td></td> <td></td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td></td> <td></td> </tr> <tr> <td>GSSP - MW0013 - 003.5 - 20221104</td> <td>11/8/22</td> <td>1441</td> <td>G</td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td>3</td> <td>Taken from EDL K.ir</td> </tr> <tr> <td>GSSP - MW0014 - 020.0 - 20221104</td> <td></td> <td>1525</td> <td>G</td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td>3</td> <td>taken from EHF K.ir</td> </tr> <tr> <td>GSSP - MW0020 - 030.0 - 20221104</td> <td></td> <td>1456</td> <td>G</td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td>3</td> <td>Taken from EHF K.ir</td> </tr> <tr> <td>GSSP - MW0042R-030.0 - 20221104</td> <td></td> <td>1514</td> <td>G</td> <td>Water</td> <td></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td></td> <td>3</td> <td>Taken from EDL K.ir</td> </tr> </table>		Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Solid, Oil)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) VC	Total Number of Containers	Special Instructions/Note:	EDL-MW0004-055-0-202211				Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A			EDL-MW0006R-035-0-202211				Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				EDL-TB -202211				Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				GSSP - MW0013 - 003.5 - 20221104	11/8/22	1441	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EDL K.ir	GSSP - MW0014 - 020.0 - 20221104		1525	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	taken from EHF K.ir	GSSP - MW0020 - 030.0 - 20221104		1456	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EHF K.ir	GSSP - MW0042R-030.0 - 20221104		1514	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EDL K.ir
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)			Matrix (Water, Solid, Oil)	Preservation Code:	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B - (MOD) VC	Total Number of Containers	Special Instructions/Note:																																																																																	
EDL-MW0004-055-0-202211						Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	A																																																																																			
EDL-MW0006R-035-0-202211						Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																				
EDL-TB -202211						Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>																																																																																				
GSSP - MW0013 - 003.5 - 20221104	11/8/22	1441	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EDL K.ir																																																																																			
GSSP - MW0014 - 020.0 - 20221104		1525	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	taken from EHF K.ir																																																																																			
GSSP - MW0020 - 030.0 - 20221104		1456	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EHF K.ir																																																																																			
GSSP - MW0042R-030.0 - 20221104		1514	G	Water		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		3	Taken from EDL K.ir																																																																																			
Project Name: teresa.amendt.jennings@aecom.com		Project #: 60610905		Field Filtered Sample (Yes or No)																																																																																									
Project #: 67001282		SSOW#:		Perform MS/MSD (Yes or No)																																																																																									
Site:				8260B - (MOD) VC																																																																																									
				A																																																																																									

**Possible Hazard Identification**

Non-Hazard  Flammable  Skin Irritant  Poison B  Unknown  Radiological

Deliverable Requested: I, II, III, IV, Other (specify)

**Empty Kit Relinquished by:** \_\_\_\_\_ Date: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Custody Seals Intact:  Yes  No Custody Seal No.: 03

**Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)**

Return To Client  Disposal By Lab  Archive For \_\_\_\_\_ Months

Special Instructions/QC Requirements:

Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_ Company: \_\_\_\_\_

Received by: \_\_\_\_\_ Date/Time: 11/9/22 Company: \_\_\_\_\_

Cooler Temperature(s) °C and Other Remarks: \_\_\_\_\_



## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-9210-1

SDG Number: GSSP

**Login Number: 9210**

**List Number: 1**

**Creator: Hartley, Tyler**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



Generated  
11/23/2022 11:06:33 AM

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

# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 12/7/2022 5:57:12 PM

## JOB DESCRIPTION

NASA KSC Industrial Area

## JOB NUMBER

670-9608-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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## Authorization



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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

### GC/MS Semi VOA

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

### HPLC/IC

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

### LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate.
U	Indicates that the compound was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

## Glossary

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

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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16



# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

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## Job ID: 670-9608-1

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### Laboratory: Eurofins Orlando

#### Narrative

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#### Job Narrative 670-9608-1

#### Receipt

The samples were received on 11/15/2022 3:30 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 4.5°C

#### GC/MS VOA

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### GC/MS Semi VOA

Method 8270E\_SIM: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 670-11420 and analytical batch 670-12624 recovered outside control limits for the following analytes: Naphthalene.

Method 8270E\_SIM: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 670-11420 and analytical batch 670-11532 recovered outside control limits for the following analytes: Naphthalene.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### HPLC/IC

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### PFAS

Method PFC\_IDA: The sample injection standard peak areas in the following sample: IA-IDW01-20221115 (670-9608-1) are outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample. The recovery for the labeled isotope(s) 13C3 PFBS and 13C5 PFPeA in the following sample: IA-IDW01-20221115 (670-9608-1) is outside the QC acceptance limits due to the matrix of the sample.

Method PFC\_IDA: The recovery for the labeled isotope(s) M2-6:2 FTS in the following sample: IA-IDW01-20221115 (670-9608-1) is outside the QC acceptance limits. Since the recovery is high and the native analyte is not detected in the sample, the data is reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

#### General Chemistry

Method 365.4: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 670-12948 and analytical batch 670-13353 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

# Detection Summary

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

**Client Sample ID: IA-IDW01-20221115**

**Lab Sample ID: 670-9608-1**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.91	I	1.0	0.50	ug/L	1		8260B	Total/NA
Nitrate as N	420	I	800	400	ug/L	2		300.0	Total/NA
Perfluorobutanesulfonic acid	0.00067	I	0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0056		0.0044	0.0017	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0019		0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0018		0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0019		0.0017	0.00079	ug/L	1		537 IDA	Total/NA
Perfluorononanoic acid	0.00048	I J	0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0035		0.0017	0.00087	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.0046		0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.00092	I	0.0017	0.00044	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	180		100	40	ug/L	1		365.4	Total/NA

**Client Sample ID: IA-TB01-20221115**

**Lab Sample ID: 670-9608-2**

No Detections.

This Detection Summary does not include radiochemical test results.

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

**Client Sample ID: IA-IDW01-20221115**

**Lab Sample ID: 670-9608-1**

**Date Collected: 11/15/22 14:15**

**Matrix: Water**

**Date Received: 11/15/22 15:30**

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:16	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:16	1
<b>Vinyl chloride</b>	<b>0.91</b>	<b>I</b>	1.0	0.50	ug/L			11/28/22 15:35	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:16	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:16	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	96		80 - 120		11/28/22 15:35	1

**Method: SW846 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	0.050	U J3	0.18	0.050	ug/L		11/16/22 14:04	11/29/22 20:33	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-methylnaphthalene-d10	117		50 - 150	11/16/22 14:04	11/29/22 20:33	1
Fluoranthene-d10 (Surr)	96		50 - 150	11/16/22 14:04	11/29/22 20:33	1

**Method: MCAWW 300.0 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Nitrate as N</b>	<b>420</b>	<b>I</b>	800	400	ug/L			11/16/22 22:47	2

**Method: EPA 537 IDA - EPA 537 Isotope Dilution**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
4:2 Fluorotelomer sulfonic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
6:2 Fluorotelomer sulfonic acid	0.0037	U	0.0044	0.0037	ug/L		11/28/22 07:14	12/04/22 06:25	1
8:2 Fluorotelomer sulfonic acid	0.00087	U	0.0026	0.00087	ug/L		11/28/22 07:14	12/04/22 06:25	1
9Cl-PF3ONS	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
DONA	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
HFPODA	0.00087	U	0.0026	0.00087	ug/L		11/28/22 07:14	12/04/22 06:25	1
NEtFOSAA	0.00044	U	0.0026	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
NMeFOSAA	0.00052	U	0.0017	0.00052	ug/L		11/28/22 07:14	12/04/22 06:25	1
NMeFOSA	0.00087	U	0.0026	0.00087	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorobutanesulfonic acid</b>	<b>0.00067</b>	<b>I</b>	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorobutanoic acid</b>	<b>0.0056</b>		0.0044	0.0017	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorodecanesulfonic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorodecanoic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorododecanoic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluoroheptanesulfonic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluoroheptanoic acid</b>	<b>0.0019</b>		0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorohexanesulfonic acid</b>	<b>0.0018</b>		0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorohexanoic acid</b>	<b>0.0019</b>		0.0017	0.00079	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorononanesulfonic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorononanoic acid</b>	<b>0.00048</b>	<b>I J</b>	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorooctanesulfonamide	0.00061	U	0.0017	0.00061	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorooctanesulfonic acid</b>	<b>0.0035</b>		0.0017	0.00087	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluorooctanoic acid</b>	<b>0.0046</b>		0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluoropentanesulfonic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<b>Perfluoropentanoic acid</b>	<b>0.00092</b>	<b>I</b>	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorotetradecanoic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
Perfluorotridecanoic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

**Client Sample ID: IA-IDW01-20221115**

**Lab Sample ID: 670-9608-1**

Date Collected: 11/15/22 14:15

Matrix: Water

Date Received: 11/15/22 15:30

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

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid	0.00044	U	0.0017	0.00044	ug/L		11/28/22 07:14	12/04/22 06:25	1
<i>Isotope Dilution</i>		<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>			<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
M2-4:2 FTS	198			10 - 200			11/28/22 07:14	12/04/22 06:25	1
M2-6:2 FTS	269	*		17 - 200			11/28/22 07:14	12/04/22 06:25	1
M2-8:2 FTS	191			33 - 200			11/28/22 07:14	12/04/22 06:25	1
13C2-PFDoDA	118			17 - 176			11/28/22 07:14	12/04/22 06:25	1
13C2 PFTeDA	85			10 - 179			11/28/22 07:14	12/04/22 06:25	1
13C3 HFPO-DA	81			17 - 185			11/28/22 07:14	12/04/22 06:25	1
13C3 PFBS	281	*		16 - 200			11/28/22 07:14	12/04/22 06:25	1
13C3 PFHxS	127			28 - 188			11/28/22 07:14	12/04/22 06:25	1
13C4 PFBA	119			42 - 165			11/28/22 07:14	12/04/22 06:25	1
13C4 PFHpA	104			31 - 182			11/28/22 07:14	12/04/22 06:25	1
13C5 PFPeA	230	*		38 - 187			11/28/22 07:14	12/04/22 06:25	1
13C6 PFDA	124			49 - 163			11/28/22 07:14	12/04/22 06:25	1
13C8 PFOA	124			48 - 162			11/28/22 07:14	12/04/22 06:25	1
13C8 PFOS	137			51 - 159			11/28/22 07:14	12/04/22 06:25	1
13C8 FOSA	77			10 - 168			11/28/22 07:14	12/04/22 06:25	1
d3-NMeFOSAA	114			31 - 174			11/28/22 07:14	12/04/22 06:25	1
d3-NMePFOSA	21			10 - 155			11/28/22 07:14	12/04/22 06:25	1
13C5 PFHxA	91			24 - 179			11/28/22 07:14	12/04/22 06:25	1
13C7 PFUnA	125			34 - 174			11/28/22 07:14	12/04/22 06:25	1
13C9 PFNA	139			51 - 167			11/28/22 07:14	12/04/22 06:25	1
d5-NEtFOSAA	134			29 - 195			11/28/22 07:14	12/04/22 06:25	1

**General Chemistry**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	180		100	40	ug/L		12/01/22 09:49	12/05/22 11:44	1

**Client Sample ID: IA-TB01-20221115**

**Lab Sample ID: 670-9608-2**

Date Collected: 11/15/22 14:00

Matrix: Water

Date Received: 11/15/22 15:30

**Method: SW846 8260B - Volatile Organic Compounds (GC/MS)**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:36	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:36	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 22:36	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:36	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 22:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		80 - 120					11/23/22 22:36	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL (80-120)
670-9547-P-1 MS	Matrix Spike	101
670-9608-1	IA-IDW01-20221115	96
670-9608-2	IA-TB01-20221115	100
670-9772-C-1 DU	Duplicate	100
670-9963-D-1 MS	Matrix Spike	98
670-9963-D-1 MSD	Matrix Spike Duplicate	99
LCS 670-12318/4	Lab Control Sample	101
LCS 670-12445/4	Lab Control Sample	99
MB 670-12318/6	Method Blank	100
MB 670-12445/6	Method Blank	96

#### Surrogate Legend

TOL = Toluene-d8 (Surr)

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	2MN (50-150)	FLN10 (50-150)
670-9608-1	IA-IDW01-20221115	117	96
LCS 670-11420/1-A	Lab Control Sample	91	91
LCSD 670-11420/2-A	Lab Control Sample Dup	116	110
MB 670-11420/3-A	Method Blank	74	69

#### Surrogate Legend

2MN = 2-methylnaphthalene-d10

FLN10 = Fluoranthene-d10 (Surr)

# Isotope Dilution Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	M242FTS (10-200)	M262FTS (17-200)	M282FTS (33-200)	PFDODA (17-176)	PFTDA (10-179)	HFPODA (17-185)	C3PFBS (16-200)	C3PFHS (28-188)
670-9608-1	IA-IDW01-20221115	198	269 *	191	118	85	81	281 *	127
LCS 410-321038/3-A	Lab Control Sample	115	119	129	117	105	110	132	134
LCSD 410-321038/4-A	Lab Control Sample Dup	117	111	100	86	71	103	140	128
MB 410-321038/1-A	Method Blank	108	109	112	106	94	100	125	120

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFBA (42-165)	C4PFHA (31-182)	PFPeA (38-187)	C6PFDA (49-163)	C8PFOA (48-162)	C8PFOS (51-159)	PFOSA (10-168)	d3NMFOS (31-174)
670-9608-1	IA-IDW01-20221115	119	104	230 *	124	124	137	77	114
LCS 410-321038/3-A	Lab Control Sample	133	125	138	131	129	145	126	121
LCSD 410-321038/4-A	Lab Control Sample Dup	132	122	138	108	124	128	98	97
MB 410-321038/1-A	Method Blank	119	114	133	120	113	132	111	110

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	d3NMFSA (10-155)	13C5PHA (24-179)	13C7PUA (34-174)	C9PFNA (51-167)	d5NEFOS (29-195)
670-9608-1	IA-IDW01-20221115	21	91	125	139	134
LCS 410-321038/3-A	Lab Control Sample	95	127	134	138	127
LCSD 410-321038/4-A	Lab Control Sample Dup	85	126	97	129	96
MB 410-321038/1-A	Method Blank	87	114	125	128	117

### Surrogate Legend

M242FTS = M2-4:2 FTS  
M262FTS = M2-6:2 FTS  
M282FTS = M2-8:2 FTS  
PFDODA = 13C2-PFDODA  
PFTDA = 13C2 PFTeDA  
HFPODA = 13C3 HFPO-DA  
C3PFBS = 13C3 PFBS  
C3PFHS = 13C3 PFHxS  
PFBA = 13C4 PFBA  
C4PFHA = 13C4 PFHpA  
PFPeA = 13C5 PFPeA  
C6PFDA = 13C6 PFDA  
C8PFOA = 13C8 PFOA  
C8PFOS = 13C8 PFOS  
PFOSA = 13C8 FOSA  
d3NMFOS = d3-NMeFOSAA  
d3NMFSA = d3-NMePFOSA  
13C5PHA = 13C5 PFHxA  
13C7PUA = 13C7 PFUnA  
C9PFNA = 13C9 PFNA  
d5NEFOS = d5-NEtFOSAA

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 8260B - Volatile Organic Compounds (GC/MS)

**Lab Sample ID: MB 670-12318/6**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/23/22 17:31	1
Surrogate	MB MB		Limits			D	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier							
Toluene-d8 (Surr)	100		80 - 120					11/23/22 17:31	1

**Lab Sample ID: LCS 670-12318/4**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits	
		Result	Qualifier					
Tetrachloroethene	20.0	20.5		ug/L		103	50 - 150	
Trichloroethene	20.0	24.5		ug/L		122	50 - 150	
Vinyl chloride	20.0	25.6		ug/L		128	50 - 150	
cis-1,2-Dichloroethene	20.0	23.4		ug/L		117	50 - 150	
trans-1,2-Dichloroethene	20.0	24.5		ug/L		122	50 - 150	
Surrogate	LCS LCS		Limits			D	%Rec	%Rec Limits
	%Recovery	Qualifier						
Toluene-d8 (Surr)	101		80 - 120					

**Lab Sample ID: 670-9547-P-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12318**

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

Analyte	Sample Sample		Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Tetrachloroethene	0.50	U	20.0	21.4		ug/L		107	50 - 150
Trichloroethene	0.50	U	20.0	25.3		ug/L		126	50 - 150
Vinyl chloride	0.50	U	20.0	27.5		ug/L		137	50 - 150
cis-1,2-Dichloroethene	0.50	U	20.0	23.8		ug/L		119	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	25.5		ug/L		128	50 - 150
Surrogate	MS MS		Limits			D	%Rec	%Rec Limits	
	%Recovery	Qualifier							
Toluene-d8 (Surr)	101		80 - 120						

**Lab Sample ID: 670-9772-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 12318**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Sample		DU DU		Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Tetrachloroethene	0.50	U	0.50	U	ug/L		NC	
Trichloroethene	0.50	U	0.50	U	ug/L		NC	
Vinyl chloride	0.50	U	0.50	U	ug/L		NC	
cis-1,2-Dichloroethene	0.50	U	0.50	U	ug/L		NC	
trans-1,2-Dichloroethene	0.50	U	0.50	U	ug/L		NC	

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 670-9772-C-1 DU**  
**Matrix: Water**  
**Analysis Batch: 12318**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Surrogate	DU DU		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	100		80 - 120

**Lab Sample ID: MB 670-12445/6**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Tetrachloroethene	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
Trichloroethene	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
Vinyl chloride	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
cis-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1
trans-1,2-Dichloroethene	0.50	U	1.0	0.50	ug/L			11/28/22 11:08	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	96		80 - 120		11/28/22 11:08	1

**Lab Sample ID: LCS 670-12445/4**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Tetrachloroethene	20.0	19.0		ug/L		95	50 - 150
Trichloroethene	20.0	20.3		ug/L		101	50 - 150
Vinyl chloride	20.0	23.7		ug/L		118	50 - 150
cis-1,2-Dichloroethene	20.0	19.9		ug/L		100	50 - 150
trans-1,2-Dichloroethene	20.0	19.1		ug/L		96	50 - 150

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	99		80 - 120

**Lab Sample ID: 670-9963-D-1 MS**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
				Result	Qualifier				
Tetrachloroethene	0.50	U	20.0	22.8		ug/L		114	50 - 150
Trichloroethene	0.50	U	20.0	23.6		ug/L		118	50 - 150
Vinyl chloride	0.50	U	20.0	24.2		ug/L		121	50 - 150
cis-1,2-Dichloroethene	0.50	U	20.0	22.6		ug/L		113	50 - 150
trans-1,2-Dichloroethene	0.50	U	20.0	21.2		ug/L		106	50 - 150

Surrogate	MS MS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	98		80 - 120



# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

**Lab Sample ID: 670-9963-D-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 12445**

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

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Tetrachloroethene	0.50	U	20.0	21.8		ug/L		109	50 - 150	4	30
Trichloroethene	0.50	U	20.0	23.1		ug/L		116	50 - 150	2	30
Vinyl chloride	0.50	U	20.0	22.8		ug/L		114	50 - 150	6	30
cis-1,2-Dichloroethene	0.50	U	20.0	22.3		ug/L		111	50 - 150	1	30
trans-1,2-Dichloroethene	0.50	U	20.0	20.6		ug/L		103	50 - 150	3	30
		<b>MSD</b>	<b>MSD</b>								
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>								
Toluene-d8 (Surr)	99		80 - 120								

## Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

**Lab Sample ID: MB 670-11420/3-A**  
**Matrix: Water**  
**Analysis Batch: 11532**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 11420**

Analyte	MB	MB	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Naphthalene	0.050	U	0.18	0.050	ug/L		11/16/22 10:21	11/17/22 10:36	1
		<b>MB</b>	<b>MB</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
2-methylnaphthalene-d10	74		50 - 150				11/16/22 10:21	11/17/22 10:36	1
Fluoranthene-d10 (Surr)	69		50 - 150				11/16/22 10:21	11/17/22 10:36	1

**Lab Sample ID: LCS 670-11420/1-A**  
**Matrix: Water**  
**Analysis Batch: 11532**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 11420**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec
							Result
Naphthalene	3.64	3.04		ug/L		84	60 - 140
		<b>LCS</b>	<b>LCS</b>				
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
2-methylnaphthalene-d10	91		50 - 150				
Fluoranthene-d10 (Surr)	91		50 - 150				

**Lab Sample ID: LCSD 670-11420/2-A**  
**Matrix: Water**  
**Analysis Batch: 11532**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 11420**

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec	RPD	Limit
							Result		
Naphthalene	3.64	4.37	J3	ug/L		120	60 - 140	36	25
		<b>LCSD</b>	<b>LCSD</b>						
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
2-methylnaphthalene-d10	116		50 - 150						
Fluoranthene-d10 (Surr)	110		50 - 150						

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 670-11468/4**  
**Matrix: Water**  
**Analysis Batch: 11468**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			11/16/22 20:52	1

**Lab Sample ID: LCS 670-11468/5**  
**Matrix: Water**  
**Analysis Batch: 11468**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	4000	4130		ug/L		103	90 - 110

**Lab Sample ID: LCSD 670-11468/6**  
**Matrix: Water**  
**Analysis Batch: 11468**

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	4000	4070		ug/L		102	90 - 110	1	

**Lab Sample ID: 670-9582-A-1 MS**  
**Matrix: Water**  
**Analysis Batch: 11468**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	3700		5000	8740		ug/L		101	80 - 120

**Lab Sample ID: 670-9582-A-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 11468**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	3700		5000	9080		ug/L		107	80 - 120	4	20

## Method: 537 IDA - EPA 537 Isotope Dilution

**Lab Sample ID: MB 410-321038/1-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		11/28/22 07:14	12/04/22 04:23	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		11/28/22 07:14	12/04/22 04:23	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
DONA	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
HFPODA	0.0010	U	0.0030	0.0010	ug/L		11/28/22 07:14	12/04/22 04:23	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		11/28/22 07:14	12/04/22 04:23	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

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

**Lab Sample ID: MB 410-321038/1-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		11/28/22 07:14	12/04/22 04:23	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
M2-4:2 FTS	108		10 - 200	11/28/22 07:14	12/04/22 04:23	1
M2-6:2 FTS	109		17 - 200	11/28/22 07:14	12/04/22 04:23	1
M2-8:2 FTS	112		33 - 200	11/28/22 07:14	12/04/22 04:23	1
13C2-PFDoDA	106		17 - 176	11/28/22 07:14	12/04/22 04:23	1
13C2 PFTeDA	94		10 - 179	11/28/22 07:14	12/04/22 04:23	1
13C3 HFPO-DA	100		17 - 185	11/28/22 07:14	12/04/22 04:23	1
13C3 PFBS	125		16 - 200	11/28/22 07:14	12/04/22 04:23	1
13C3 PFHxS	120		28 - 188	11/28/22 07:14	12/04/22 04:23	1
13C4 PFBA	119		42 - 165	11/28/22 07:14	12/04/22 04:23	1
13C4 PFHpA	114		31 - 182	11/28/22 07:14	12/04/22 04:23	1
13C5 PFPeA	133		38 - 187	11/28/22 07:14	12/04/22 04:23	1
13C6 PFDA	120		49 - 163	11/28/22 07:14	12/04/22 04:23	1
13C8 PFOA	113		48 - 162	11/28/22 07:14	12/04/22 04:23	1
13C8 PFOS	132		51 - 159	11/28/22 07:14	12/04/22 04:23	1
13C8 FOSA	111		10 - 168	11/28/22 07:14	12/04/22 04:23	1
d3-NMeFOSAA	110		31 - 174	11/28/22 07:14	12/04/22 04:23	1
d3-NMePFOSA	87		10 - 155	11/28/22 07:14	12/04/22 04:23	1
13C5 PFHxA	114		24 - 179	11/28/22 07:14	12/04/22 04:23	1
13C7 PFUnA	125		34 - 174	11/28/22 07:14	12/04/22 04:23	1
13C9 PFNA	128		51 - 167	11/28/22 07:14	12/04/22 04:23	1
d5-NEtFOSAA	117		29 - 195	11/28/22 07:14	12/04/22 04:23	1

**Lab Sample ID: LCS 410-321038/3-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0169		ug/L		71	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0193		ug/L		81	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0195		ug/L		80	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0188		ug/L		77	55 - 138

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

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

**Lab Sample ID: LCS 410-321038/3-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
9CI-PF3ONS	0.0238	0.0178		ug/L		75	59 - 135
DONA	0.0242	0.0218		ug/L		90	55 - 143
HFPODA	0.0256	0.0237		ug/L		93	50 - 135
NEtFOSAA	0.0256	0.0214		ug/L		84	55 - 134
NMeFOSAA	0.0256	0.0225		ug/L		88	59 - 140
NMeFOSA	0.0256	0.0239		ug/L		93	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0202		ug/L		89	53 - 138
Perfluorobutanoic acid	0.0256	0.0204		ug/L		80	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0178		ug/L		72	55 - 137
Perfluorodecanoic acid	0.0256	0.0240		ug/L		94	56 - 138
Perfluorododecanoic acid	0.0256	0.0220		ug/L		86	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0207		ug/L		85	56 - 140
Perfluoroheptanoic acid	0.0256	0.0221		ug/L		86	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0202		ug/L		87	58 - 134
Perfluorohexanoic acid	0.0256	0.0218		ug/L		85	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0188		ug/L		76	59 - 136
Perfluorononanoic acid	0.0256	0.0224		ug/L		88	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0228		ug/L		89	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0210		ug/L		89	45 - 150
Perfluorooctanoic acid	0.0256	0.0226		ug/L		88	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0222		ug/L		92	55 - 140
Perfluoropentanoic acid	0.0256	0.0198		ug/L		78	57 - 141
Perfluorotetradecanoic acid	0.0256	0.0220		ug/L		86	62 - 139
Perfluorotridecanoic acid	0.0256	0.0209		ug/L		82	58 - 146
Perfluoroundecanoic acid	0.0256	0.0229		ug/L		89	60 - 141

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
M2-4:2 FTS	115		10 - 200
M2-6:2 FTS	119		17 - 200
M2-8:2 FTS	129		33 - 200
13C2-PFDoDA	117		17 - 176
13C2 PFTeDA	105		10 - 179
13C3 HFPO-DA	110		17 - 185
13C3 PFBS	132		16 - 200
13C3 PFHxS	134		28 - 188
13C4 PFBA	133		42 - 165
13C4 PFHpA	125		31 - 182
13C5 PFPeA	138		38 - 187
13C6 PFDA	131		49 - 163
13C8 PFOA	129		48 - 162
13C8 PFOS	145		51 - 159
13C8 FOSA	126		10 - 168
d3-NMeFOSAA	121		31 - 174
d3-NMePFOSA	95		10 - 155
13C5 PFHxA	127		24 - 179
13C7 PFUnA	134		34 - 174
13C9 PFNA	138		51 - 167
d5-NEtFOSAA	127		29 - 195

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

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

**Lab Sample ID: LCSD 410-321038/4-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD
									Limit
11CI-PF3OUdS	0.0238	0.0156		ug/L		65	53 - 139	8	30
4:2 Fluorotelomer sulfonic acid	0.0239	0.0190		ug/L		80	55 - 139	1	30
6:2 Fluorotelomer sulfonic acid	0.0243	0.0202		ug/L		83	28 - 173	4	30
8:2 Fluorotelomer sulfonic acid	0.0245	0.0205		ug/L		84	55 - 138	9	30
9CI-PF3ONS	0.0238	0.0182		ug/L		76	59 - 135	2	30
DONA	0.0242	0.0219		ug/L		91	55 - 143	0	30
HFPODA	0.0256	0.0254		ug/L		99	50 - 135	7	30
NEtFOSAA	0.0256	0.0227		ug/L		89	55 - 134	6	30
NMeFOSAA	0.0256	0.0240		ug/L		94	59 - 140	6	30
NMeFOSA	0.0256	0.0252		ug/L		98	64 - 143	5	30
Perfluorobutanesulfonic acid	0.0227	0.0192		ug/L		85	53 - 138	5	30
Perfluorobutanoic acid	0.0256	0.0200		ug/L		78	59 - 136	2	30
Perfluorodecanesulfonic acid	0.0247	0.0163		ug/L		66	55 - 137	9	30
Perfluorodecanoic acid	0.0256	0.0257		ug/L		100	56 - 138	7	30
Perfluorododecanoic acid	0.0256	0.0251		ug/L		98	59 - 143	14	30
Perfluoroheptanesulfonic acid	0.0244	0.0212		ug/L		87	56 - 140	3	30
Perfluoroheptanoic acid	0.0256	0.0224		ug/L		88	59 - 145	1	30
Perfluorohexanesulfonic acid	0.0233	0.0205		ug/L		88	58 - 134	1	30
Perfluorohexanoic acid	0.0256	0.0220		ug/L		86	58 - 139	1	30
Perfluorononanesulfonic acid	0.0246	0.0184		ug/L		75	59 - 136	2	30
Perfluorononanoic acid	0.0256	0.0235		ug/L		92	61 - 139	5	30
Perfluorooctanesulfonamide	0.0256	0.0253		ug/L		99	43 - 167	10	30
Perfluorooctanesulfonic acid	0.0237	0.0220		ug/L		93	45 - 150	5	30
Perfluorooctanoic acid	0.0256	0.0224		ug/L		88	51 - 145	1	30
Perfluoropentanesulfonic acid	0.0240	0.0217		ug/L		90	55 - 140	2	30
Perfluoropentanoic acid	0.0256	0.0208		ug/L		81	57 - 141	5	30
Perfluorotetradecanoic acid	0.0256	0.0264		ug/L		103	62 - 139	18	30
Perfluorotridecanoic acid	0.0256	0.0219		ug/L		86	58 - 146	5	30
Perfluoroundecanoic acid	0.0256	0.0258		ug/L		101	60 - 141	12	30

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
M2-4:2 FTS	117		10 - 200
M2-6:2 FTS	111		17 - 200
M2-8:2 FTS	100		33 - 200
13C2-PFDoDA	86		17 - 176
13C2 PFTeDA	71		10 - 179
13C3 HFPO-DA	103		17 - 185
13C3 PFBS	140		16 - 200
13C3 PFHxS	128		28 - 188
13C4 PFBA	132		42 - 165
13C4 PFHpA	122		31 - 182
13C5 PFPeA	138		38 - 187
13C6 PFDA	108		49 - 163
13C8 PFOA	124		48 - 162
13C8 PFOS	128		51 - 159
13C8 FOSA	98		10 - 168
d3-NMeFOSAA	97		31 - 174
d3-NMePFOSA	85		10 - 155

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

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

**Lab Sample ID: LCSD 410-321038/4-A**  
**Matrix: Water**  
**Analysis Batch: 323404**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 321038**

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C5 PFHxA	126		24 - 179
13C7 PFOxA	97		34 - 174
13C9 PFNA	129		51 - 167
d5-NEtFOSAA	96		29 - 195

## Method: 365.4 - Phosphorus, Total

**Lab Sample ID: MB 670-12948/2-A**  
**Matrix: Water**  
**Analysis Batch: 13353**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 12948**

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Phosphorus as P	40	U	100	40	ug/L		12/01/22 09:49	12/05/22 11:23	1

**Lab Sample ID: LCS 670-12948/1-A**  
**Matrix: Water**  
**Analysis Batch: 13353**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 12948**

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Total Phosphorus as P	1500	1480		ug/L		99	90 - 110

**Lab Sample ID: 670-9568-A-1-A MS**  
**Matrix: Water**  
**Analysis Batch: 13353**

**Client Sample ID: Matrix Spike**  
**Prep Type: Total/NA**  
**Prep Batch: 12948**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
				Result	Qualifier				
Total Phosphorus as P	12000	J3	1500	12800	J3	ug/L		53	85 - 115

**Lab Sample ID: 670-9568-A-1-B MSD**  
**Matrix: Water**  
**Analysis Batch: 13353**

**Client Sample ID: Matrix Spike Duplicate**  
**Prep Type: Total/NA**  
**Prep Batch: 12948**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
				Result	Qualifier						
Total Phosphorus as P	12000	J3	1500	12900	J3	ug/L		60	85 - 115	1	20

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## GC/MS VOA

### Analysis Batch: 12318

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	8260B	
670-9608-2	IA-TB01-20221115	Total/NA	Water	8260B	
MB 670-12318/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12318/4	Lab Control Sample	Total/NA	Water	8260B	
670-9547-P-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9772-C-1 DU	Duplicate	Total/NA	Water	8260B	

### Analysis Batch: 12445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	8260B	
MB 670-12445/6	Method Blank	Total/NA	Water	8260B	
LCS 670-12445/4	Lab Control Sample	Total/NA	Water	8260B	
670-9963-D-1 MS	Matrix Spike	Total/NA	Water	8260B	
670-9963-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	8260B	

## GC/MS Semi VOA

### Prep Batch: 11420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	3511	
MB 670-11420/3-A	Method Blank	Total/NA	Water	3511	
LCS 670-11420/1-A	Lab Control Sample	Total/NA	Water	3511	
LCSD 670-11420/2-A	Lab Control Sample Dup	Total/NA	Water	3511	

### Analysis Batch: 11532

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 670-11420/3-A	Method Blank	Total/NA	Water	8270E SIM	11420
LCS 670-11420/1-A	Lab Control Sample	Total/NA	Water	8270E SIM	11420
LCSD 670-11420/2-A	Lab Control Sample Dup	Total/NA	Water	8270E SIM	11420

### Analysis Batch: 12624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	8270E SIM	11420

## HPLC/IC

### Analysis Batch: 11468

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	300.0	
MB 670-11468/4	Method Blank	Total/NA	Water	300.0	
LCS 670-11468/5	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-11468/6	Lab Control Sample Dup	Total/NA	Water	300.0	
670-9582-A-1 MS	Matrix Spike	Total/NA	Water	300.0	
670-9582-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	

## LCMS

### Prep Batch: 321038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	537 IDA	
670-9608-1 - RA	IA-IDW01-20221115	Total/NA	Water	537 IDA	
MB 410-321038/1-A	Method Blank	Total/NA	Water	537 IDA	

Eurofins Orlando

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

## LCMS (Continued)

### Prep Batch: 321038 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 410-321038/3-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-321038/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

### Analysis Batch: 323404

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	537 IDA	321038
MB 410-321038/1-A	Method Blank	Total/NA	Water	537 IDA	321038
LCS 410-321038/3-A	Lab Control Sample	Total/NA	Water	537 IDA	321038
LCSD 410-321038/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	321038

### Analysis Batch: 324236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1 - RA	IA-IDW01-20221115	Total/NA	Water	537 IDA	321038

## General Chemistry

### Prep Batch: 12948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	365.2/365.3/365	
MB 670-12948/2-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-12948/1-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-9568-A-1-A MS	Matrix Spike	Total/NA	Water	365.2/365.3/365	
670-9568-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.2/365.3/365	

### Analysis Batch: 13353

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-9608-1	IA-IDW01-20221115	Total/NA	Water	365.4	12948
MB 670-12948/2-A	Method Blank	Total/NA	Water	365.4	12948
LCS 670-12948/1-A	Lab Control Sample	Total/NA	Water	365.4	12948
670-9568-A-1-A MS	Matrix Spike	Total/NA	Water	365.4	12948
670-9568-A-1-B MSD	Matrix Spike Duplicate	Total/NA	Water	365.4	12948



# Lab Chronicle

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

**Client Sample ID: IA-IDW01-20221115**

**Lab Sample ID: 670-9608-1**

**Date Collected: 11/15/22 14:15**

**Matrix: Water**

**Date Received: 11/15/22 15:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 22:16
Total/NA	Analysis	8260B		1	12445	K1P	EET ORL	11/28/22 15:35
Total/NA	Prep	3511			11420	OH	EET ORL	11/16/22 14:04
Total/NA	Analysis	8270E SIM		1	12624	JI	EET ORL	11/29/22 20:33
Total/NA	Analysis	300.0		2	11468	YS	EET ORL	11/16/22 22:47
Total/NA	Prep	537 IDA			321038	RC3V	ELLE	11/28/22 07:14
Total/NA	Analysis	537 IDA		1	323404	PY4D	ELLE	12/04/22 06:25
Total/NA	Prep	537 IDA	RA		321038	RC3V	ELLE	11/28/22 07:14
Total/NA	Analysis	537 IDA	RA	1	324236	DTA4	ELLE	12/06/22 17:31
Total/NA	Prep	365.2/365.3/365			12948	AT	EET ORL	12/01/22 09:49
Total/NA	Analysis	365.4		1	13353	AT	EET ORL	12/05/22 11:44

**Client Sample ID: IA-TB01-20221115**

**Lab Sample ID: 670-9608-2**

**Date Collected: 11/15/22 14:00**

**Matrix: Water**

**Date Received: 11/15/22 15:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260B		1	12318	K1P	EET ORL	11/23/22 22:36

**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 Industrial Area

Job ID: 670-9608-1

## Laboratory: Eurofins Orlando

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8270E SIM	3511	Water	Naphthalene

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87997	06-30-23



# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	EET ORL
8270E SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	EET ORL
300.0	Anions, Ion Chromatography	MCAWW	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
365.4	Phosphorus, Total	EPA	EET ORL
3511	Microextraction of Organic Compounds	SW846	EET ORL
365.2/365.3/365	Phosphorus, Total	MCAWW	EET ORL
5030C	Purge and Trap	SW846	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE

#### Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

#### Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-9608-1


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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-9608-1	IA-IDW01-20221115	Water	11/15/22 14:15	11/15/22 15:30
670-9608-2	IA-TB01-20221115	Water	11/15/22 14:00	11/15/22 15:30

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

# Chain of Custody Record



<b>Client Information</b>	Sampler: <u>Isaiah Skater</u> Phone: <u>407-766-0141</u> Lab PM: <u>Dylnicki, Kaitlin</u> E-Mail: <u>kaitlin.dylnicki@et.eurofins.com</u> Carrier Tracking No(s): State of Origin:	COC No: <u>670-2831-1005.1</u> Page: <u>Page 1 of 1</u> Job #:																																											
Company: <u>AECOM Technical Services Inc.</u> Address: <u>150 North Orange Avenue Suite 200</u> City: <u>Orlando</u> State, Zip: <u>FL, 32801</u> Phone: <u>919-461-1282(Tel)</u> Email: <u>teresa.amentt.jennings@aecom.com</u> Project Name: <u>NASA KSC Industrial Area</u> Site:	PWSID: Due Date Requested: TAT Requested (days): Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No PO #: <u>138224</u> WO #: <u>60610905</u> Project #: <u>67001282</u> SSOW#:	<b>Analysis Requested</b>	Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)																																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Sample Identification</th> <th>Sample Date</th> <th>Sample Time</th> <th>Sample Type (C=Comp, G=grab)</th> <th>Matrix (W=water, S=solid, O=waste/oil, BT=BIOSAM, AS=AS)</th> <th>Field Filtered Sample (Yes or No)</th> <th>Perform MS/MSD (Yes or No)</th> <th>PFC_IDA - (MOD) NASA KCS WS#15-2 DOD</th> <th>365.4 - Total Phosphorus as P</th> <th>826B - (MOD) NASA KSC WKST #15-39</th> <th>300_ORGFMS - Nitrate</th> <th>8270D_SIM - (MOD) Nap only</th> <th>Total Number of containers</th> <th>Special Instructions/Note:</th> </tr> </thead> <tbody> <tr> <td>IA-IDW01-20221115</td> <td>11/15/22</td> <td>1415</td> <td>G</td> <td>Water</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>N 2</td> <td>S 1</td> <td>A 3</td> <td>N 1</td> <td>N 1</td> <td></td> <td></td> </tr> <tr> <td>IA-TB01-20221115</td> <td>11/15/22</td> <td>1400</td> <td>G</td> <td>Water</td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td>N 2</td> <td>S 2</td> <td>A 2</td> <td>N 2</td> <td>N 2</td> <td></td> <td></td> </tr> </tbody> </table>	Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=BIOSAM, AS=AS)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - (MOD) NASA KCS WS#15-2 DOD	365.4 - Total Phosphorus as P	826B - (MOD) NASA KSC WKST #15-39	300_ORGFMS - Nitrate	8270D_SIM - (MOD) Nap only	Total Number of containers	Special Instructions/Note:	IA-IDW01-20221115	11/15/22	1415	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 2	S 1	A 3	N 1	N 1			IA-TB01-20221115	11/15/22	1400	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 2	S 2	A 2	N 2	N 2			<div style="text-align: center;">             670-9608 Chain of Custody         </div>	Preservation Code: <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:
Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=BIOSAM, AS=AS)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA - (MOD) NASA KCS WS#15-2 DOD	365.4 - Total Phosphorus as P	826B - (MOD) NASA KSC WKST #15-39	300_ORGFMS - Nitrate	8270D_SIM - (MOD) Nap only	Total Number of containers	Special Instructions/Note:																																
IA-IDW01-20221115	11/15/22	1415	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 2	S 1	A 3	N 1	N 1																																		
IA-TB01-20221115	11/15/22	1400	G	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	N 2	S 2	A 2	N 2	N 2																																		
Empty Kit Relinquished by: Relinquished by: <u>[Signature]</u> Relinquished by: Relinquished by:	Date: <u>11/15/22</u> e <u>1550</u> Date/Time:	Date: <u>11/15/22</u> e <u>1530</u> Date/Time:	Date: <u>11/15/22</u> e <u>1530</u> Date/Time:																																										
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: <u>4.5</u>	Method of Shipment:																																										



**Eurofins Orlando**

481 Newburyport Avenue  
 Altamonte Springs, FL 32701  
 Phone: 407-339-5984 Fax: 407-260-6110

**Chain of Custody Record**



eurofins

<b>Client Information (Sub Contract Lab)</b>		Sampler:		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s):		COC No: 670-1684.1			
Client Contact: Shipping/Receiving		Phone:		E-Mail: kaitlin.dylnicki@et.eurofinsus.com		State of Origin: Florida		Page: Page 1 of 1			
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note): NELAP - Florida				Job #: 670-9608-1			
Address: 2425 New Holland Pike.		Due Date Requested: 12/6/2022		<b>Analysis Requested</b>						<b>Preservation Codes:</b> A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 R - Na2SO3 F - MeOH S - H2SO4 G - Amchlor T - TSP Dodecahydrate H - Ascorbic Acid U - Acetone I - Ice V - MCAA J - DI Water W - pH 4-5 K - EDTA Y - Trizma L - EDA Z - other (specify)  Other:	
City: Lancaster		TAT Requested (days):									
State, Zip: PA, 17601		PO #:		Field Filtered Sample (Yes or No)		Perform MS/MSD (Yes or No)		Total Number of containers			
Phone: 717-656-2300(Tel)		WC #:		PFC_IDA3535_PFC (MOD) NASA KCS WSA#15-2 DOD		PRE_SCREEN_PFA/PPFA/PreScn_W_P					
Email:		Project #: 67001282		SSOW#:							
Project Name: NASA KSC Industrial Area		Site:									
<b>Sample Identification - Client ID (Lab ID)</b>		<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=soil/sediment, BT=Tissue, AA=Air)</b>	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	PFC_IDA3535_PFC (MOD) NASA KCS WSA#15-2 DOD	PRE_SCREEN_PFA/PPFA/PreScn_W_P	Total Number of containers	<b>Special Instructions/Note:</b>
IA-IDW01-20221115 (670-9608-1)		11/15/22	14:15 Eastern		Water	X	X			2	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte &amp; accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.</p>											
<b>Possible Hazard Identification</b>						<b>Sample Disposal ( A fee may be assessed if samples are retained longer than 1 month)</b>					
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:					
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:			
Relinquished by: BB		Date/Time: 11/16 1239		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time: 11/17/22 1005		Company: ECH	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:				Cooler Temperature (°C) and Other Remarks: 0-7					

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# Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-9608-1

**Login Number: 9608**  
**List Number: 1**  
**Creator: Hartley, Tyler**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-9608-1

**Login Number: 9608**

**List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**

**List Number: 2**

**List Creation: 11/17/22 04:25 PM**

**Creator: Foreman, Leah M**

Question	Answer	Comment
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (<=/6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (<=/6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	





# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 1/17/2023 4:49:01 PM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER Environmental Health Facility

## JOB NUMBER

670-12834-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

## Qualifiers

### GC/MS VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

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**Job ID: 670-12834-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative  
670-12834-1**

**Receipt**

The samples were received on 1/11/2023 4:50 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 3.0°C

**GC/MS VOA**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0001-010.0-20230110**

**Lab Sample ID: 670-12834-1**

No Detections.

**Client Sample ID: EHF-DPT0001-015.0-20230110**

**Lab Sample ID: 670-12834-2**

No Detections.

**Client Sample ID: EHF-DPT0001-020.0-20230110**

**Lab Sample ID: 670-12834-3**

No Detections.

**Client Sample ID: EHF-DPT0001-030.0-20230110**

**Lab Sample ID: 670-12834-4**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	1.4		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0001-040.0-20230110**

**Lab Sample ID: 670-12834-5**

No Detections.

**Client Sample ID: EHF-DPT0001-050.0-20230110**

**Lab Sample ID: 670-12834-6**

No Detections.

**Client Sample ID: EHF-DPT0002-010.0-20230110**

**Lab Sample ID: 670-12834-7**

No Detections.

**Client Sample ID: EHF-DPT0002-015.0-20230110**

**Lab Sample ID: 670-12834-8**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	15		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0002-020.0-20230110**

**Lab Sample ID: 670-12834-9**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	19		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0002-030.0-20230110**

**Lab Sample ID: 670-12834-10**

No Detections.

**Client Sample ID: EHF-DPT0002-040.0-20230110**

**Lab Sample ID: 670-12834-11**

No Detections.

**Client Sample ID: EHF-DPT0002-050.0-20230110**

**Lab Sample ID: 670-12834-12**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0001-010.0-20230110**

**Lab Sample ID: 670-12834-1**

Date Collected: 01/10/23 08:35

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 15:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		01/13/23 15:47	1
4-Bromofluorobenzene (Surr)	98		41 - 142		01/13/23 15:47	1
Dibromofluoromethane (Surr)	104		53 - 146		01/13/23 15:47	1

**Client Sample ID: EHF-DPT0001-015.0-20230110**

**Lab Sample ID: 670-12834-2**

Date Collected: 01/10/23 08:55

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 16:38	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		01/13/23 16:38	1
4-Bromofluorobenzene (Surr)	97		41 - 142		01/13/23 16:38	1
Dibromofluoromethane (Surr)	104		53 - 146		01/13/23 16:38	1

**Client Sample ID: EHF-DPT0001-020.0-20230110**

**Lab Sample ID: 670-12834-3**

Date Collected: 01/10/23 09:20

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 17:12	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146		01/13/23 17:12	1
4-Bromofluorobenzene (Surr)	97		41 - 142		01/13/23 17:12	1
Dibromofluoromethane (Surr)	103		53 - 146		01/13/23 17:12	1

**Client Sample ID: EHF-DPT0001-030.0-20230110**

**Lab Sample ID: 670-12834-4**

Date Collected: 01/10/23 09:50

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.4		1.0	0.71	ug/L			01/13/23 17:29	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		01/13/23 17:29	1
4-Bromofluorobenzene (Surr)	98		41 - 142		01/13/23 17:29	1
Dibromofluoromethane (Surr)	105		53 - 146		01/13/23 17:29	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0001-040.0-20230110**

**Lab Sample ID: 670-12834-5**

Date Collected: 01/10/23 10:15

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 17:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/13/23 17:46	1
4-Bromofluorobenzene (Surr)	98		41 - 142					01/13/23 17:46	1
Dibromofluoromethane (Surr)	105		53 - 146					01/13/23 17:46	1

**Client Sample ID: EHF-DPT0001-050.0-20230110**

**Lab Sample ID: 670-12834-6**

Date Collected: 01/10/23 10:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 18:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146					01/13/23 18:03	1
4-Bromofluorobenzene (Surr)	99		41 - 142					01/13/23 18:03	1
Dibromofluoromethane (Surr)	103		53 - 146					01/13/23 18:03	1

**Client Sample ID: EHF-DPT0002-010.0-20230110**

**Lab Sample ID: 670-12834-7**

Date Collected: 01/10/23 11:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 18:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/13/23 18:20	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/13/23 18:20	1
Dibromofluoromethane (Surr)	104		53 - 146					01/13/23 18:20	1

**Client Sample ID: EHF-DPT0002-015.0-20230110**

**Lab Sample ID: 670-12834-8**

Date Collected: 01/10/23 12:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	15		1.0	0.71	ug/L			01/13/23 18:37	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/13/23 18:37	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/13/23 18:37	1
Dibromofluoromethane (Surr)	104		53 - 146					01/13/23 18:37	1



# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0002-020.0-20230110**

**Lab Sample ID: 670-12834-9**

Date Collected: 01/10/23 12:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	19		1.0	0.71	ug/L			01/13/23 18:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146		01/13/23 18:54	1
4-Bromofluorobenzene (Surr)	100		41 - 142		01/13/23 18:54	1
Dibromofluoromethane (Surr)	102		53 - 146		01/13/23 18:54	1

**Client Sample ID: EHF-DPT0002-030.0-20230110**

**Lab Sample ID: 670-12834-10**

Date Collected: 01/10/23 12:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 19:11	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		01/13/23 19:11	1
4-Bromofluorobenzene (Surr)	95		41 - 142		01/13/23 19:11	1
Dibromofluoromethane (Surr)	103		53 - 146		01/13/23 19:11	1

**Client Sample ID: EHF-DPT0002-040.0-20230110**

**Lab Sample ID: 670-12834-11**

Date Collected: 01/10/23 13:10

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 19:28	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146		01/13/23 19:28	1
4-Bromofluorobenzene (Surr)	99		41 - 142		01/13/23 19:28	1
Dibromofluoromethane (Surr)	102		53 - 146		01/13/23 19:28	1

**Client Sample ID: EHF-DPT0002-050.0-20230110**

**Lab Sample ID: 670-12834-12**

Date Collected: 01/10/23 13:35

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 19:45	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146		01/13/23 19:45	1
4-Bromofluorobenzene (Surr)	101		41 - 142		01/13/23 19:45	1
Dibromofluoromethane (Surr)	102		53 - 146		01/13/23 19:45	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

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

Matrix: Ground Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
670-12834-1	EHF-DPT0001-010.0-20230110	101	98	104
670-12834-1 MS	EHF-DPT0001-010.0-20230110	98	95	101
670-12834-2	EHF-DPT0001-015.0-20230110	100	97	104
670-12834-2 DU	EHF-DPT0001-015.0-20230110	100	102	102
670-12834-3	EHF-DPT0001-020.0-20230110	99	97	103
670-12834-4	EHF-DPT0001-030.0-20230110	101	98	105
670-12834-5	EHF-DPT0001-040.0-20230110	99	98	105
670-12834-6	EHF-DPT0001-050.0-20230110	102	99	103
670-12834-7	EHF-DPT0002-010.0-20230110	101	100	104
670-12834-8	EHF-DPT0002-015.0-20230110	99	100	104
670-12834-9	EHF-DPT0002-020.0-20230110	101	100	102
670-12834-10	EHF-DPT0002-030.0-20230110	100	95	103
670-12834-11	EHF-DPT0002-040.0-20230110	98	99	102
670-12834-12	EHF-DPT0002-050.0-20230110	97	101	102

**Surrogate Legend**

- TOL = Toluene-d8 (Surr)
- BFB = 4-Bromofluorobenzene (Surr)
- DBFM = Dibromofluoromethane (Surr)

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
LCS 670-18322/6	Lab Control Sample	100	96	102
MB 670-18322/29	Method Blank	101	97	105

**Surrogate Legend**

- TOL = Toluene-d8 (Surr)
- BFB = 4-Bromofluorobenzene (Surr)
- DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

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

**Lab Sample ID: MB 670-18322/29**  
**Matrix: Water**  
**Analysis Batch: 18322**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 15:10	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/13/23 15:10	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/13/23 15:10	1
Dibromofluoromethane (Surr)	105		53 - 146					01/13/23 15:10	1

**Lab Sample ID: LCS 670-18322/6**  
**Matrix: Water**  
**Analysis Batch: 18322**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	20.4		ug/L		102	20 - 167
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	100		40 - 146				
4-Bromofluorobenzene (Surr)	96		41 - 142				
Dibromofluoromethane (Surr)	102		53 - 146				

**Lab Sample ID: 670-12834-1 MS**  
**Matrix: Ground Water**  
**Analysis Batch: 18322**

**Client Sample ID: EHF-DPT0001-010.0-20230110**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.71	U	20.0	27.6		ug/L		138	20 - 167
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	98		40 - 146						
4-Bromofluorobenzene (Surr)	95		41 - 142						
Dibromofluoromethane (Surr)	101		53 - 146						

**Lab Sample ID: 670-12834-2 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 18322**

**Client Sample ID: EHF-DPT0001-015.0-20230110**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30
Surrogate	DU %Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	100		40 - 146					
4-Bromofluorobenzene (Surr)	102		41 - 142					
Dibromofluoromethane (Surr)	102		53 - 146					

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

## GC/MS VOA

### Analysis Batch: 18322

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12834-1	EHF-DPT0001-010.0-20230110	Total/NA	Ground Water	8260D	
670-12834-2	EHF-DPT0001-015.0-20230110	Total/NA	Ground Water	8260D	
670-12834-3	EHF-DPT0001-020.0-20230110	Total/NA	Ground Water	8260D	
670-12834-4	EHF-DPT0001-030.0-20230110	Total/NA	Ground Water	8260D	
670-12834-5	EHF-DPT0001-040.0-20230110	Total/NA	Ground Water	8260D	
670-12834-6	EHF-DPT0001-050.0-20230110	Total/NA	Ground Water	8260D	
670-12834-7	EHF-DPT0002-010.0-20230110	Total/NA	Ground Water	8260D	
670-12834-8	EHF-DPT0002-015.0-20230110	Total/NA	Ground Water	8260D	
670-12834-9	EHF-DPT0002-020.0-20230110	Total/NA	Ground Water	8260D	
670-12834-10	EHF-DPT0002-030.0-20230110	Total/NA	Ground Water	8260D	
670-12834-11	EHF-DPT0002-040.0-20230110	Total/NA	Ground Water	8260D	
670-12834-12	EHF-DPT0002-050.0-20230110	Total/NA	Ground Water	8260D	
MB 670-18322/29	Method Blank	Total/NA	Water	8260D	
LCS 670-18322/6	Lab Control Sample	Total/NA	Water	8260D	
670-12834-1 MS	EHF-DPT0001-010.0-20230110	Total/NA	Ground Water	8260D	
670-12834-2 DU	EHF-DPT0001-015.0-20230110	Total/NA	Ground Water	8260D	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0001-010.0-20230110**

**Lab Sample ID: 670-12834-1**

Date Collected: 01/10/23 08:35

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 15:47

**Client Sample ID: EHF-DPT0001-015.0-20230110**

**Lab Sample ID: 670-12834-2**

Date Collected: 01/10/23 08:55

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 16:38

**Client Sample ID: EHF-DPT0001-020.0-20230110**

**Lab Sample ID: 670-12834-3**

Date Collected: 01/10/23 09:20

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 17:12

**Client Sample ID: EHF-DPT0001-030.0-20230110**

**Lab Sample ID: 670-12834-4**

Date Collected: 01/10/23 09:50

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 17:29

**Client Sample ID: EHF-DPT0001-040.0-20230110**

**Lab Sample ID: 670-12834-5**

Date Collected: 01/10/23 10:15

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 17:46

**Client Sample ID: EHF-DPT0001-050.0-20230110**

**Lab Sample ID: 670-12834-6**

Date Collected: 01/10/23 10:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 18:03

**Client Sample ID: EHF-DPT0002-010.0-20230110**

**Lab Sample ID: 670-12834-7**

Date Collected: 01/10/23 11:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 18:20

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0002-015.0-20230110**

**Lab Sample ID: 670-12834-8**

Date Collected: 01/10/23 12:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 18:37

**Client Sample ID: EHF-DPT0002-020.0-20230110**

**Lab Sample ID: 670-12834-9**

Date Collected: 01/10/23 12:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 18:54

**Client Sample ID: EHF-DPT0002-030.0-20230110**

**Lab Sample ID: 670-12834-10**

Date Collected: 01/10/23 12:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 19:11

**Client Sample ID: EHF-DPT0002-040.0-20230110**

**Lab Sample ID: 670-12834-11**

Date Collected: 01/10/23 13:10

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 19:28

**Client Sample ID: EHF-DPT0002-050.0-20230110**

**Lab Sample ID: 670-12834-12**

Date Collected: 01/10/23 13:35

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18322	JW	EET ORL	01/13/23 19:45

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

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# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984





# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12834-1  
SDG: Environmental Health Facility

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-12834-1	EHF-DPT0001-010.0-20230110	Ground Water	01/10/23 08:35	01/11/23 16:50
670-12834-2	EHF-DPT0001-015.0-20230110	Ground Water	01/10/23 08:55	01/11/23 16:50
670-12834-3	EHF-DPT0001-020.0-20230110	Ground Water	01/10/23 09:20	01/11/23 16:50
670-12834-4	EHF-DPT0001-030.0-20230110	Ground Water	01/10/23 09:50	01/11/23 16:50
670-12834-5	EHF-DPT0001-040.0-20230110	Ground Water	01/10/23 10:15	01/11/23 16:50
670-12834-6	EHF-DPT0001-050.0-20230110	Ground Water	01/10/23 10:45	01/11/23 16:50
670-12834-7	EHF-DPT0002-010.0-20230110	Ground Water	01/10/23 11:25	01/11/23 16:50
670-12834-8	EHF-DPT0002-015.0-20230110	Ground Water	01/10/23 12:05	01/11/23 16:50
670-12834-9	EHF-DPT0002-020.0-20230110	Ground Water	01/10/23 12:25	01/11/23 16:50
670-12834-10	EHF-DPT0002-030.0-20230110	Ground Water	01/10/23 12:45	01/11/23 16:50
670-12834-11	EHF-DPT0002-040.0-20230110	Ground Water	01/10/23 13:10	01/11/23 16:50
670-12834-12	EHF-DPT0002-050.0-20230110	Ground Water	01/10/23 13:35	01/11/23 16:50

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**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Environmental Health Facility  
 TO No.: 80KSC019F0071  
 Greg Kusel | (772) 631-7426

Project No. 60619005 Subs 2021-23 Subs 2021-23  
 Phase:  
 Send Invoice To: Instructions in WSA # 195-24548-GW03  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando  
 Deliver Samples To: Eurofins Orlando

Page: 1 of 1  
 EDD to: Jennifer Chastain Cc: Teresa Amment Jennings  
 Report to: Jennifer Chastain Cc: Teresa Amment Jennings  
 Site-Specific WS#15 from QAPP: 15-33

Sampler/Phone #  
 Lab Name: Eurofins  
 Turnaround Time(specify): Standard 14 day

**Chris Marshall**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G-Grab C=Comp	(3)	HCl	Comments
	EHF-DPT0001-010.0-20230110	EHF-DPT0001	010.0	20230110	0935	WG	N	G	3		
	EHF-DPT0001-015.0-20230110	EHF-DPT0001	015.0	20230110	0955	WG	N	G	3		
	EHF-DPT0001-020.0-20230110	EHF-DPT0001	020.0	20230110	0920	WG	N	G	3		
	EHF-DPT0001-030.0-20230110	EHF-DPT0001	030.0	20230110	0950	WG	N	G	3		
	EHF-DPT0001-040.0-20230110	EHF-DPT0001	040.0	20230110	1015	WG	N	G	3		
	EHF-DPT0001-050.0-20230110	EHF-DPT0001	050.0	20230110	1045	WG	N	G	3		
	EHF-DPT0002-010.0-20230110	EHF-DPT0002	010.0	20230110	1125	WG	N	G	3		
	EHF-DPT0002-015.0-20230110	EHF-DPT0002	015.0	20230110	1205	WG	N	G	3		
	EHF-DPT0002-020.0-20230110	EHF-DPT0002	020.0	20230110	1225	WG	N	G	3		
	EHF-DPT0002-030.0-20230110	EHF-DPT0002	030.0	20230110	1245	WG	N	G	3		
	EHF-DPT0002-040.0-20230110	EHF-DPT0002	040.0	20230110	1310	WG	N	G	3		
	EHF-DPT0002-050.0-20230110	EHF-DPT0002	050.0	20230110	1335	WG	N	G	3		



**Field Comments:**

Report only per QAPP WS #15-33

Relinquished by (signature) *Greg Kusel* Date *1/11/23* Time *1515*

Received by (signature) *Jennifer Chastain* Date *4/11/23* Time *1515*

Number of coolers in shipment: \_\_\_\_\_  
 Samples tested? (check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

**Lab Comments:**

(1) AA = Ambient air, AQ = Air quality control, ASB = Asbestos, CK = Caulk, DS = Storm drain sediment, GS = Soil gas, IC = IDW Concrete, IDD = IDW Solid, IDS = IDW soil, IDW = IDW Water, LE = Free Product, MA = Mastic, PC = Paint Chips, SC = Cement/Concrete, SE = Sediment, SL = Sludge, SO = Soil, SQ = Soil/Solid quality control, SSD = Subsurface sediment, SU = Surface soil (<6 m), SW = Swab or wipe, TA = Animal tissue, TP = Plant tissue, TQ = Tissue quality control, WG = Ground water, WL = Leachate, WO = Ocean water, WP = Drinking water, WQ = Water quality control, WR = Ground water effluent, WS = Surface water, WU = Storm water, WW = Waste water

(2) Sample Type: AB = Ambient Blk, EB = Equipment Blk, FB = Field Blk, FD = Field Duplicate Sample, IDW = Investigative-Derived Waste, IIS = Incremental Sampling Methodology, N = Normal Environmental Sample, TB = Trip Blk

(3) Preservative added: 4 DEG C = Cool to 4 degrees, Dark = Store in Darkness, store cool at 4 degrees, H2SO4 <2 = Adjust to pH < 2 with sulfuric acid, H3PO4 <2 = Adjust to pH < 2 with phosphoric acid, HCl <2 = Adjust to pH < 2 with hydrochloric acid, HNO3 <2 = Adjust to pH < 2 with nitric acid, MeOH <2 = Methanol preservation, Na2O3S2 3/gal = Add 3 ml 10% sodium thiosulfate per gal, Na2O3S2 4/4oz = 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2 = Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12 = Adjust to pH > 12 with sodium hydroxide, NaOH >9 = Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500 = 0.6 g of ascorbic acid to 500mLs, ZnAct 2/500 = Add 2 ml of zinc acetate to 500mLs, ZnAct+NaOH >9 = Zinc acetate and NaOH to pH>9, store cool at 4C. If NO preservative added leave blank

Rev 8/19

3.5/3.0

**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Environmental Health Facility  
 TO No.: 80KSC019F0071  
 Greg Kusel / (772) 631-7426

COC No. \_\_\_\_\_ Page: 1 of 1  
 Project No. 60610005-Subs 2021-23-Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-24946-GV03 EDD to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Samples To: Eurofins Orlando Site-Specific WS# 15 from QAPP: 15-33

Chris Marshall  
 AECOM Project Manager:

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military (hhmm))	Matrix Code (1)	Sample Type (2) G=Grab C=Comp	Standard 14 day	Turnaround Time(s) (specify):		Comments
									(3)	HCl	
	EHF-DPT0001-010.0-20230110	EHF-DPT0001	010.0	20230110	0835	WG	N	G	3	3	
	EHF-DPT0001-015.0-20230110	EHF-DPT0001	015.0	20230110	0855	WG	N	G	3	3	
	EHF-DPT0001-020.0-20230110	EHF-DPT0001	020.0	20230110	0920	WG	N	G	3	3	
	EHF-DPT0001-030.0-20230110	EHF-DPT0001	030.0	20230110	0950	WG	N	G	3	3	
	EHF-DPT0001-040.0-20230110	EHF-DPT0001	040.0	20230110	1015	WG	N	G	3	3	
	EHF-DPT0001-050.0-20230110	EHF-DPT0001	050.0	20230110	1045	WG	N	G	3	3	
	EHF-DPT0002-010.0-20230110	EHF-DPT0002	010.0	20230110	1125	WG	N	G	3	3	
	EHF-DPT0002-015.0-20230110	EHF-DPT0002	015.0	20230110	1205	WG	N	G	3	3	
	EHF-DPT0002-020.0-20230110	EHF-DPT0002	020.0	20230110	1225	WG	N	G	3	3	
	EHF-DPT0002-030.0-20230110	EHF-DPT0002	030.0	20230110	1245	WG	N	G	3	3	
	EHF-DPT0002-040.0-20230110	EHF-DPT0002	040.0	20230110	1310	WG	N	G	3	3	
	EHF-DPT0002-050.0-20230110	EHF-DPT0002	050.0	20230110	1335	WG	N	G	3	3	



**Field Comments:**

Report only per QAPP WS # 15-33

Relinquished by (signature) \_\_\_\_\_ Date 1/11/23 Time 1515

Number of coolers in shipment: \_\_\_\_\_  
 Samples tested? (check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

**Lab Comments:**

Received by (signature) \_\_\_\_\_ Date 1/11/23 Time 1515  
 2 \_\_\_\_\_  
 3 \_\_\_\_\_

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW soil, IDW=IDW Water, LF=Free Product, MA=Mastic, PC=Paint Chips, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TO=Tissue quality control, WG=Ground water, WI=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees C H2SO4=Hydrogen sulfate, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2 3/gal=Add 3 ml, 1.0% sodium thiosulfate per gal, Na2O3S2 4/4oz=4 drops of 1.0% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >9=Adjust to pH > 9 with sodium hydroxide, NaOH >9=Adjust to pH > 9 with sodium hydroxide, VIRC 0.6/500=0.6 g of ascorbic acid to 500mLs, VIRC 2/500=Add 2 ml of zinc acetate to 500mLs, ZnAct+NaOH >9=Zinc acetate and NaOH to pH > 9; store cool at 4C. If NO preservative added leave blank

Rev 8/19

3-5/3-0

**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Environmental Health Facility  
 TO No.: 80KSC019F0071  
 Greg Kusel / (772) 631-7426

COC No. \_\_\_\_\_ Page: 1 of 1  
 Project No. 00610905-Subs 2021-23-Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Samples To: Eurofins Orlando Site-Specific WS# 15 from QAPP, 15-33

Chris Marshall  
 AECOM Project Manager:

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Comments
	EHF-DPT0001-010.0-20230110	EHF-DPT0001	010.0	20230110	0935	WG	N	G	3		
	EHF-DPT0001-015.0-20230110	EHF-DPT0001	015.0	20230110	0855	WG	N	G	3		
	EHF-DPT0001-020.0-20230110	EHF-DPT0001	020.0	20230110	0920	WG	N	G	3		
	EHF-DPT0001-030.0-20230110	EHF-DPT0001	030.0	20230110	0950	WG	N	G	3		
	EHF-DPT0001-040.0-20230110	EHF-DPT0001	040.0	20230110	1015	WG	N	G	3		
	EHF-DPT0001-050.0-20230110	EHF-DPT0001	050.0	20230110	1045	WG	N	G	3		
	EHF-DPT0002-010.0-20230110	EHF-DPT0002	010.0	20230110	1125	WG	N	G	3		
	EHF-DPT0002-015.0-20230110	EHF-DPT0002	015.0	20230110	1205	WG	N	G	3		
	EHF-DPT0002-020.0-20230110	EHF-DPT0002	020.0	20230110	1225	WG	N	G	3		
	EHF-DPT0002-030.0-20230110	EHF-DPT0002	030.0	20230110	1245	WG	N	G	3		
	EHF-DPT0002-040.0-20230110	EHF-DPT0002	040.0	20230110	1310	WG	N	G	3		
	EHF-DPT0002-050.0-20230110	EHF-DPT0002	050.0	20230110	1335	WG	N	G	3		



**Field Comments:**

Report only per QAPP WS #15-33

Relinquished by (signature) \_\_\_\_\_ Date 1/11/23 Time 1515

1. Greg Kusel

2. \_\_\_\_\_ Date 1/11/23 Time 1650

3. \_\_\_\_\_ Date 1/11/23 Time 1650

**Lab Comments:**

Number of coolers in shipment: \_\_\_\_\_

Samples iced?(check) Yes \_\_\_\_\_ No \_\_\_\_\_

Shipping Company: \_\_\_\_\_

Tracking No: \_\_\_\_\_

Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

**(1) AA** - Ambient air, **AO** - Air quality control, **ASB** - Asbestos, **CK** - Caulk, **DS** - Storm drain sediment, **GS** - Soil gas, **IC** - IDW Concrete, **IDD** - IDW Solid, **IDS** - IDW Water, **IDW** - IDW water, **LF** - Free Product, **MA** - Mastic, **PC** - Paint Chips, **SC** - Cement/Concrete, **SE** - Sediment, **SL** - Sludge, **SO** - Soil, **SQ** - Soil/Solid quality control, **SSD** - Subsurface sediment, **SU** - Surface soil (<6 in), **SW** - Swab or wipe, **TA** - Animal tissue, **TP** - Plant tissue, **TQ** - Tissue quality control, **WG** - Ground water, **WL** - Leachate, **WO** - Ocean water, **WP** - Drinking water, **WQ** - Water quality control, **WR** - Ground water effluent, **WS** - Surface water, **WW** - Waste water

**(2) Sample Type:** **AB** - Ambient, **EB** - Equipment, **FB** - Field Bk, **FD** - Field Duplicate Sample, **IDW** - Investigative-Derived Waste, **MIS** - Incremental Sampling Methodology, **N** - Normal Environmental Sample, **TB** - Trip Bk

**(3) Preservative added:** **4 DEG C** = Cool to 4 degrees, **Dark** = Store in Darkness, store cool at 4 degrees, **H3PO4 <2** = Adjust to pH < 2 with phosphoric acid, **HCl <2** = Adjust to pH < 2 with hydrochloric acid, **HNO3 <2** = Adjust to pH < 2 with nitric acid, **MeOH** = Methanol preservation, **Na2O352 3/gal** = Add 3 mL 10% sodium thiosulfate per 1 gal, **Na2O352 4/4oz** = 4 drops of 10% sodium thiosulfate to 4 oz, **NaHSO4 <2** = Adjust to pH < 2 with sodium hydrogensulfate, **NaOH >12** = Adjust to pH > 12 with sodium hydroxide, **NaOH >9** = Adjust to pH > 9 with sodium hydroxide, **VitC 0.6/500** = Add 2 mL of zinc acetate to 500mL, **ZnAct 2/500** = Add 2 mL of zinc acetate to 500mL, **ZnAct + NaOH >9** = Zinc acetate and NaOH to pH > 9, store cool at 4C. If NO preservative added leave blank

Rev 8/19

3.5/3.0



# Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12834-1  
SDG Number: Environmental Health Facility

**Login Number: 12834**  
**List Number: 1**  
**Creator: Clerisier, Meline**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 1/17/2023 9:40:22 AM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER Environmental Health Facility

## JOB NUMBER

670-12833-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

## Qualifiers

### GC/MS VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

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**Job ID: 670-12833-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative  
670-12833-1**

**Receipt**

The samples were received on 1/11/2023 4:50 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 3.0°C

**Receipt Exceptions**

Trip Blank was listed on COC but sample containers were not received.

**GC/MS VOA**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0003-010.0-20230110**

**Lab Sample ID: 670-12833-1**

No Detections.

**Client Sample ID: EHF-DPT0003-015.0-20230110**

**Lab Sample ID: 670-12833-2**

No Detections.

**Client Sample ID: EHF-DPT0003-020.0-20230110**

**Lab Sample ID: 670-12833-3**

No Detections.

**Client Sample ID: EHF-DPT0003-030.0-20230110**

**Lab Sample ID: 670-12833-4**

No Detections.

**Client Sample ID: EHF-DPT0003-040.0-20230110**

**Lab Sample ID: 670-12833-5**

No Detections.

**Client Sample ID: EHF-DPT0003-050.0-20230110**

**Lab Sample ID: 670-12833-6**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando



# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0003-010.0-20230110**

**Lab Sample ID: 670-12833-1**

Date Collected: 01/10/23 14:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 12:34	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/13/23 12:34	1
4-Bromofluorobenzene (Surr)	103		41 - 142					01/13/23 12:34	1
Dibromofluoromethane (Surr)	101		53 - 146					01/13/23 12:34	1

**Client Sample ID: EHF-DPT0003-015.0-20230110**

**Lab Sample ID: 670-12833-2**

Date Collected: 01/10/23 14:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 12:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/13/23 12:53	1
4-Bromofluorobenzene (Surr)	102		41 - 142					01/13/23 12:53	1
Dibromofluoromethane (Surr)	98		53 - 146					01/13/23 12:53	1

**Client Sample ID: EHF-DPT0003-020.0-20230110**

**Lab Sample ID: 670-12833-3**

Date Collected: 01/10/23 14:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 13:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/13/23 13:13	1
4-Bromofluorobenzene (Surr)	101		41 - 142					01/13/23 13:13	1
Dibromofluoromethane (Surr)	100		53 - 146					01/13/23 13:13	1

**Client Sample ID: EHF-DPT0003-030.0-20230110**

**Lab Sample ID: 670-12833-4**

Date Collected: 01/10/23 15:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 13:32	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/13/23 13:32	1
4-Bromofluorobenzene (Surr)	103		41 - 142					01/13/23 13:32	1
Dibromofluoromethane (Surr)	99		53 - 146					01/13/23 13:32	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
 SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0003-040.0-20230110**

**Lab Sample ID: 670-12833-5**

Date Collected: 01/10/23 15:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 13:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/13/23 13:52	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/13/23 13:52	1
Dibromofluoromethane (Surr)	102		53 - 146					01/13/23 13:52	1

**Client Sample ID: EHF-DPT0003-050.0-20230110**

**Lab Sample ID: 670-12833-6**

Date Collected: 01/10/23 15:50

Matrix: Ground Water

Date Received: 01/11/23 16:50

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/13/23 14:12	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/13/23 14:12	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/13/23 14:12	1
Dibromofluoromethane (Surr)	100		53 - 146					01/13/23 14:12	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

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

Matrix: Ground Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	BFB	DBFM
		(40-146)	(41-142)	(53-146)
670-12833-1	EHF-DPT0003-010.0-20230110	101	103	101
670-12833-2	EHF-DPT0003-015.0-20230110	99	102	98
670-12833-3	EHF-DPT0003-020.0-20230110	100	101	100
670-12833-4	EHF-DPT0003-030.0-20230110	100	103	99
670-12833-5	EHF-DPT0003-040.0-20230110	101	100	102
670-12833-6	EHF-DPT0003-050.0-20230110	100	100	100

#### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

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

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	BFB	DBFM
		(40-146)	(41-142)	(53-146)
660-126179-C-2 MS	Matrix Spike	100	100	101
670-12786-E-1 DU	Duplicate	99	101	98
LCS 670-18265/4	Lab Control Sample	99	101	100
MB 670-18265/6	Method Blank	98	104	98

#### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

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

**Lab Sample ID: MB 670-18265/6**  
**Matrix: Water**  
**Analysis Batch: 18265**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L	-		01/13/23 09:33	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					01/13/23 09:33	1
4-Bromofluorobenzene (Surr)	104		41 - 142					01/13/23 09:33	1
Dibromofluoromethane (Surr)	98		53 - 146					01/13/23 09:33	1

**Lab Sample ID: LCS 670-18265/4**  
**Matrix: Water**  
**Analysis Batch: 18265**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	19.8		ug/L	-	99	20 - 167
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	99		40 - 146				
4-Bromofluorobenzene (Surr)	101		41 - 142				
Dibromofluoromethane (Surr)	100		53 - 146				

**Lab Sample ID: 660-126179-C-2 MS**  
**Matrix: Water**  
**Analysis Batch: 18265**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.71	U	20.0	26.1		ug/L	-	131	20 - 167
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	100		40 - 146						
4-Bromofluorobenzene (Surr)	100		41 - 142						
Dibromofluoromethane (Surr)	101		53 - 146						

**Lab Sample ID: 670-12786-E-1 DU**  
**Matrix: Water**  
**Analysis Batch: 18265**

**Client Sample ID: Duplicate**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Vinyl chloride	0.71	U	0.71	U	ug/L	-	NC	30
Surrogate	DU %Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	99		40 - 146					
4-Bromofluorobenzene (Surr)	101		41 - 142					
Dibromofluoromethane (Surr)	98		53 - 146					

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

## GC/MS VOA

### Analysis Batch: 18265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12833-1	EHF-DPT0003-010.0-20230110	Total/NA	Ground Water	8260D	
670-12833-2	EHF-DPT0003-015.0-20230110	Total/NA	Ground Water	8260D	
670-12833-3	EHF-DPT0003-020.0-20230110	Total/NA	Ground Water	8260D	
670-12833-4	EHF-DPT0003-030.0-20230110	Total/NA	Ground Water	8260D	
670-12833-5	EHF-DPT0003-040.0-20230110	Total/NA	Ground Water	8260D	
670-12833-6	EHF-DPT0003-050.0-20230110	Total/NA	Ground Water	8260D	
MB 670-18265/6	Method Blank	Total/NA	Water	8260D	
LCS 670-18265/4	Lab Control Sample	Total/NA	Water	8260D	
660-126179-C-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-12786-E-1 DU	Duplicate	Total/NA	Water	8260D	



# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

**Client Sample ID: EHF-DPT0003-010.0-20230110**

**Lab Sample ID: 670-12833-1**

Date Collected: 01/10/23 14:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 12:34

**Client Sample ID: EHF-DPT0003-015.0-20230110**

**Lab Sample ID: 670-12833-2**

Date Collected: 01/10/23 14:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 12:53

**Client Sample ID: EHF-DPT0003-020.0-20230110**

**Lab Sample ID: 670-12833-3**

Date Collected: 01/10/23 14:45

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 13:13

**Client Sample ID: EHF-DPT0003-030.0-20230110**

**Lab Sample ID: 670-12833-4**

Date Collected: 01/10/23 15:05

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 13:32

**Client Sample ID: EHF-DPT0003-040.0-20230110**

**Lab Sample ID: 670-12833-5**

Date Collected: 01/10/23 15:25

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 13:52

**Client Sample ID: EHF-DPT0003-050.0-20230110**

**Lab Sample ID: 670-12833-6**

Date Collected: 01/10/23 15:50

Matrix: Ground Water

Date Received: 01/11/23 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18265	JW	EET ORL	01/13/23 14:12

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

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- 13
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# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12833-1  
SDG: Environmental Health Facility

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-12833-1	EHF-DPT0003-010.0-20230110	Ground Water	01/10/23 14:05	01/11/23 16:50
670-12833-2	EHF-DPT0003-015.0-20230110	Ground Water	01/10/23 14:25	01/11/23 16:50
670-12833-3	EHF-DPT0003-020.0-20230110	Ground Water	01/10/23 14:45	01/11/23 16:50
670-12833-4	EHF-DPT0003-030.0-20230110	Ground Water	01/10/23 15:05	01/11/23 16:50
670-12833-5	EHF-DPT0003-040.0-20230110	Ground Water	01/10/23 15:25	01/11/23 16:50
670-12833-6	EHF-DPT0003-050.0-20230110	Ground Water	01/10/23 15:50	01/11/23 16:50

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**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

**Project Name:** NASA KSC - Industrial Area  
**Site Location:** Environmental Health Facility  
**TO No.:** 80KSC019F0071  
**Greg Kusel / (772) 631-7426**  
**Sampler/Phone #**


**COC No.**  
**PO No.** 138224  
**Send Invoice To:** Instructions in HSA # 195-24548-GV03  
**Deliver Sample Kits To:** AECOM Depot, 523 18th Street, Orlando  
**Deliver Samples To:** Eurofins Orlando

**Page:** 1 of 1  
**Project No.** 60610905.Subs 2021-23-Subs 2021-23 | **Phase:**  
**EDD to:** Jennifer Chastain | **Cc:** Teresa Amendt Jennings  
**Report to:** Jennifer Chastain | **Cc:** Teresa Amendt Jennings  
**Site-Specific WS#15 from QAPP:** 15-33

**Chris Marshall**  
AECOM Project Manager

**Lab Name:** Eurofins  
**Turnaround Time(specific):** Standard 14 day  
**Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3) HCl	Comments
	EHF-DPT0003-010.0-20230110	EHF-DPT0003	010.0	20230110	1405	WG	N	G	3	
	EHF-DPT0003-015.0-20230110	EHF-DPT0003	015.0	20230110	1425	WG	N	G	3	
	EHF-DPT0003-020.0-20230110	EHF-DPT0003	020.0	20230110	1445	WG	N	G	3	
	EHF-DPT0003-030.0-20230110	EHF-DPT0003	030.0	20230110	1505	WG	N	G	3	
	EHF-DPT0003-040.0-20230110	EHF-DPT0003	040.0	20230110	1525	WG	N	G	3	
	EHF-DPT0003-050.0-20230110	EHF-DPT0003	050.0	20230110	1550	WG	N	G	3	
	EHF-TB-20230110	EHF-TB01	-	20230110	0700	WQ	TB	-	2	

  
 670-12833 Chain of Custody

**Field Comments:**  
 Report only per QAPP WS #15-33  
 Relinquished by (signature) *Greg Kusel* Date *1/11/23*  
 1 *Greg Kusel* Date *1/11/23*  
 2 *James W Gregory* Date *1/11/23*  
 3 *MC* Date *1/11/23*

**Sample Shipment and Delivery Details**  
 Number of coolers in shipment: \_\_\_\_\_  
 Samples iced? (check) Yes \_\_\_ No \_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: *1650*  
 Date Shipped: \_\_\_\_\_

(1) AA= Ambient air, AQ= Air quality control, ASB= Asbestos, CK= Caulk, DS= Storm drain sediment, GS= Soil gas, IC= IDW Concrete, IDD= IDW Solid, IDS= IDW Soil, IDW= IDW Water, LF= Free Product, MA= Mastic, PC= Paint Chips, SC= Cement/Concrete, SE= Sediment, SI= Sludge, SO= Soil, SQ= Soil/Solid quality control, SSD= Subsurface sediment, SU= Surface soil (<6 in), SW= Swab or wipe, TA= Animal tissue, TP= Plant tissue, TQ= Tissue quality control, WG= Ground water, WL= Leachate, WO= Ocean water, WP= Drinking water, WQ= Water quality control, WR= Ground water effluent, WS= Surface water, WU= Storm water, WW= Waste water  
 (2) Sample Type: AB= Ambient Blk, EB= Equipment Blk, FB= Field Blk, FD= Field Duplicate Sample, IDW= Investigative-Derived Waste, MIS= Incremental Sampling Methodology, N= Normal Environmental Sample, TB= Trip Blk  
 (3) Preservative added: 4 DEG C= Cool to 4 degrees, Dark= Store in Darkness, store cool at 4 degrees, H2SO4<2= Adjust to pH < 2 with sulfuric acid, H3PO4<2= Adjust to pH < 2 with phosphoric acid, HCl<2= Adjust to pH < 2 with hydrochloric acid, HNO3<2= Adjust to pH < 2 with nitric acid, MeOH= Methanol preservation, Na2O3S2 3/gal= Add 3 mL 10% sodium thiosulfate per gal, Na2O3S2 4/4oz= 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4<2= Adjust to pH < 2 with sodium hydrogen sulfate, NaOH > 12= Adjust to pH > 12 with sodium hydroxide, NaOH > 9= Adjust to pH > 9 with sodium hydroxide, NaOH > 9= Adjust to pH > 9 with sodium hydroxide, VITC 0.6/500= 0.6 g of ascorbic acid to 500mL, ZnAct 2/500= Add 2 mL of zinc acetate to 500mL, ZnAct+NaOH > 9= Zinc acetate and NaOH to pH > 9, store cool at 4C. If NO preservative added leave blank

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3.5 / 3.0



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Environmental Health Facility  
 TO No.: 80KSC019F0071  
 Greg Kusel / (772) 631-7426

Project No. 60610905-Subs 2021-23-Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-24548-GV03  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando  
 Deliver Samples To: Eurofins Orlando

Jennifer Chastain Cc: Teresa Arment Jennings  
 Jennifer Chastain Cc: Teresa Arment Jennings  
 Site-Specific WS# 15 from QAPP: 15-33

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	(3)	HCl	Comments
	EHF-DPT0003-010.0-202301 10	EHF-DPT0003	010.0	20230110	1405	WG	N	G	3	3	
	EHF-DPT0003-015.0-202301 10	EHF-DPT0003	015.0	20230110	1425	WG	N	G	3	3	
	EHF-DPT0003-020.0-202301 10	EHF-DPT0003	020.0	20230110	1445	WG	N	G	3	3	
	EHF-DPT0003-030.0-202301 10	EHF-DPT0003	030.0	20230110	1505	WG	N	G	3	3	
	EHF-DPT0003-040.0-202301 10	EHF-DPT0003	040.0	20230110	1525	WG	N	G	3	3	
	EHF-DPT0003-050.0-202301 10	EHF-DPT0003	050.0	20230110	1550	WG	N	G	3	3	
	EHF-TB-20230110	EHF-TB01	-	20230110	0700	WA	TB	-	2	2	



**Lab Name:** Eurofins

**Turnaround Time (specify):** Standard 14 day

**Sample Analysis Requested (Enter number of containers for each test)**

**Lab Comments:**

Report only per QAPP WS #15-33

Relinquished by (signature) Date

1. Greg Kusel 1/11/23

2. James W Gregory 4/11/23 1515

3. MC 1/11/23 1650

Number of coolers in shipment: \_\_\_\_\_  
 Samples tested (check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

(1) AA= Ambient air, AQ= Air quality control, ASB= Asbestos, CK= Caulk, DS= Storm drain sediment, GS= Soil gas, IC= IDW Concrete, IDD= IDW Solid, IDS= IDW soil, IDW= IDW water, LF= Free Product, MA= Mastic, PC= Paint Chips, SE= Sediment, SI= Sludge, SO= Soil, SQ= Soil/Solid quality control, SSD= Subsurface sediment, SU= Surface soil (<6 in), SW= Swab or wipe, TA= Animal tissue, TP= Plant tissue, TQ= Tissue quality control, WG= Ground water, WL= Leachate, WO= Ocean water, WP= Drinking water, WQ= Water quality control, WR= Ground water effluent, WS= Surface water, WW= Storm water, WY= Waste water

(2) Sample Type: AB= Ambient Blk, EB= Equipment Blk, FB= Field Blk, FD= Field Duplicate Sample, IDW= Investigative-Derived Waste, MIS= Incremental Sampling Methodology, N= Normal Environmental Sample, TB= Trip Blk

(3) Preservative added: 4 DEG C= Cool to 4 degrees, Dark= Store in Darkness, store cool at 4 degrees C H2SO4= Hydrogen sulfate, H2SO4 <2= Adjust to pH < 2 with sulfuric acid, H3PO4 <2= Adjust to pH < 2 with phosphoric acid, HCl <2= Adjust to pH < 2 with hydrochloric acid, HNaO4S= Sodium bisulfate preservation, HNO3 <2= Adjust to pH < 2 with nitric acid, MeOH= Methanol preservation, Na2O3S2 3/gal= Add 3 mL 10% sodium thiosulfate per 1-gal, Na2O3S2 4/4oz= 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2= Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12= Adjust to pH > 12 with sodium hydroxide, NaOH >9= Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500= Add 2 mL of ascorbic acid to 500mL, ZNact >9= Zinc acetate and NaOH to pH > 9, store cool at 4C. If NO preservative added leave blank

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3.5 / 3.0



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

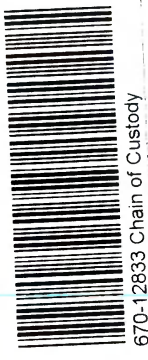
Project Name: NASA KSC - Industrial Area  
 Site Location: Environmental Health Facility  
 TO No.: 80KSC019F0071  
 AECOM Project Manager: Chris Marshall  
 Greg Kusel / (772) 631-7426

COC No. \_\_\_\_\_ Page: 1 of 1  
 Project No. 60610905-Subs 2021-23-Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-24548-GV03 EDD to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando Report to: Jennifer Chastain Cc: Teresa Arment Jennings  
 Deliver Samples To: Eurofins Orlando Site-Specific WS# 15 from QAPP: 15-33

Lab Name: Eurofins Turnaround Time(specific): Standard 14 day

**Sample Analysis Requested (Enter number of containers for each test)**

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	HCl	Total No. of Containers	Comments
	EHF-DPT0003-010.0-20230110	EHF-DPT0003	010.0	20230110	1405	WG	N	G		3	
	EHF-DPT0003-015.0-20230110	EHF-DPT0003	015.0	20230110	1425	WG	N	G		3	
	EHF-DPT0003-020.0-20230110	EHF-DPT0003	020.0	20230110	1445	WG	N	G		3	
	EHF-DPT0003-030.0-20230110	EHF-DPT0003	030.0	20230110	1505	WG	N	G		3	
	EHF-DPT0003-040.0-20230110	EHF-DPT0003	040.0	20230110	1525	WG	N	G		3	
	EHF-DPT0003-050.0-20230110	EHF-DPT0003	050.0	20230110	1550	WG	N	G		3	
	EHF-TB-20230110 EHF-TBC1			20230110	0700	WG	TB	-		2	



**Field Comments:**

Report only per QAPP WS # 15-33

Relinquished by (signature) *Greg Marshall* Date *1/11/23* Time *1515*

Received by (signature) *Jamie W Gregory* Date *1/11/23* Time *1515*

Number of coolers in shipment: \_\_\_\_\_  
 Samples Iced? (check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: *1111123*  
 Date Shipped: *1/11/23*

(1) AA = Ambient air, AQ = Air quality control, ASB = Asbestos, CK = Caulk, DS = Storm drain sediment, GS = Soil gas, IC = IDW Concrete, IDD = IDW Solid, IDS = IDW soil, IDW = IDW water, LF = Free Product, MA = Mastic, PC = Paint Chips, SC = Cement/Concrete, SE = Sediment, SL = Sludge, SO = Soil, SQ = Soil/Solid quality control, SSD = Subsurface sediment, SU = Surface soil (<6 in), SW = Swab or wipe, TA = Animal tissue, TP = Plant tissue, TQ = Tissue quality control, WG = Ground water, WL = Leachate, WO = Ocean water, WP = Drinking water, WQ = Water quality control, WR = Ground water effluent, WS = Surface water, WU = Storm water, WW = Waste water

(2) Sample Type: AB = Ambient Blk, EB = Equipment Blk, FB = Field Blk, FD = Field Duplicate Sample, IDW = Investigative-Derived Waste, MIS = Incremental Sampling Methodology, N = Normal Environmental Sample, TB = Trip Blk

(3) Preservative added: 4 DEG C = Cool to 4 degrees, Dark = Store in Darkness, store cool at 4 degrees C H2SO4 = Hydrogen sulfate, H2SO4 <2 = Adjust to pH < 2 with sulfuric acid, H3PO4 <2 = Adjust to pH < 2 with phosphoric acid, HQI <2 = Adjust to pH < 2 with hydrochloric acid, HNO3 <2 = Adjust to pH < 2 with nitric acid, MeOH = Methanol preservation, Na2O3S2 3/gal = Add 3 mL 10% sodium thiosulfate per gal, Na2O3S2 4/6oz = 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2 = Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >9 = Adjust to pH > 9 with sodium hydroxide, NaOH >9 = Adjust to pH > 9 with sodium hydroxide, VitC 0.6/500 = Add 2 mL of zinc acetate to 500mLs, ZnAct 2/500 = Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9 = Zinc acetate and NaOH to pH > 9

4C. If NO preservative added leave blank

Rev 8/19

3.5 / 3.0

# Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12833-1  
SDG Number: Environmental Health Facility

**Login Number: 12833**  
**List Number: 1**  
**Creator: Clerisier, Meline**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 1/20/2023 9:37:08 AM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER Ransom Road Landfill

## JOB NUMBER

670-12961-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



Generated  
1/20/2023 9:37:08 AM

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



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## Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

### Qualifiers

#### GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

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**Job ID: 670-12961-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative**  
**670-12961-1**

**Receipt**

The samples were received on 1/13/2023 1:23 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 2.0°C

**GC/MS VOA**

Method 8260D: The method requirement for no headspace was not met. The following volatile samples were analyzed with headspace in the sample container(s): RRLF-DPT0020-048.0-20230112 (670-12961-5), RRLF-DPT0022-028.0-20230112 (670-12961-13), RRLF-DPT0022-038.0-20230112 (670-12961-14) and RRLF-DPT0022-048.0-20230112 (670-12961-15). The samples had significant amount of sediment in the vials and had to be transferred into another vial to avoid potential damage to the instruments.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0020-008.0-20230111**

**Lab Sample ID: 670-12961-1**

No Detections.

**Client Sample ID: RRLF-DPT0020-018.0-20230111**

**Lab Sample ID: 670-12961-2**

No Detections.

**Client Sample ID: RRLF-DPT0020-028.0-20230111**

**Lab Sample ID: 670-12961-3**

No Detections.

**Client Sample ID: RRLF-DPT0020-038.0-20230112**

**Lab Sample ID: 670-12961-4**

No Detections.

**Client Sample ID: RRLF-DPT0020-048.0-20230112**

**Lab Sample ID: 670-12961-5**

No Detections.

**Client Sample ID: RRLF-DPT0021-008.0-20230111**

**Lab Sample ID: 670-12961-6**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.81	I	1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: RRLF-DPT0021-018.0-20230111**

**Lab Sample ID: 670-12961-7**

No Detections.

**Client Sample ID: RRLF-DPT0021-028.0-20230111**

**Lab Sample ID: 670-12961-8**

No Detections.

**Client Sample ID: RRLF-DPT0021-038.0-20230111**

**Lab Sample ID: 670-12961-9**

No Detections.

**Client Sample ID: RRLF-DPT0021-048.0-20230111**

**Lab Sample ID: 670-12961-10**

No Detections.

**Client Sample ID: RRLF-DPT0022-008.0-20230112**

**Lab Sample ID: 670-12961-11**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	14		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: RRLF-DPT0022-018.0-20230112**

**Lab Sample ID: 670-12961-12**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	13		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: RRLF-DPT0022-028.0-20230112**

**Lab Sample ID: 670-12961-13**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	8.6		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: RRLF-DPT0022-038.0-20230112**

**Lab Sample ID: 670-12961-14**

No Detections.

**Client Sample ID: RRLF-DPT0022-048.0-20230112**

**Lab Sample ID: 670-12961-15**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-TB-20230110**

**Lab Sample ID: 670-12961-16**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0020-008.0-20230111**

**Lab Sample ID: 670-12961-1**

Date Collected: 01/11/23 15:40

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 10:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/18/23 10:33	1
4-Bromofluorobenzene (Surr)	101		41 - 142					01/18/23 10:33	1
Dibromofluoromethane (Surr)	101		53 - 146					01/18/23 10:33	1

**Client Sample ID: RRLF-DPT0020-018.0-20230111**

**Lab Sample ID: 670-12961-2**

Date Collected: 01/11/23 15:55

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 12:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					01/18/23 12:29	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 12:29	1
Dibromofluoromethane (Surr)	99		53 - 146					01/18/23 12:29	1

**Client Sample ID: RRLF-DPT0020-028.0-20230111**

**Lab Sample ID: 670-12961-3**

Date Collected: 01/11/23 16:20

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 12:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/18/23 12:49	1
4-Bromofluorobenzene (Surr)	99		41 - 142					01/18/23 12:49	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 12:49	1

**Client Sample ID: RRLF-DPT0020-038.0-20230112**

**Lab Sample ID: 670-12961-4**

Date Collected: 01/12/23 08:05

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 13:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/18/23 13:08	1
4-Bromofluorobenzene (Surr)	98		41 - 142					01/18/23 13:08	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 13:08	1



# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0020-048.0-20230112**

**Lab Sample ID: 670-12961-5**

Date Collected: 01/12/23 08:40

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 13:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/18/23 13:28	1
4-Bromofluorobenzene (Surr)	101		41 - 142					01/18/23 13:28	1
Dibromofluoromethane (Surr)	102		53 - 146					01/18/23 13:28	1

**Client Sample ID: RRLF-DPT0021-008.0-20230111**

**Lab Sample ID: 670-12961-6**

Date Collected: 01/11/23 12:15

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.81	I	1.0	0.71	ug/L			01/18/23 13:47	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					01/18/23 13:47	1
4-Bromofluorobenzene (Surr)	98		41 - 142					01/18/23 13:47	1
Dibromofluoromethane (Surr)	98		53 - 146					01/18/23 13:47	1

**Client Sample ID: RRLF-DPT0021-018.0-20230111**

**Lab Sample ID: 670-12961-7**

Date Collected: 01/11/23 12:35

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 11:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/18/23 11:51	1
4-Bromofluorobenzene (Surr)	101		41 - 142					01/18/23 11:51	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 11:51	1

**Client Sample ID: RRLF-DPT0021-028.0-20230111**

**Lab Sample ID: 670-12961-8**

Date Collected: 01/11/23 12:55

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 14:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/18/23 14:07	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 14:07	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 14:07	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0021-038.0-20230111**

**Lab Sample ID: 670-12961-9**

Date Collected: 01/11/23 13:15

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 14:26	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/18/23 14:26	1
4-Bromofluorobenzene (Surr)	98		41 - 142					01/18/23 14:26	1
Dibromofluoromethane (Surr)	101		53 - 146					01/18/23 14:26	1

**Client Sample ID: RRLF-DPT0021-048.0-20230111**

**Lab Sample ID: 670-12961-10**

Date Collected: 01/11/23 14:25

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 14:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/18/23 14:46	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 14:46	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 14:46	1

**Client Sample ID: RRLF-DPT0022-008.0-20230112**

**Lab Sample ID: 670-12961-11**

Date Collected: 01/12/23 09:30

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	14		1.0	0.71	ug/L			01/18/23 15:05	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/18/23 15:05	1
4-Bromofluorobenzene (Surr)	99		41 - 142					01/18/23 15:05	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 15:05	1

**Client Sample ID: RRLF-DPT0022-018.0-20230112**

**Lab Sample ID: 670-12961-12**

Date Collected: 01/12/23 09:50

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	13		1.0	0.71	ug/L			01/18/23 15:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/18/23 15:24	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 15:24	1
Dibromofluoromethane (Surr)	100		53 - 146					01/18/23 15:24	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0022-028.0-20230112**

**Lab Sample ID: 670-12961-13**

Date Collected: 01/12/23 10:10

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	8.6		1.0	0.71	ug/L			01/18/23 15:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/18/23 15:44	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 15:44	1
Dibromofluoromethane (Surr)	101		53 - 146					01/18/23 15:44	1

**Client Sample ID: RRLF-DPT0022-038.0-20230112**

**Lab Sample ID: 670-12961-14**

Date Collected: 01/12/23 10:35

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 16:03	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/18/23 16:03	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/18/23 16:03	1
Dibromofluoromethane (Surr)	102		53 - 146					01/18/23 16:03	1

**Client Sample ID: RRLF-DPT0022-048.0-20230112**

**Lab Sample ID: 670-12961-15**

Date Collected: 01/12/23 11:05

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 16:23	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/18/23 16:23	1
4-Bromofluorobenzene (Surr)	100		41 - 142					01/18/23 16:23	1
Dibromofluoromethane (Surr)	99		53 - 146					01/18/23 16:23	1

**Client Sample ID: RRLF-TB-20230110**

**Lab Sample ID: 670-12961-16**

Date Collected: 01/10/23 07:00

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 11:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					01/18/23 11:31	1
4-Bromofluorobenzene (Surr)	99		41 - 142					01/18/23 11:31	1
Dibromofluoromethane (Surr)	99		53 - 146					01/18/23 11:31	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
670-12961-1	RRLF-DPT0020-008.0-20230111	100	101	101
670-12961-1 MS	RRLF-DPT0020-008.0-20230111 1	101	103	100
670-12961-2	RRLF-DPT0020-018.0-20230111 1	98	100	99
670-12961-3	RRLF-DPT0020-028.0-20230111 1	99	99	100
670-12961-4	RRLF-DPT0020-038.0-20230111 2	99	98	100
670-12961-5	RRLF-DPT0020-048.0-20230111 2	101	101	102
670-12961-6	RRLF-DPT0021-008.0-20230111 1	98	98	98
670-12961-7	RRLF-DPT0021-018.0-20230111 1	101	101	100
670-12961-7 DU	RRLF-DPT0021-018.0-20230111 1	101	100	100
670-12961-8	RRLF-DPT0021-028.0-20230111 1	99	100	100
670-12961-9	RRLF-DPT0021-038.0-20230111 1	101	98	101
670-12961-10	RRLF-DPT0021-048.0-20230111 1	100	100	100
670-12961-11	RRLF-DPT0022-008.0-20230111 2	99	99	100
670-12961-12	RRLF-DPT0022-018.0-20230111 2	100	100	100
670-12961-13	RRLF-DPT0022-028.0-20230111 2	100	100	101
670-12961-14	RRLF-DPT0022-038.0-20230111 2	100	97	102
670-12961-15	RRLF-DPT0022-048.0-20230111 2	99	100	99
670-12961-16	RRLF-TB-20230110	98	99	99
LCS 670-18816/4	Lab Control Sample	102	99	102
MB 670-18816/6	Method Blank	99	99	100

### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

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

**Lab Sample ID: MB 670-18816/6**  
**Matrix: Water**  
**Analysis Batch: 18816**

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

Analyte	MB	MB	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/18/23 09:54	1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac	
Toluene-d8 (Surr)	99		40 - 146				01/18/23 09:54	1	
4-Bromofluorobenzene (Surr)	99		41 - 142				01/18/23 09:54	1	
Dibromofluoromethane (Surr)	100		53 - 146				01/18/23 09:54	1	

**Lab Sample ID: LCS 670-18816/4**  
**Matrix: Water**  
**Analysis Batch: 18816**

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

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Vinyl chloride	20.0	18.8		ug/L		94	20 - 167
Surrogate	%Recovery	Qualifier	Limits				
Toluene-d8 (Surr)	102		40 - 146				
4-Bromofluorobenzene (Surr)	99		41 - 142				
Dibromofluoromethane (Surr)	102		53 - 146				

**Lab Sample ID: 670-12961-1 MS**  
**Matrix: Water**  
**Analysis Batch: 18816**

**Client Sample ID: RRLF-DPT0020-008.0-20230111**  
**Prep Type: Total/NA**

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Vinyl chloride	0.71	U	20.0	21.7		ug/L		109	20 - 167
Surrogate	%Recovery	Qualifier	Limits						
Toluene-d8 (Surr)	101		40 - 146						
4-Bromofluorobenzene (Surr)	103		41 - 142						
Dibromofluoromethane (Surr)	100		53 - 146						

**Lab Sample ID: 670-12961-7 DU**  
**Matrix: Water**  
**Analysis Batch: 18816**

**Client Sample ID: RRLF-DPT0021-018.0-20230111**  
**Prep Type: Total/NA**

Analyte	Sample	Sample	DU Result	DU	Unit	D	RPD	Limit
	Result	Qualifier		Qualifier				
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30
Surrogate	%Recovery	Qualifier	Limits					
Toluene-d8 (Surr)	101		40 - 146					
4-Bromofluorobenzene (Surr)	100		41 - 142					
Dibromofluoromethane (Surr)	100		53 - 146					

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

## GC/MS VOA

### Analysis Batch: 18816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12961-1	RRLF-DPT0020-008.0-20230111	Total/NA	Water	8260D	
670-12961-2	RRLF-DPT0020-018.0-20230111	Total/NA	Water	8260D	
670-12961-3	RRLF-DPT0020-028.0-20230111	Total/NA	Water	8260D	
670-12961-4	RRLF-DPT0020-038.0-20230112	Total/NA	Water	8260D	
670-12961-5	RRLF-DPT0020-048.0-20230112	Total/NA	Water	8260D	
670-12961-6	RRLF-DPT0021-008.0-20230111	Total/NA	Water	8260D	
670-12961-7	RRLF-DPT0021-018.0-20230111	Total/NA	Water	8260D	
670-12961-8	RRLF-DPT0021-028.0-20230111	Total/NA	Water	8260D	
670-12961-9	RRLF-DPT0021-038.0-20230111	Total/NA	Water	8260D	
670-12961-10	RRLF-DPT0021-048.0-20230111	Total/NA	Water	8260D	
670-12961-11	RRLF-DPT0022-008.0-20230112	Total/NA	Water	8260D	
670-12961-12	RRLF-DPT0022-018.0-20230112	Total/NA	Water	8260D	
670-12961-13	RRLF-DPT0022-028.0-20230112	Total/NA	Water	8260D	
670-12961-14	RRLF-DPT0022-038.0-20230112	Total/NA	Water	8260D	
670-12961-15	RRLF-DPT0022-048.0-20230112	Total/NA	Water	8260D	
670-12961-16	RRLF-TB-20230110	Total/NA	Water	8260D	
MB 670-18816/6	Method Blank	Total/NA	Water	8260D	
LCS 670-18816/4	Lab Control Sample	Total/NA	Water	8260D	
670-12961-1 MS	RRLF-DPT0020-008.0-20230111	Total/NA	Water	8260D	
670-12961-7 DU	RRLF-DPT0021-018.0-20230111	Total/NA	Water	8260D	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0020-008.0-20230111**

**Lab Sample ID: 670-12961-1**

Date Collected: 01/11/23 15:40

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 10:33

**Client Sample ID: RRLF-DPT0020-018.0-20230111**

**Lab Sample ID: 670-12961-2**

Date Collected: 01/11/23 15:55

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 12:29

**Client Sample ID: RRLF-DPT0020-028.0-20230111**

**Lab Sample ID: 670-12961-3**

Date Collected: 01/11/23 16:20

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 12:49

**Client Sample ID: RRLF-DPT0020-038.0-20230112**

**Lab Sample ID: 670-12961-4**

Date Collected: 01/12/23 08:05

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 13:08

**Client Sample ID: RRLF-DPT0020-048.0-20230112**

**Lab Sample ID: 670-12961-5**

Date Collected: 01/12/23 08:40

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 13:28

**Client Sample ID: RRLF-DPT0021-008.0-20230111**

**Lab Sample ID: 670-12961-6**

Date Collected: 01/11/23 12:15

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 13:47

**Client Sample ID: RRLF-DPT0021-018.0-20230111**

**Lab Sample ID: 670-12961-7**

Date Collected: 01/11/23 12:35

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 11:51

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0021-028.0-20230111**

**Lab Sample ID: 670-12961-8**

Date Collected: 01/11/23 12:55

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 14:07

**Client Sample ID: RRLF-DPT0021-038.0-20230111**

**Lab Sample ID: 670-12961-9**

Date Collected: 01/11/23 13:15

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 14:26

**Client Sample ID: RRLF-DPT0021-048.0-20230111**

**Lab Sample ID: 670-12961-10**

Date Collected: 01/11/23 14:25

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 14:46

**Client Sample ID: RRLF-DPT0022-008.0-20230112**

**Lab Sample ID: 670-12961-11**

Date Collected: 01/12/23 09:30

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 15:05

**Client Sample ID: RRLF-DPT0022-018.0-20230112**

**Lab Sample ID: 670-12961-12**

Date Collected: 01/12/23 09:50

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 15:24

**Client Sample ID: RRLF-DPT0022-028.0-20230112**

**Lab Sample ID: 670-12961-13**

Date Collected: 01/12/23 10:10

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 15:44

**Client Sample ID: RRLF-DPT0022-038.0-20230112**

**Lab Sample ID: 670-12961-14**

Date Collected: 01/12/23 10:35

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 16:03



# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

**Client Sample ID: RRLF-DPT0022-048.0-20230112**

**Lab Sample ID: 670-12961-15**

Date Collected: 01/12/23 11:05

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 16:23

**Client Sample ID: RRLF-TB-20230110**

**Lab Sample ID: 670-12961-16**

Date Collected: 01/10/23 07:00

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18816	P1K	EET ORL	01/18/23 11:31

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12961-1  
SDG: Ransom Road Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-12961-1	RRLF-DPT0020-008.0-20230111	Water	01/11/23 15:40	01/13/23 13:23
670-12961-2	RRLF-DPT0020-018.0-20230111	Water	01/11/23 15:55	01/13/23 13:23
670-12961-3	RRLF-DPT0020-028.0-20230111	Water	01/11/23 16:20	01/13/23 13:23
670-12961-4	RRLF-DPT0020-038.0-20230112	Water	01/12/23 08:05	01/13/23 13:23
670-12961-5	RRLF-DPT0020-048.0-20230112	Water	01/12/23 08:40	01/13/23 13:23
670-12961-6	RRLF-DPT0021-008.0-20230111	Water	01/11/23 12:15	01/13/23 13:23
670-12961-7	RRLF-DPT0021-018.0-20230111	Water	01/11/23 12:35	01/13/23 13:23
670-12961-8	RRLF-DPT0021-028.0-20230111	Water	01/11/23 12:55	01/13/23 13:23
670-12961-9	RRLF-DPT0021-038.0-20230111	Water	01/11/23 13:15	01/13/23 13:23
670-12961-10	RRLF-DPT0021-048.0-20230111	Water	01/11/23 14:25	01/13/23 13:23
670-12961-11	RRLF-DPT0022-008.0-20230112	Water	01/12/23 09:30	01/13/23 13:23
670-12961-12	RRLF-DPT0022-018.0-20230112	Water	01/12/23 09:50	01/13/23 13:23
670-12961-13	RRLF-DPT0022-028.0-20230112	Water	01/12/23 10:10	01/13/23 13:23
670-12961-14	RRLF-DPT0022-038.0-20230112	Water	01/12/23 10:35	01/13/23 13:23
670-12961-15	RRLF-DPT0022-048.0-20230112	Water	01/12/23 11:05	01/13/23 13:23
670-12961-16	RRLF-TB-20230110	Water	01/10/23 07:00	01/13/23 13:23

**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC  
 Site Location: Ransom Road Landfill  
 TO No.: 80KSC019F0071  
 Greg Kusel / (772) 631-7426

COC No. \_\_\_\_\_ Page: 1 of 2  
 PO No. 148674  
 Instructions in MSA # 195-24548-GV03  
 AECOM Project Manager: Chris Marshall  
 EDD to: Jennifer Chastein Cc: Teresa Amment Jennings  
 Report to: Jennifer Chastein Cc: Teresa Amment Jennings  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando  
 Deliver Samples To: Eurofins Orlando  
 Site-Specific WS#15 from QAPP: 15-29

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military (hhmm))	Matrix Code (1)	Sample Type (2)	Turnaround Time (specify):	Standard 1.4 day	Comments
	RRLF-DPT0020-008.0-202301 11	RRLF-DPT0020 11	008.0	20230111	1540	WG	N		G	
	RRLF-DPT0020-018.0-202301 11	RRLF-DPT0020 11	018.0	20230111	1555	WG	N		G	
	RRLF-DPT0020-028.0-202301 11	RRLF-DPT0020 11	028.0	20230111	1620	WG	N		G	
	RRLF-DPT0020-038.0-202301 12	RRLF-DPT0020 12	038.0	20230112	0805	WG	N		G	
	RRLF-DPT0020-048.0-202301 12	RRLF-DPT0020 12	048.0	20230112	0840	WG	N		G	
	RRLF-DPT0021-008.0-202301 11	RRLF-DPT0021 11	008.0	20230111	1215	WG	N		G	
	RRLF-DPT0021-018.0-202301 11	RRLF-DPT0021 11	018.0	20230111	1235	WG	N		G	
	RRLF-DPT0021-028.0-202301 11	RRLF-DPT0021 11	028.0	20230111	1255	WG	N		G	
	RRLF-DPT0021-038.0-202301 11	RRLF-DPT0021 11	038.0	20230111	1315	WG	N		G	
	RRLF-DPT0021-048.0-202301 11	RRLF-DPT0021 11	048.0	20230111	1405	WG	N		G	
	RRLF-DPT0022-008.0-202301 12	RRLF-DPT0022 12	008.0	20230112	0930	WG	N		G	
	RRLF-DPT0022-018.0-202301 12	RRLF-DPT0022 12	018.0	20230112	0950	WG	N		G	

**Field Comments:**  
 Report only per QAPP WS # 15-29

**Lab Comments:**  
 Total No. of Containers: 3  
 Vinyl chloride by SW2608  
 670-12961 Chain of Custody

**Relinquished by (signature):** *Drug Amel* Date: 1/13/23 Time: 1320  
**Received by (signature):** *[Signature]* Date: 1/13/23 Time: 1323

Number of coolers in shipment: \_\_\_\_\_  
 Samples Iced?(check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

(1) AA= Ambient air, AQ= Air quality control, ASB= Asbestos, CK= Caulk, DS= Storm drain sediment, GS= Soil gas, IC= IDW Concrete, IDD= IDW Solid, IDS= IDW soil, IDW= IDW Water, LF= Free Product, MA= Mastic, PG= Paint Chips, SC= Cement/Concrete, SE= Sediment, SL= Sludge, SO= Soil, SQ= Soil Solid quality control, SSD= Subsurface sediment, SU= Surface soil (<6 in), SW= Swab or wipe, TA= Animal tissue, TP= Plant tissue, TQ= Tissue quality control, WG= Ground water, WL= Leachate, WO= Ocean water, WR= Drinking water, WQ= Water quality control, WS= Surface water, WU= Storm water, WW= Waste water

(2) Sample Type: AB= Ambient Blk, EB= Equipment Blk, FB= Field Duplicate Sample, IDW= Investigative-Derived Waste, MIS= Incremental Sampling Methodology, N= Normal Environmental Sample, TB= Trip Blk

(3) Preservative added: 4 DEG C= Cool to 4 degrees, Dark= Store in Darkness, store cool to pH < 2 with sulfuric acid, H3PO4 <2= Adjust to pH < 2 with phosphoric acid, HCl <2= Adjust to pH < 2 with hydrochloric acid, HNO3 <2= Adjust to pH < 2 with nitric acid, MeOH= Methanol preservation, Na2O3S2 3/gal= Add 3 mL 10% sodium thiosulfate per gal, Na2O3S2 3/gal= Add 3 mL 10% sodium thiosulfate per gal, NaHSO4 <2= Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >12= Adjust to pH > 12 with sodium hydroxide, NaOH >9= Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500= 0.6 g of ascorbic acid to 500mLs, ZnAct 2/500= Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH >9= Zinc acetate and NaOH to pH>9; store cool at 4C. If NO preservative added leave blank

Rev 8/19

2.5 / 2.0



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC  
 Site Location: Ransom Road Landfill  
 TO No.: 80MSC019F0071  
 Greg Kussel / (772) 631-7426

Project No. 60610905 Subs 2021-23 Subs 2021-23 Phase:  
 Send Invoice To: Instructions in MSA # 195-2-4548-GV03  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando  
 Deliver Samples To: Eurofins Orlando

Page: 2 of 2  
 COC No. PO No. 138224  
 EDD to: Jennifer Chastain Cc: Teresa Ament Jennings  
 Report to: Jennifer Chastain Cc: Teresa Ament Jennings  
 Site-Specific WS#15 from QAPP: 15-29

Sampler/Phone #  
 Lab Name: Eurofins  
 Turnaround Time(specify): Standard 14 day  
 Chris Marshall  
 AECOM Project Manager:

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	(3)	HCl	Comments
	RRLF-DPT0022-028.0-202301 12	RRLF-DPT0022	028.0	20230112	1010	WG	N	G		
	RRLF-DPT0022-038.0-202301 12	RRLF-DPT0022	038.0	20230112	1035	WG	N	G		
	RRLF-DPT0022-048.0-202301 12	RRLF-DPT0022	048.0	20230112	1105	WG	N	G		
	RRLF-TB-20230110	RRLF-TB		20230110	0700	VQ	TB			
Total No. of Containers										
Vinyl chloride by SW2608										

**Field Comments:**

Report only per QAPP WS # 15-29

Relinquished by (signature) *Drey Mull* Date \_\_\_\_\_ Time \_\_\_\_\_

Received by (signature) *MC* Date 1/13/23 Time 1323

Number of coolers in shipment: \_\_\_\_\_  
 Samples Test?(check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Sample Shipment and Delivery Details**

(1) AA = Ambient air, AQ = Air quality control, ASB = Asbestos, CK = Caulk, DS = Storm drain sediment, GS = Soil gas, IC = IDW Concrete, IDD = IDW Solid, IDW = IDW Water, LF = Free Product, MA = Mastic, PC = Paint Chips, SC = Cement/Concrete, SE = Sediment, SL = Sludge, SO = Soil, SQ = Soil Solid quality control, SSD = Subsurface sediment, SU = Surface soil (<6 in), SW = Swab or wipe, TA = Animal tissue, TP = Plant tissue, TQ = Tissue quality control, WG = Ground water, WL = Leachate, WO = Ocean water, WP = Drinking water, WQ = Water quality control, WR = Ground water effluent, WS = Surface water, WU = Storm water, WW = Waste water

(2) Sample Type: AB = Ambient Bk, EB = Equipment Bk, FB = Field Bk, FD = Field Duplicate Sample, IDW = Investigative-Derived Waste, MIS = Incremental Sampling Methodology, N = Normal Environmental Sample, TB = Trip Bk

(3) Preservative added: 4 DEG C = Cool to 4 degrees, Dark = Store in Darkness, H2SO4 <2 = Adjust to pH < 2 with sulfuric acid, H3PO4 <2 = Adjust to pH < 2 with phosphoric acid, HCl <2 = Adjust to pH < 2 with hydrochloric acid, HNO3 <2 = Adjust to pH < 2 with nitric acid, MeOH = Methanol preservation, Na2O3S2 3/gal = Add 3 mL 10% sodium thiosulfate per gal, Na2O3S2 4/4oz = 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2 = Adjust to pH < 2 with sodium hydrogen sulfate, NaOH > 12 = Adjust to pH > 12 with sodium hydroxide, NaOH > 9 = Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500 = 0.6 g of ascorbic acid to 500mLs, VHC 0.6/500 = 0.6 g of ascorbic acid to 500mLs, ZNACT+NaOH > 9 = Zinc acetate and NaOH to pH > 9, store cool at 4C. If NO preservative added leave blank

Rev 8/19

2.5 / 2.0

## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12961-1  
SDG Number: Ransom Road Landfill

**Login Number: 12961**

**List Number: 1**

**Creator: Ferguson, Craig**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 1/18/2023 2:36:53 PM

## JOB DESCRIPTION

NASA KSC Industrial Area  
SDG NUMBER Engineering Development Laboratory

## JOB NUMBER

670-12968-1



# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



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1/18/2023 2:36:53 PM

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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

## Qualifiers

### GC/MS VOA

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

---

**Job ID: 670-12968-1**

---

**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative  
670-12968-1**

**Receipt**

The samples were received on 1/13/2023 1:23 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.4°C

**GC/MS VOA**

Method 8260D: The matrix spike (MS) recoveries for analytical batch 670-18651 were outside control limits for one or more analytes, see QC Sample Results for detail. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery is within acceptance limits.

Method 8260D: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 670-18651 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. Chromatogram shows obvious matrix interference in the baseline.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.



# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0012-030.0-20230112**

**Lab Sample ID: 670-12968-1**

No Detections.

**Client Sample ID: EDL-DPT0012-040.0-20230112**

**Lab Sample ID: 670-12968-2**

No Detections.

**Client Sample ID: EDL-DPT0012-050.0-20230112**

**Lab Sample ID: 670-12968-3**

No Detections.

**Client Sample ID: EDL-DPT0013-030.0-20230112**

**Lab Sample ID: 670-12968-4**

No Detections.

**Client Sample ID: EDL-DPT0013-040.0-20230112**

**Lab Sample ID: 670-12968-5**

No Detections.

**Client Sample ID: EDL-DPT0013-050.0-20230112**

**Lab Sample ID: 670-12968-6**

No Detections.

**Client Sample ID: EDL-DPT0014-030.0-20230113**

**Lab Sample ID: 670-12968-7**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	0.94	I	1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EDL-DPT0014-040.0-20230113**

**Lab Sample ID: 670-12968-8**

No Detections.

**Client Sample ID: EDL-DPT0014-050.0-20230113**

**Lab Sample ID: 670-12968-9**

No Detections.

**Client Sample ID: EDL-TB-20230110**

**Lab Sample ID: 670-12968-10**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0012-030.0-20230112**

**Lab Sample ID: 670-12968-1**

Date Collected: 01/12/23 14:00

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 12:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/17/23 12:44	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/17/23 12:44	1
Dibromofluoromethane (Surr)	96		53 - 146					01/17/23 12:44	1

**Client Sample ID: EDL-DPT0012-040.0-20230112**

**Lab Sample ID: 670-12968-2**

Date Collected: 01/12/23 14:30

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 14:31	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/17/23 14:31	1
4-Bromofluorobenzene (Surr)	95		41 - 142					01/17/23 14:31	1
Dibromofluoromethane (Surr)	101		53 - 146					01/17/23 14:31	1

**Client Sample ID: EDL-DPT0012-050.0-20230112**

**Lab Sample ID: 670-12968-3**

Date Collected: 01/12/23 15:05

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 14:49	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/17/23 14:49	1
4-Bromofluorobenzene (Surr)	98		41 - 142					01/17/23 14:49	1
Dibromofluoromethane (Surr)	101		53 - 146					01/17/23 14:49	1

**Client Sample ID: EDL-DPT0013-030.0-20230112**

**Lab Sample ID: 670-12968-4**

Date Collected: 01/12/23 15:50

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 15:07	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					01/17/23 15:07	1
4-Bromofluorobenzene (Surr)	95		41 - 142					01/17/23 15:07	1
Dibromofluoromethane (Surr)	98		53 - 146					01/17/23 15:07	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0013-040.0-20230112**

**Lab Sample ID: 670-12968-5**

Date Collected: 01/12/23 16:15

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 15:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/17/23 15:25	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/17/23 15:25	1
Dibromofluoromethane (Surr)	97		53 - 146					01/17/23 15:25	1

**Client Sample ID: EDL-DPT0013-050.0-20230112**

**Lab Sample ID: 670-12968-6**

Date Collected: 01/12/23 16:40

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 15:43	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/17/23 15:43	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/17/23 15:43	1
Dibromofluoromethane (Surr)	99		53 - 146					01/17/23 15:43	1

**Client Sample ID: EDL-DPT0014-030.0-20230113**

**Lab Sample ID: 670-12968-7**

Date Collected: 01/13/23 07:45

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.94	I	1.0	0.71	ug/L			01/17/23 16:00	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/17/23 16:00	1
4-Bromofluorobenzene (Surr)	96		41 - 142					01/17/23 16:00	1
Dibromofluoromethane (Surr)	95		53 - 146					01/17/23 16:00	1

**Client Sample ID: EDL-DPT0014-040.0-20230113**

**Lab Sample ID: 670-12968-8**

Date Collected: 01/13/23 08:10

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 16:18	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					01/17/23 16:18	1
4-Bromofluorobenzene (Surr)	94		41 - 142					01/17/23 16:18	1
Dibromofluoromethane (Surr)	98		53 - 146					01/17/23 16:18	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0014-050.0-20230113**

**Lab Sample ID: 670-12968-9**

Date Collected: 01/13/23 08:35

Matrix: Ground Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 16:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					01/17/23 16:36	1
4-Bromofluorobenzene (Surr)	91		41 - 142					01/17/23 16:36	1
Dibromofluoromethane (Surr)	95		53 - 146					01/17/23 16:36	1

**Client Sample ID: EDL-TB-20230110**

**Lab Sample ID: 670-12968-10**

Date Collected: 01/10/23 07:00

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 14:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					01/17/23 14:13	1
4-Bromofluorobenzene (Surr)	97		41 - 142					01/17/23 14:13	1
Dibromofluoromethane (Surr)	93		53 - 146					01/17/23 14:13	1



# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

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

Matrix: Ground Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	BFB	DBFM
		(40-146)	(41-142)	(53-146)
670-12968-1	EDL-DPT0012-030.0-20230112	99	97	96
670-12968-1 DU	EDL-DPT0012-030.0-20230112	100	94	99
670-12968-2	EDL-DPT0012-040.0-20230112	101	95	101
670-12968-3	EDL-DPT0012-050.0-20230112	101	98	101
670-12968-4	EDL-DPT0013-030.0-20230112	97	95	98
670-12968-5	EDL-DPT0013-040.0-20230112	101	97	97
670-12968-6	EDL-DPT0013-050.0-20230112	100	97	99
670-12968-7	EDL-DPT0014-030.0-20230113	99	96	95
670-12968-8	EDL-DPT0014-040.0-20230113	101	94	98
670-12968-9	EDL-DPT0014-050.0-20230113	99	91	95

### Surrogate Legend

TOL = Toluene-d8 (Surr)  
BFB = 4-Bromofluorobenzene (Surr)  
DBFM = Dibromofluoromethane (Surr)

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

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	BFB	DBFM
		(40-146)	(41-142)	(53-146)
670-12968-10	EDL-TB-20230110	100	97	93
762-571-C-2 MS	Matrix Spike	98	98	103
LCS 670-18651/4	Lab Control Sample	101	99	102
MB 670-18651/6	Method Blank	100	97	96

### Surrogate Legend

TOL = Toluene-d8 (Surr)  
BFB = 4-Bromofluorobenzene (Surr)  
DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

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

**Lab Sample ID: MB 670-18651/6**  
**Matrix: Water**  
**Analysis Batch: 18651**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 10:38	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146		01/17/23 10:38	1
4-Bromofluorobenzene (Surr)	97		41 - 142		01/17/23 10:38	1
Dibromofluoromethane (Surr)	96		53 - 146		01/17/23 10:38	1

**Lab Sample ID: LCS 670-18651/4**  
**Matrix: Water**  
**Analysis Batch: 18651**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	20.6		ug/L		103	20 - 167

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	101		40 - 146
4-Bromofluorobenzene (Surr)	99		41 - 142
Dibromofluoromethane (Surr)	102		53 - 146

**Lab Sample ID: 762-571-C-2 MS**  
**Matrix: Water**  
**Analysis Batch: 18651**

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.71	U J3	20.0	0.756	I J3	ug/L		4	20 - 167

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

**Lab Sample ID: 670-12968-1 DU**  
**Matrix: Ground Water**  
**Analysis Batch: 18651**

**Client Sample ID: EDL-DPT0012-030.0-20230112**  
**Prep Type: Total/NA**

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

Surrogate	DU %Recovery	DU Qualifier	Limits
Toluene-d8 (Surr)	100		40 - 146
4-Bromofluorobenzene (Surr)	94		41 - 142
Dibromofluoromethane (Surr)	99		53 - 146

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

## GC/MS VOA

### Analysis Batch: 18651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12968-1	EDL-DPT0012-030.0-20230112	Total/NA	Ground Water	8260D	
670-12968-2	EDL-DPT0012-040.0-20230112	Total/NA	Ground Water	8260D	
670-12968-3	EDL-DPT0012-050.0-20230112	Total/NA	Ground Water	8260D	
670-12968-4	EDL-DPT0013-030.0-20230112	Total/NA	Ground Water	8260D	
670-12968-5	EDL-DPT0013-040.0-20230112	Total/NA	Ground Water	8260D	
670-12968-6	EDL-DPT0013-050.0-20230112	Total/NA	Ground Water	8260D	
670-12968-7	EDL-DPT0014-030.0-20230113	Total/NA	Ground Water	8260D	
670-12968-8	EDL-DPT0014-040.0-20230113	Total/NA	Ground Water	8260D	
670-12968-9	EDL-DPT0014-050.0-20230113	Total/NA	Ground Water	8260D	
670-12968-10	EDL-TB-20230110	Total/NA	Water	8260D	
MB 670-18651/6	Method Blank	Total/NA	Water	8260D	
LCS 670-18651/4	Lab Control Sample	Total/NA	Water	8260D	
762-571-C-2 MS	Matrix Spike	Total/NA	Water	8260D	
670-12968-1 DU	EDL-DPT0012-030.0-20230112	Total/NA	Ground Water	8260D	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0012-030.0-20230112**

**Lab Sample ID: 670-12968-1**

Date Collected: 01/12/23 14:00

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 12:44

**Client Sample ID: EDL-DPT0012-040.0-20230112**

**Lab Sample ID: 670-12968-2**

Date Collected: 01/12/23 14:30

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 14:31

**Client Sample ID: EDL-DPT0012-050.0-20230112**

**Lab Sample ID: 670-12968-3**

Date Collected: 01/12/23 15:05

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 14:49

**Client Sample ID: EDL-DPT0013-030.0-20230112**

**Lab Sample ID: 670-12968-4**

Date Collected: 01/12/23 15:50

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 15:07

**Client Sample ID: EDL-DPT0013-040.0-20230112**

**Lab Sample ID: 670-12968-5**

Date Collected: 01/12/23 16:15

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 15:25

**Client Sample ID: EDL-DPT0013-050.0-20230112**

**Lab Sample ID: 670-12968-6**

Date Collected: 01/12/23 16:40

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 15:43

**Client Sample ID: EDL-DPT0014-030.0-20230113**

**Lab Sample ID: 670-12968-7**

Date Collected: 01/13/23 07:45

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 16:00

# Lab Chronicle

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
 SDG: Engineering Development Laboratory

**Client Sample ID: EDL-DPT0014-040.0-20230113**

**Lab Sample ID: 670-12968-8**

Date Collected: 01/13/23 08:10

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 16:18

**Client Sample ID: EDL-DPT0014-050.0-20230113**

**Lab Sample ID: 670-12968-9**

Date Collected: 01/13/23 08:35

Matrix: Ground Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 16:36

**Client Sample ID: EDL-TB-20230110**

**Lab Sample ID: 670-12968-10**

Date Collected: 01/10/23 07:00

Matrix: Water

Date Received: 01/13/23 13:23

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18651	K1P	EET ORL	01/17/23 14:13

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12968-1  
SDG: Engineering Development Laboratory

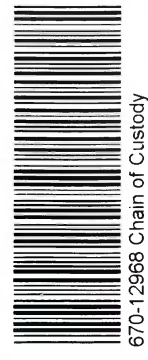
Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-12968-1	EDL-DPT0012-030.0-20230112	Ground Water	01/12/23 14:00	01/13/23 13:23
670-12968-2	EDL-DPT0012-040.0-20230112	Ground Water	01/12/23 14:30	01/13/23 13:23
670-12968-3	EDL-DPT0012-050.0-20230112	Ground Water	01/12/23 15:05	01/13/23 13:23
670-12968-4	EDL-DPT0013-030.0-20230112	Ground Water	01/12/23 15:50	01/13/23 13:23
670-12968-5	EDL-DPT0013-040.0-20230112	Ground Water	01/12/23 16:15	01/13/23 13:23
670-12968-6	EDL-DPT0013-050.0-20230112	Ground Water	01/12/23 16:40	01/13/23 13:23
670-12968-7	EDL-DPT0014-030.0-20230113	Ground Water	01/13/23 07:45	01/13/23 13:23
670-12968-8	EDL-DPT0014-040.0-20230113	Ground Water	01/13/23 08:10	01/13/23 13:23
670-12968-9	EDL-DPT0014-050.0-20230113	Ground Water	01/13/23 08:35	01/13/23 13:23
670-12968-10	EDL-TB-20230110	Water	01/10/23 07:00	01/13/23 13:23



**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

Project Name: NASA KSC - Industrial Area  
 Site Location: Engineering Development Laboratory  
 TO No.: 80KSC019F0071  
 Greg Kusel / (772) 631-7426  
 Project No. 66610905-Subs 2021-23-Subs 2021-23 Phase: 1 of 1  
 PO No. 148674  
 Instructions in MSA # 195-24548-GV03  
 AECOM Project Manager: Chris Marshall  
 AECOM Depot: 523 18th Street, Orlando  
 Eurofins Orlando  
 Jennifer Chastain Cc: Teresa Arment Jennings  
 Jennifer Chastain Cc: Teresa Arment Jennings  
 Site-Specific WS# 15 from QAPP, 15-36

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Sample Depth (feet below land surface)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	HCI	Comments
	EDL-DPT0012-030.0-20230112	EDL-DPT0012	030.0	20230112	1400	WG	N	G	3	
	EDL-DPT0012-040.0-20230112	EDL-DPT0012	040.0	20230112	1430	WG	N	G	3	
	EDL-DPT0012-050.0-20230112	EDL-DPT0012	050.0	20230112	1505	WG	N	G	3	
	EDL-DPT0013-030.0-20230112	EDL-DPT0013	030.0	20230112	1550	WG	N	G	3	
	EDL-DPT0013-040.0-20230112	EDL-DPT0013	040.0	20230112	1615	WG	N	G	3	
	EDL-DPT0013-050.0-20230112	EDL-DPT0013	050.0	20230113	1640	WG	N	G	3	
	EDL-DPT0014-030.0-20230113	EDL-DPT0014	030.0	20230113	0745	WG	N	G	3	
	EDL-DPT0014-040.0-20230113	EDL-DPT0014	040.0	20230113	0810	WG	N	G	3	
	EDL-DPT0014-050.0-20230113	EDL-DPT0014	050.0	20230113	0835	WG	N	G	3	
	EDL-TB-20230110	EDL-TB		20230110	0700	WB	TB		2	
<b>Sample Analysis Requested (Enter number of containers for each test)</b> Total No. of Containers: Vinyl chloride by SW82608										



**Field Comments:**  
 Report only per QAPP WS # 15-36  
 Relinquished by (signature) *Greg Kusel* Date *1/13/23* Time *1320*  
 Received by (signature) *MC* Date *1/13/23* Time *1323*  
 Number of coolers in shipment: \_\_\_\_\_  
 Samples feed?(check) Yes \_\_\_\_\_ No \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

**Lab Comments:**  
 670-12968 Chain of Custody  
 Sample Shipment and Delivery Details  
 (1) AA = Ambient air, AQ = Air quality control, ASB = Asbestos, CK = Caulk, DS = Storm drain sediment, GS = Soil gas, IC = IDW Concrete, IDD = IDW Solid, IDW = IDW Water, LF = Free Product, MA = Mastic, PC = Paint Chips, SC = Cement/Concrete, SE = Sediment, SL = Sludge, SO = Soil, SQ = Soil/Solid quality control, SSD = Subsurface sediment, SU = Surface soil (<6 in), SW = Swab or wipe, TA = Animal tissue, TP = Plant tissue, TQ = Tissue quality control, WG = Ground water, WL = Leachate, WO = Ocean water, WP = Drinking water, WQ = Water quality control, WR = Ground water effluent, WS = Surface water, WU = Storm water, WW = Waste water  
 (2) Sample Type: AB = Ambient Blk, EB = Equipment Blk, FB = Field Blk, FD = Field Duplicate Sample, IDW = Investigative-Derived Waste, MIS = Incremental Sampling Methodology, N = Normal Environmental Sample, TB = Trip Blk  
 (3) Preservative added: 4 DEG C = Cool to 4 degrees, Dark = Store in Darkness, store cool at 4 degrees C H2SO4 <2 = Adjust to pH < 2 with sulfuric acid, H3PO4 <2 = Adjust to pH < 2 with phosphoric acid, HCl <2 = Adjust to pH < 2 with hydrochloric acid, HNO3 <2 = Adjust to pH < 2 with nitric acid, MeOH = Methanol preservation, Na2O3S2 3/pal = Add 3 ml 10% sodium thiosulfate per l-pal, Na2O3S2 4/4oz = 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2 = Adjust to pH < 2 with sodium hydrogen sulfate, NaOH >9 = Adjust to pH > 9 with sodium hydroxide, NaOH >9 = Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500 = Add 2 ml of zinc acetate to 500mLs, VHC 0.6/500 = Add 2 ml of zinc acetate to 500mLs, ZnAct + NaOH >9 = Zinc acetate and NaOH to pH > 9; Store cool at 4C. If NO preservative added leave blank  
 Rev 8/19  
 0.9 / 0.4



## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12968-1

SDG Number: Engineering Development Laboratory

**Login Number: 12968**

**List Number: 1**

**Creator: Ferguson, Craig**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 1/30/2023 8:51:12 AM

## JOB DESCRIPTION

NASA KSC Industrial Area

## JOB NUMBER

670-12969-1

# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



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



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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

## Qualifiers

### GC/MS VOA

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

### HPLC/IC

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

### LCMS

Qualifier	Qualifier Description
*	Isotope Dilution analyte is outside acceptance limits.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J	Estimated value; value may not be accurate.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

### General Chemistry

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
▫	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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## Job ID: 670-12969-1

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### Laboratory: Eurofins Orlando

#### Narrative

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#### Job Narrative 670-12969-1

#### Receipt

The samples were received on 1/13/2023 1:23 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 5.2°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: Target analyte(s): 8:2 Fluorotelomer sulfonic acid and NMeFOSAA are outside of QC acceptance limits in the LCS/LCSD associated with samples: IA-IDW01-20230113 (670-12969-1) and IA-IDW02-20230113 (670-12969-2). Since the result is high and 8:2 Fluorotelomer sulfonic acid and NMeFOSAA is not detected in the samples, the data is reported.

Method PFC\_IDA: The recovery for target analyte: Perfluorotridecanoic acid is outside the QC acceptance limits in the closing continuing calibration verification standard, biased high. Since the result is high and target Perfluorotridecanoic acid is not detected in the following samples: IA-IDW01-20230113 (670-12969-1) and IA-IDW02-20230113 (670-12969-2), the data is reported.

Method PFC\_IDA: The sample injection standard peak areas in the following sample: IA-IDW01-20230113 (670-12969-1) are outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

Method PFC\_IDA: The recovery for the labeled isotope(s) M2-6:2 FTS, 13C2-PFDoDA and 13C2 PFTeDA in the following sample: IA-IDW01-20230113 (670-12969-1) are outside the QC acceptance limits. Since the recovery is high and the native analyte is not detected in the sample, the data is reported.

Method PFC\_IDA: Reporting limits were raised for the following sample: IA-IDW02-20230113 (670-12969-2) 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.

## Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

### Client Sample ID: IA-IDW01-20230113

### Lab Sample ID: 670-12969-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.00099	I	0.0018	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorobutanoic acid	0.0068		0.0044	0.0018	ug/L	1		537 IDA	Total/NA
Perfluoroheptanoic acid	0.0012	I	0.0018	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0015	I	0.0018	0.00044	ug/L	1		537 IDA	Total/NA
Perfluorohexanoic acid	0.0025		0.0018	0.00079	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0072	J	0.0018	0.00088	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.013		0.0018	0.00044	ug/L	1		537 IDA	Total/NA
Perfluoropentanoic acid	0.0013	I	0.0018	0.00044	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	75	I	100	40	ug/L	1		365.4	Total/NA

### Client Sample ID: IA-IDW02-20230113

### Lab Sample ID: 670-12969-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid	0.0014	I J	0.0022	0.00055	ug/L	1		537 IDA	Total/NA
Perfluorodecanesulfonic acid	0.0034	J	0.0022	0.00055	ug/L	1		537 IDA	Total/NA
Perfluorohexanesulfonic acid	0.0013	I	0.0022	0.00055	ug/L	1		537 IDA	Total/NA
Perfluorononanesulfonic acid	0.0032	J	0.0022	0.00055	ug/L	1		537 IDA	Total/NA
Perfluorooctanesulfonic acid	0.0042	J	0.0022	0.0011	ug/L	1		537 IDA	Total/NA
Perfluorooctanoic acid	0.00093	I	0.0022	0.00055	ug/L	1		537 IDA	Total/NA
Total Phosphorus as P	5700		100	40	ug/L	1		365.4	Total/NA

This Detection Summary does not include radiochemical test results.

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

**Client Sample ID: IA-IDW01-20230113**

**Lab Sample ID: 670-12969-1**

Date Collected: 01/13/23 10:05

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 02:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					01/17/23 02:40	1
Dibromofluoromethane (Surr)	97		53 - 146					01/17/23 02:40	1
4-Bromofluorobenzene (Surr)	99		41 - 142					01/17/23 02:40	1

**Method: MCAWW 300.0 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			01/13/23 23:15	1

**Method: EPA 537 IDA - EPA 537 Isotope Dilution**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
4:2 Fluorotelomer sulfonic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
6:2 Fluorotelomer sulfonic acid	0.0037	U	0.0044	0.0037	ug/L		01/26/23 07:05	01/27/23 21:21	1
8:2 Fluorotelomer sulfonic acid	0.00088	U J3	0.0026	0.00088	ug/L		01/26/23 07:05	01/27/23 21:21	1
9Cl-PF3ONS	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
DONA	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
HFPODA	0.00088	U	0.0026	0.00088	ug/L		01/26/23 07:05	01/27/23 21:21	1
NEtFOSAA	0.00044	U	0.0026	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
NMeFOSAA	0.00053	U J3	0.0018	0.00053	ug/L		01/26/23 07:05	01/27/23 21:21	1
NMeFOSA	0.00088	U	0.0026	0.00088	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorobutanesulfonic acid</b>	<b>0.00099</b>	<b>I</b>	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorobutanoic acid</b>	<b>0.0068</b>		0.0044	0.0018	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorodecanesulfonic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorodecanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorododecanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluoroheptanesulfonic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluoroheptanoic acid</b>	<b>0.0012</b>	<b>I</b>	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorohexanesulfonic acid</b>	<b>0.0015</b>	<b>I</b>	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorohexanoic acid</b>	<b>0.0025</b>		0.0018	0.00079	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorononanesulfonic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorononanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorooctanesulfonamide	0.00062	U	0.0018	0.00062	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorooctanesulfonic acid</b>	<b>0.0072</b>	<b>J</b>	0.0018	0.00088	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluorooctanoic acid</b>	<b>0.013</b>		0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluoropentanesulfonic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
<b>Perfluoropentanoic acid</b>	<b>0.0013</b>	<b>I</b>	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorotetradecanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluorotridecanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Perfluoroundecanoic acid	0.00044	U	0.0018	0.00044	ug/L		01/26/23 07:05	01/27/23 21:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
M2-4:2 FTS	164		10 - 200				01/26/23 07:05	01/27/23 21:21	1
M2-6:2 FTS	217	*	17 - 200				01/26/23 07:05	01/27/23 21:21	1
M2-8:2 FTS	143		33 - 200				01/26/23 07:05	01/27/23 21:21	1
13C2-PFDoDA	276	*	17 - 176				01/26/23 07:05	01/27/23 21:21	1
13C2 PFTeDA	476	*	10 - 179				01/26/23 07:05	01/27/23 21:21	1
13C3 HFPO-DA	59		17 - 185				01/26/23 07:05	01/27/23 21:21	1
13C3 PFBS	88		16 - 200				01/26/23 07:05	01/27/23 21:21	1

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# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

**Client Sample ID: IA-IDW01-20230113**

**Lab Sample ID: 670-12969-1**

Date Collected: 01/13/23 10:05

Matrix: Water

Date Received: 01/13/23 13:23

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

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C3 PFHxS	85		28 - 188	01/26/23 07:05	01/27/23 21:21	1
13C4 PFBA	96		42 - 165	01/26/23 07:05	01/27/23 21:21	1
13C4 PFHpA	78		31 - 182	01/26/23 07:05	01/27/23 21:21	1
13C5 PFPeA	83		38 - 187	01/26/23 07:05	01/27/23 21:21	1
13C6 PFDA	99		49 - 163	01/26/23 07:05	01/27/23 21:21	1
d5-NEtFOSAA	87		29 - 195	01/26/23 07:05	01/27/23 21:21	1
13C8 PFOA	84		48 - 162	01/26/23 07:05	01/27/23 21:21	1
13C8 PFOS	96		51 - 159	01/26/23 07:05	01/27/23 21:21	1
13C8 FOSA	20		10 - 168	01/26/23 07:05	01/27/23 21:21	1
d3-NMeFOSAA	37		31 - 174	01/26/23 07:05	01/27/23 21:21	1
d3-NMePFOSA	107		10 - 155	01/26/23 07:05	01/27/23 21:21	1
13C5 PFHxA	83		24 - 179	01/26/23 07:05	01/27/23 21:21	1
13C7 PFUnA	66		34 - 174	01/26/23 07:05	01/27/23 21:21	1
13C9 PFNA	86		51 - 167	01/26/23 07:05	01/27/23 21:21	1

**General Chemistry**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P (EPA 365.4)	75	I	100	40	ug/L		01/20/23 09:31	01/25/23 19:50	1

**Client Sample ID: IA-IDW02-20230113**

**Lab Sample ID: 670-12969-2**

Date Collected: 01/13/23 11:15

Matrix: Water

Date Received: 01/13/23 13:23

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/17/23 02:59	1
Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
Toluene-d8 (Surr)	98		40 - 146		01/17/23 02:59	1			
Dibromofluoromethane (Surr)	98		53 - 146		01/17/23 02:59	1			
4-Bromofluorobenzene (Surr)	100		41 - 142		01/17/23 02:59	1			

**Method: MCAWW 300.0 - Anions, Ion Chromatography**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			01/14/23 00:04	1

**Method: EPA 537 IDA - EPA 537 Isotope Dilution**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11CI-PF3OUdS	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
4:2 Fluorotelomer sulfonic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
6:2 Fluorotelomer sulfonic acid	0.0046	U	0.0055	0.0046	ug/L		01/26/23 07:05	01/27/23 21:33	1
8:2 Fluorotelomer sulfonic acid	0.0011	U J3	0.0033	0.0011	ug/L		01/26/23 07:05	01/27/23 21:33	1
9CI-PF3ONS	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
DONA	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
HFPODA	0.0011	U	0.0033	0.0011	ug/L		01/26/23 07:05	01/27/23 21:33	1
NEtFOSAA	0.00055	U	0.0033	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
NMeFOSAA	0.00066	U J3	0.0022	0.00066	ug/L		01/26/23 07:05	01/27/23 21:33	1
NMeFOSA	0.0011	U	0.0033	0.0011	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorobutanesulfonic acid	0.0014	I J	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorobutanoic acid	0.0022	U	0.0055	0.0022	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorodecanesulfonic acid	0.0034	J	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

**Client Sample ID: IA-IDW02-20230113**

**Lab Sample ID: 670-12969-2**

Date Collected: 01/13/23 11:15

Matrix: Water

Date Received: 01/13/23 13:23

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

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorodecanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorododecanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluoroheptanesulfonic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluoroheptanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
<b>Perfluorohexanesulfonic acid</b>	<b>0.0013</b>	<b>I</b>	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorohexanoic acid	0.00099	U	0.0022	0.00099	ug/L		01/26/23 07:05	01/27/23 21:33	1
<b>Perfluorononanesulfonic acid</b>	<b>0.0032</b>	<b>J</b>	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorononanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorooctanesulfonamide	0.00077	U	0.0022	0.00077	ug/L		01/26/23 07:05	01/27/23 21:33	1
<b>Perfluorooctanesulfonic acid</b>	<b>0.0042</b>	<b>J</b>	0.0022	0.0011	ug/L		01/26/23 07:05	01/27/23 21:33	1
<b>Perfluorooctanoic acid</b>	<b>0.00093</b>	<b>I</b>	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluoropentanesulfonic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluoropentanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorotetradecanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluorotridecanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Perfluoroundecanoic acid	0.00055	U	0.0022	0.00055	ug/L		01/26/23 07:05	01/27/23 21:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
M2-4:2 FTS	162		10 - 200				01/26/23 07:05	01/27/23 21:33	1
M2-6:2 FTS	183		17 - 200				01/26/23 07:05	01/27/23 21:33	1
M2-8:2 FTS	126		33 - 200				01/26/23 07:05	01/27/23 21:33	1
13C2-PFDoDA	44		17 - 176				01/26/23 07:05	01/27/23 21:33	1
13C2 PFTeDA	135		10 - 179				01/26/23 07:05	01/27/23 21:33	1
13C3 HFPO-DA	64		17 - 185				01/26/23 07:05	01/27/23 21:33	1
13C3 PFBS	84		16 - 200				01/26/23 07:05	01/27/23 21:33	1
13C3 PFHxS	80		28 - 188				01/26/23 07:05	01/27/23 21:33	1
13C4 PFBA	91		42 - 165				01/26/23 07:05	01/27/23 21:33	1
13C4 PFHpA	79		31 - 182				01/26/23 07:05	01/27/23 21:33	1
13C5 PFPeA	80		38 - 187				01/26/23 07:05	01/27/23 21:33	1
13C6 PFDA	82		49 - 163				01/26/23 07:05	01/27/23 21:33	1
d5-NEtFOSAA	31		29 - 195				01/26/23 07:05	01/27/23 21:33	1
13C8 PFOA	78		48 - 162				01/26/23 07:05	01/27/23 21:33	1
13C8 PFOS	95		51 - 159				01/26/23 07:05	01/27/23 21:33	1
13C8 FOSA	23		10 - 168				01/26/23 07:05	01/27/23 21:33	1
d3-NMeFOSAA	43		31 - 174				01/26/23 07:05	01/27/23 21:33	1
d3-NMePFOSA	25		10 - 155				01/26/23 07:05	01/27/23 21:33	1
13C5 PFHxA	80		24 - 179				01/26/23 07:05	01/27/23 21:33	1
13C7 PFUnA	38		34 - 174				01/26/23 07:05	01/27/23 21:33	1
13C9 PFNA	86		51 - 167				01/26/23 07:05	01/27/23 21:33	1

**General Chemistry**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Total Phosphorus as P (EPA 365.4)</b>	<b>5700</b>		100	40	ug/L		01/20/23 09:31	01/25/23 19:54	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

Matrix: Water

Prep Type: Total/NA

### Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TOL	DBFM	BFB
		(40-146)	(53-146)	(41-142)
660-126254-A-1 MS	Matrix Spike	98	98	99
660-126254-C-2 DU	Duplicate	100	98	100
670-12969-1	IA-IDW01-20230113	98	97	99
670-12969-2	IA-IDW02-20230113	98	98	100
LCS 670-18558/4	Lab Control Sample	98	99	98
MB 670-18558/6	Method Blank	97	99	100

### Surrogate Legend

TOL = Toluene-d8 (Surr)

DBFM = Dibromofluoromethane (Surr)

BFB = 4-Bromofluorobenzene (Surr)

# Isotope Dilution Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

## Method: 537 IDA - EPA 537 Isotope Dilution

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	M242FTS (10-200)	M262FTS (17-200)	M282FTS (33-200)	PFDODA (17-176)	PFTDA (10-179)	HFPODA (17-185)	C3PFBS (16-200)	C3PFHS (28-188)
670-12969-1	IA-IDW01-20230113	164	217 *	143	276 *	476 *	59	88	85
670-12969-2	IA-IDW02-20230113	162	183	126	44	135	64	84	80
LCS 410-338784/3-A	Lab Control Sample	80	91	69	82	84	79	98	83
LCSD 410-338784/4-A	Lab Control Sample Dup	93	98	95	86	83	79	88	87
MB 410-338784/1-A	Method Blank	77	74	87	74	72	71	82	78

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFBA (42-165)	C4PFHA (31-182)	PFPeA (38-187)	C6PFDA (49-163)	d5NEFOS (29-195)	C8PFOA (48-162)	C8PFOS (51-159)	PFOSA (10-168)
670-12969-1	IA-IDW01-20230113	96	78	83	99	87	84	96	20
670-12969-2	IA-IDW02-20230113	91	79	80	82	31	78	95	23
LCS 410-338784/3-A	Lab Control Sample	96	94	99	84	80	89	92	78
LCSD 410-338784/4-A	Lab Control Sample Dup	95	87	94	84	81	86	104	81
MB 410-338784/1-A	Method Blank	84	80	85	80	68	83	85	72

		Percent Isotope Dilution Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	d3NMFOS (31-174)	d3NMFSA (10-155)	13C5PHA (24-179)	13C7PUA (34-174)	C9PFNA (51-167)
670-12969-1	IA-IDW01-20230113	37	107	83	66	86
670-12969-2	IA-IDW02-20230113	43	25	80	38	86
LCS 410-338784/3-A	Lab Control Sample	77	52	85	87	96
LCSD 410-338784/4-A	Lab Control Sample Dup	78	44	87	84	99
MB 410-338784/1-A	Method Blank	70	41	83	74	88

### Surrogate Legend

- M242FTS = M2-4:2 FTS
- M262FTS = M2-6:2 FTS
- M282FTS = M2-8:2 FTS
- PFDODA = 13C2-PFDODA
- PFTDA = 13C2 PFTeDA
- HFPODA = 13C3 HFPO-DA
- C3PFBS = 13C3 PFBS
- C3PFHS = 13C3 PFHxS
- PFBA = 13C4 PFBA
- C4PFHA = 13C4 PFHpA
- PFPeA = 13C5 PFPeA
- C6PFDA = 13C6 PFDA
- d5NEFOS = d5-NEtFOSAA
- C8PFOA = 13C8 PFOA
- C8PFOS = 13C8 PFOS
- PFOSA = 13C8 FOSA
- d3NMFOS = d3-NMeFOSAA
- d3NMFSA = d3-NMePFOSA
- 13C5PHA = 13C5 PFHxA
- 13C7PUA = 13C7 PFUnA
- C9PFNA = 13C9 PFNA

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

**Lab Sample ID: MB 670-18558/6**

**Matrix: Water**

**Analysis Batch: 18558**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB	MB	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Vinyl chloride	0.71	U	1.0	0.71	ug/L			01/16/23 19:51	1
Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac			
	%Recovery	Qualifier							
Toluene-d8 (Surr)	97		40 - 146		01/16/23 19:51	1			
Dibromofluoromethane (Surr)	99		53 - 146		01/16/23 19:51	1			
4-Bromofluorobenzene (Surr)	100		41 - 142		01/16/23 19:51	1			

**Lab Sample ID: LCS 670-18558/4**

**Matrix: Water**

**Analysis Batch: 18558**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Vinyl chloride	20.0	21.1		ug/L		106	20 - 167
Surrogate	LCS	LCS	Limits				
	%Recovery	Qualifier					
Toluene-d8 (Surr)	98		40 - 146				
Dibromofluoromethane (Surr)	99		53 - 146				
4-Bromofluorobenzene (Surr)	98		41 - 142				

**Lab Sample ID: 660-126254-A-1 MS**

**Matrix: Water**

**Analysis Batch: 18558**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample	Sample	Spike Added	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier		Result	Qualifier				
Vinyl chloride	0.71	U	20.0	26.7		ug/L		134	20 - 167
Surrogate	MS	MS	Limits						
	%Recovery	Qualifier							
Toluene-d8 (Surr)	98		40 - 146						
Dibromofluoromethane (Surr)	98		53 - 146						
4-Bromofluorobenzene (Surr)	99		41 - 142						

**Lab Sample ID: 660-126254-C-2 DU**

**Matrix: Water**

**Analysis Batch: 18558**

**Client Sample ID: Duplicate**

**Prep Type: Total/NA**

Analyte	Sample	Sample	DU Result	DU	Unit	D	RPD	Limit
	Result	Qualifier		Qualifier				
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30
Surrogate	DU	DU	Limits					
	%Recovery	Qualifier						
Toluene-d8 (Surr)	100		40 - 146					
Dibromofluoromethane (Surr)	98		53 - 146					
4-Bromofluorobenzene (Surr)	100		41 - 142					

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

## Method: 300.0 - Anions, Ion Chromatography

**Lab Sample ID: MB 670-18269/37**  
**Matrix: Water**  
**Analysis Batch: 18269**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			01/13/23 18:52	1

**Lab Sample ID: MB 670-18269/6**  
**Matrix: Water**  
**Analysis Batch: 18269**

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

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	200	U	400	200	ug/L			01/13/23 10:40	1

**Lab Sample ID: LCS 670-18269/35**  
**Matrix: Water**  
**Analysis Batch: 18269**

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	4000	3940		ug/L		99	90 - 110

**Lab Sample ID: LCSD 670-18269/36**  
**Matrix: Water**  
**Analysis Batch: 18269**

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

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	4000	3850		ug/L		96	90 - 110	2	20

**Lab Sample ID: 670-12969-1 MS**  
**Matrix: Water**  
**Analysis Batch: 18269**

**Client Sample ID: IA-IDW01-20230113**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	200	U	5000	5210		ug/L		104	80 - 120

**Lab Sample ID: 670-12969-1 MSD**  
**Matrix: Water**  
**Analysis Batch: 18269**

**Client Sample ID: IA-IDW01-20230113**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate as N	200	U	5000	4740		ug/L		95	80 - 120	9	20

## Method: 537 IDA - EPA 537 Isotope Dilution

**Lab Sample ID: MB 410-338784/1-A**  
**Matrix: Water**  
**Analysis Batch: 339329**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 338784**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
11Cl-PF3OUdS	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
4:2 Fluorotelomer sulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
6:2 Fluorotelomer sulfonic acid	0.0042	U	0.0050	0.0042	ug/L		01/26/23 07:05	01/27/23 17:06	1
8:2 Fluorotelomer sulfonic acid	0.0010	U	0.0030	0.0010	ug/L		01/26/23 07:05	01/27/23 17:06	1
9Cl-PF3ONS	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
DONA	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

Lab Sample ID: MB 410-338784/1-A

Matrix: Water

Analysis Batch: 339329

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 338784

Analyte	MB	MB	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
HFPODA	0.0010	U	0.0030	0.0010	ug/L		01/26/23 07:05	01/27/23 17:06	1
NEtFOSAA	0.00050	U	0.0030	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
NMeFOSAA	0.00060	U	0.0020	0.00060	ug/L		01/26/23 07:05	01/27/23 17:06	1
NMeFOSA	0.0010	U	0.0030	0.0010	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorobutanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorobutanoic acid	0.0020	U	0.0050	0.0020	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorodecanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorodecanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorododecanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluoroheptanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluoroheptanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorohexanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorohexanoic acid	0.00090	U	0.0020	0.00090	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorononanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorononanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorooctanesulfonamide	0.00070	U	0.0020	0.00070	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorooctanesulfonic acid	0.0010	U	0.0020	0.0010	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorooctanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluoropentanesulfonic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluoropentanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorotetradecanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluorotridecanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1
Perfluoroundecanoic acid	0.00050	U	0.0020	0.00050	ug/L		01/26/23 07:05	01/27/23 17:06	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
M2-4:2 FTS	77		10 - 200	01/26/23 07:05	01/27/23 17:06	1
M2-6:2 FTS	74		17 - 200	01/26/23 07:05	01/27/23 17:06	1
M2-8:2 FTS	87		33 - 200	01/26/23 07:05	01/27/23 17:06	1
13C2-PFD <sub>o</sub> DA	74		17 - 176	01/26/23 07:05	01/27/23 17:06	1
13C2 PFT <sub>e</sub> DA	72		10 - 179	01/26/23 07:05	01/27/23 17:06	1
13C3 HFPO-DA	71		17 - 185	01/26/23 07:05	01/27/23 17:06	1
13C3 PFBS	82		16 - 200	01/26/23 07:05	01/27/23 17:06	1
13C3 PFH <sub>x</sub> S	78		28 - 188	01/26/23 07:05	01/27/23 17:06	1
13C4 PFBA	84		42 - 165	01/26/23 07:05	01/27/23 17:06	1
13C4 PFHpA	80		31 - 182	01/26/23 07:05	01/27/23 17:06	1
13C5 PFP <sub>e</sub> A	85		38 - 187	01/26/23 07:05	01/27/23 17:06	1
13C6 PFDA	80		49 - 163	01/26/23 07:05	01/27/23 17:06	1
d5-NEtFOSAA	68		29 - 195	01/26/23 07:05	01/27/23 17:06	1
13C8 PFOA	83		48 - 162	01/26/23 07:05	01/27/23 17:06	1
13C8 PFOS	85		51 - 159	01/26/23 07:05	01/27/23 17:06	1
13C8 FOSA	72		10 - 168	01/26/23 07:05	01/27/23 17:06	1
d3-NMeFOSAA	70		31 - 174	01/26/23 07:05	01/27/23 17:06	1
d3-NMePFOSA	41		10 - 155	01/26/23 07:05	01/27/23 17:06	1
13C5 PFH <sub>x</sub> A	83		24 - 179	01/26/23 07:05	01/27/23 17:06	1
13C7 PFUnA	74		34 - 174	01/26/23 07:05	01/27/23 17:06	1
13C9 PFNA	88		51 - 167	01/26/23 07:05	01/27/23 17:06	1

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

Lab Sample ID: LCS 410-338784/3-A

Matrix: Water

Analysis Batch: 339329

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 338784

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
11Cl-PF3OUdS	0.0238	0.0265		ug/L		111	53 - 139
4:2 Fluorotelomer sulfonic acid	0.0239	0.0308		ug/L		129	55 - 139
6:2 Fluorotelomer sulfonic acid	0.0243	0.0296		ug/L		122	28 - 173
8:2 Fluorotelomer sulfonic acid	0.0245	0.0374	J3	ug/L		152	55 - 138
9Cl-PF3ONS	0.0238	0.0316		ug/L		133	59 - 135
DONA	0.0242	0.0242		ug/L		100	55 - 143
HFPODA	0.0256	0.0257		ug/L		100	50 - 135
NEtFOSAA	0.0256	0.0325		ug/L		127	55 - 134
NMeFOSAA	0.0256	0.0360	J3	ug/L		141	59 - 140
NMeFOSA	0.0256	0.0288		ug/L		113	64 - 143
Perfluorobutanesulfonic acid	0.0227	0.0242		ug/L		107	53 - 138
Perfluorobutanoic acid	0.0256	0.0270		ug/L		105	59 - 136
Perfluorodecanesulfonic acid	0.0247	0.0264		ug/L		107	55 - 137
Perfluorodecanoic acid	0.0256	0.0298		ug/L		116	56 - 138
Perfluorododecanoic acid	0.0256	0.0292		ug/L		114	59 - 143
Perfluoroheptanesulfonic acid	0.0244	0.0279		ug/L		114	56 - 140
Perfluoroheptanoic acid	0.0256	0.0272		ug/L		106	59 - 145
Perfluorohexanesulfonic acid	0.0233	0.0285		ug/L		122	58 - 134
Perfluorohexanoic acid	0.0256	0.0288		ug/L		113	58 - 139
Perfluorononanesulfonic acid	0.0246	0.0262		ug/L		107	59 - 136
Perfluorononanoic acid	0.0256	0.0272		ug/L		106	61 - 139
Perfluorooctanesulfonamide	0.0256	0.0278		ug/L		108	43 - 167
Perfluorooctanesulfonic acid	0.0237	0.0290		ug/L		122	45 - 150
Perfluorooctanoic acid	0.0256	0.0343		ug/L		134	51 - 145
Perfluoropentanesulfonic acid	0.0240	0.0275		ug/L		115	55 - 140
Perfluoropentanoic acid	0.0256	0.0283		ug/L		110	57 - 141
Perfluorotetradecanoic acid	0.0256	0.0311		ug/L		122	62 - 139
Perfluorotridecanoic acid	0.0256	0.0306		ug/L		119	58 - 146
Perfluoroundecanoic acid	0.0256	0.0290		ug/L		113	60 - 141

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
M2-4:2 FTS	80		10 - 200
M2-6:2 FTS	91		17 - 200
M2-8:2 FTS	69		33 - 200
13C2-PFDoDA	82		17 - 176
13C2 PFTeDA	84		10 - 179
13C3 HFPO-DA	79		17 - 185
13C3 PFBS	98		16 - 200
13C3 PFHxS	83		28 - 188
13C4 PFBA	96		42 - 165
13C4 PFHpA	94		31 - 182
13C5 PFPeA	99		38 - 187
13C6 PFDA	84		49 - 163
d5-NEtFOSAA	80		29 - 195
13C8 PFOA	89		48 - 162
13C8 PFOS	92		51 - 159
13C8 FOSA	78		10 - 168
d3-NMeFOSAA	77		31 - 174

Eurofins Orlando

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

Lab Sample ID: LCS 410-338784/3-A

Matrix: Water

Analysis Batch: 339329

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 338784

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
d3-NMePFOSA	52		10 - 155
13C5 PFHxA	85		24 - 179
13C7 PFUnA	87		34 - 174
13C9 PFNA	96		51 - 167

Lab Sample ID: LCSD 410-338784/4-A

Matrix: Water

Analysis Batch: 339329

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 338784

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	Limit
							Limits	RPD		
11Cl-PF3OUdS	0.0238	0.0240		ug/L		101	53 - 139	10	30	
4:2 Fluorotelomer sulfonic acid	0.0239	0.0244		ug/L		102	55 - 139	23	30	
6:2 Fluorotelomer sulfonic acid	0.0243	0.0280		ug/L		115	28 - 173	6	30	
8:2 Fluorotelomer sulfonic acid	0.0245	0.0276		ug/L		112	55 - 138	30	30	
9Cl-PF3ONS	0.0238	0.0257		ug/L		108	59 - 135	20	30	
DONA	0.0242	0.0289		ug/L		120	55 - 143	18	30	
HFPODA	0.0256	0.0277		ug/L		108	50 - 135	8	30	
NEtFOSAA	0.0256	0.0302		ug/L		118	55 - 134	7	30	
NMeFOSAA	0.0256	0.0307		ug/L		120	59 - 140	16	30	
NMeFOSA	0.0256	0.0273		ug/L		107	64 - 143	5	30	
Perfluorobutanesulfonic acid	0.0227	0.0276		ug/L		122	53 - 138	13	30	
Perfluorobutanoic acid	0.0256	0.0263		ug/L		103	59 - 136	3	30	
Perfluorodecanesulfonic acid	0.0247	0.0240		ug/L		97	55 - 137	9	30	
Perfluorodecanoic acid	0.0256	0.0293		ug/L		114	56 - 138	2	30	
Perfluorododecanoic acid	0.0256	0.0269		ug/L		105	59 - 143	8	30	
Perfluoroheptanesulfonic acid	0.0244	0.0280		ug/L		115	56 - 140	1	30	
Perfluoroheptanoic acid	0.0256	0.0295		ug/L		115	59 - 145	8	30	
Perfluorohexanesulfonic acid	0.0233	0.0270		ug/L		116	58 - 134	6	30	
Perfluorohexanoic acid	0.0256	0.0271		ug/L		106	58 - 139	6	30	
Perfluorononanesulfonic acid	0.0246	0.0233		ug/L		95	59 - 136	12	30	
Perfluorononanoic acid	0.0256	0.0306		ug/L		119	61 - 139	12	30	
Perfluorooctanesulfonamide	0.0256	0.0278		ug/L		108	43 - 167	0	30	
Perfluorooctanesulfonic acid	0.0237	0.0260		ug/L		110	45 - 150	11	30	
Perfluorooctanoic acid	0.0256	0.0330		ug/L		129	51 - 145	4	30	
Perfluoropentanesulfonic acid	0.0240	0.0277		ug/L		115	55 - 140	1	30	
Perfluoropentanoic acid	0.0256	0.0255		ug/L		100	57 - 141	10	30	
Perfluorotetradecanoic acid	0.0256	0.0281		ug/L		110	62 - 139	10	30	
Perfluorotridecanoic acid	0.0256	0.0305		ug/L		119	58 - 146	0	30	
Perfluoroundecanoic acid	0.0256	0.0276		ug/L		108	60 - 141	5	30	

Isotope Dilution	LCSD LCSD		Limits
	%Recovery	Qualifier	
M2-4:2 FTS	93		10 - 200
M2-6:2 FTS	98		17 - 200
M2-8:2 FTS	95		33 - 200
13C2-PFDoDA	86		17 - 176
13C2 PFTeDA	83		10 - 179
13C3 HFPO-DA	79		17 - 185
13C3 PFBS	88		16 - 200
13C3 PFHxS	87		28 - 188

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# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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

**Lab Sample ID:** LCSD 410-338784/4-A  
**Matrix:** Water  
**Analysis Batch:** 339329

**Client Sample ID:** Lab Control Sample Dup  
**Prep Type:** Total/NA  
**Prep Batch:** 338784

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C4 PFBA	95		42 - 165
13C4 PFHpA	87		31 - 182
13C5 PFPeA	94		38 - 187
13C6 PFDA	84		49 - 163
d5-NEtFOSAA	81		29 - 195
13C8 PFOA	86		48 - 162
13C8 PFOS	104		51 - 159
13C8 FOSA	81		10 - 168
d3-NMeFOSAA	78		31 - 174
d3-NMePFOSA	44		10 - 155
13C5 PFHxA	87		24 - 179
13C7 PFUnA	84		34 - 174
13C9 PFNA	99		51 - 167

## Method: 365.4 - Phosphorus, Total

**Lab Sample ID:** MB 670-19244/2-A  
**Matrix:** Water  
**Analysis Batch:** 20145

**Client Sample ID:** Method Blank  
**Prep Type:** Total/NA  
**Prep Batch:** 19244

Analyte	MB MB		PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Phosphorus as P	40	U	100	40	ug/L		01/20/23 09:31	01/25/23 19:46	1

**Lab Sample ID:** LCS 670-19244/1-A  
**Matrix:** Water  
**Analysis Batch:** 20145

**Client Sample ID:** Lab Control Sample  
**Prep Type:** Total/NA  
**Prep Batch:** 19244

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	%Rec Limits
		Result	Qualifier				
Total Phosphorus as P	1500	1620		ug/L		108	90 - 110

**Lab Sample ID:** 670-12969-1 MS  
**Matrix:** Water  
**Analysis Batch:** 20145

**Client Sample ID:** IA-IDW01-20230113  
**Prep Type:** Total/NA  
**Prep Batch:** 19244

Analyte	Sample Result	Sample Qualifier	Spike Added	MS MS		Unit	D	%Rec	%Rec Limits
				Result	Qualifier				
Total Phosphorus as P	75	I	1500	1520		ug/L		96	85 - 115

**Lab Sample ID:** 670-12969-1 MSD  
**Matrix:** Water  
**Analysis Batch:** 20145

**Client Sample ID:** IA-IDW01-20230113  
**Prep Type:** Total/NA  
**Prep Batch:** 19244

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD MSD		Unit	D	%Rec	%Rec Limits	RPD	
				Result	Qualifier					RPD	Limit
Total Phosphorus as P	75	I	1500	1510		ug/L		96	85 - 115	1	20

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

## GC/MS VOA

### Analysis Batch: 18558

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	8260D	
670-12969-2	IA-IDW02-20230113	Total/NA	Water	8260D	
MB 670-18558/6	Method Blank	Total/NA	Water	8260D	
LCS 670-18558/4	Lab Control Sample	Total/NA	Water	8260D	
660-126254-A-1 MS	Matrix Spike	Total/NA	Water	8260D	
660-126254-C-2 DU	Duplicate	Total/NA	Water	8260D	

## HPLC/IC

### Analysis Batch: 18269

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	300.0	
670-12969-2	IA-IDW02-20230113	Total/NA	Water	300.0	
MB 670-18269/37	Method Blank	Total/NA	Water	300.0	
MB 670-18269/6	Method Blank	Total/NA	Water	300.0	
LCS 670-18269/35	Lab Control Sample	Total/NA	Water	300.0	
LCSD 670-18269/36	Lab Control Sample Dup	Total/NA	Water	300.0	
670-12969-1 MS	IA-IDW01-20230113	Total/NA	Water	300.0	
670-12969-1 MSD	IA-IDW01-20230113	Total/NA	Water	300.0	

## LCMS

### Prep Batch: 338784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	537 IDA	
670-12969-1 - RA	IA-IDW01-20230113	Total/NA	Water	537 IDA	
670-12969-2	IA-IDW02-20230113	Total/NA	Water	537 IDA	
MB 410-338784/1-A	Method Blank	Total/NA	Water	537 IDA	
LCS 410-338784/3-A	Lab Control Sample	Total/NA	Water	537 IDA	
LCSD 410-338784/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	

### Analysis Batch: 339329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	537 IDA	338784
670-12969-2	IA-IDW02-20230113	Total/NA	Water	537 IDA	338784
MB 410-338784/1-A	Method Blank	Total/NA	Water	537 IDA	338784
LCS 410-338784/3-A	Lab Control Sample	Total/NA	Water	537 IDA	338784
LCSD 410-338784/4-A	Lab Control Sample Dup	Total/NA	Water	537 IDA	338784

### Analysis Batch: 339530

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1 - RA	IA-IDW01-20230113	Total/NA	Water	537 IDA	338784

## General Chemistry

### Prep Batch: 19244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	365.2/365.3/365	
670-12969-2	IA-IDW02-20230113	Total/NA	Water	365.2/365.3/365	
MB 670-19244/2-A	Method Blank	Total/NA	Water	365.2/365.3/365	
LCS 670-19244/1-A	Lab Control Sample	Total/NA	Water	365.2/365.3/365	
670-12969-1 MS	IA-IDW01-20230113	Total/NA	Water	365.2/365.3/365	

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# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

## General Chemistry (Continued)

### Prep Batch: 19244 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1 MSD	IA-IDW01-20230113	Total/NA	Water	365.2/365.3/365	

### Analysis Batch: 20145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-12969-1	IA-IDW01-20230113	Total/NA	Water	365.4	19244
670-12969-2	IA-IDW02-20230113	Total/NA	Water	365.4	19244
MB 670-19244/2-A	Method Blank	Total/NA	Water	365.4	19244
LCS 670-19244/1-A	Lab Control Sample	Total/NA	Water	365.4	19244
670-12969-1 MS	IA-IDW01-20230113	Total/NA	Water	365.4	19244
670-12969-1 MSD	IA-IDW01-20230113	Total/NA	Water	365.4	19244



## Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

**Client Sample ID: IA-IDW01-20230113**

**Lab Sample ID: 670-12969-1**

**Date Collected: 01/13/23 10:05**

**Matrix: Water**

**Date Received: 01/13/23 13:23**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18558	K1P	EET ORL	01/17/23 02:40
Total/NA	Analysis	300.0		1	18269	YS	EET ORL	01/13/23 23:15
Total/NA	Prep	537 IDA			338784	M4QQ	ELLE	01/26/23 07:05
Total/NA	Analysis	537 IDA		1	339329	PY4D	ELLE	01/27/23 21:21
Total/NA	Prep	537 IDA	RA		338784	M4QQ	ELLE	01/26/23 07:05
Total/NA	Analysis	537 IDA	RA	1	339530	PY4D	ELLE	01/29/23 14:30
Total/NA	Prep	365.2/365.3/365			19244	AT	EET ORL	01/20/23 09:31
Total/NA	Analysis	365.4		1	20145	AT	EET ORL	01/25/23 19:50

**Client Sample ID: IA-IDW02-20230113**

**Lab Sample ID: 670-12969-2**

**Date Collected: 01/13/23 11:15**

**Matrix: Water**

**Date Received: 01/13/23 13:23**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Batch Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	18558	K1P	EET ORL	01/17/23 02:59
Total/NA	Analysis	300.0		1	18269	YS	EET ORL	01/14/23 00:04
Total/NA	Prep	537 IDA			338784	M4QQ	ELLE	01/26/23 07:05
Total/NA	Analysis	537 IDA		1	339329	PY4D	ELLE	01/27/23 21:33
Total/NA	Prep	365.2/365.3/365			19244	AT	EET ORL	01/20/23 09:31
Total/NA	Analysis	365.4		1	20145	AT	EET ORL	01/25/23 19:54

**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 Industrial Area

Job ID: 670-12969-1

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

## Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E87997	07-02-23

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# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
300.0	Anions, Ion Chromatography	MCAWW	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE
365.4	Phosphorus, Total	EPA	EET ORL
365.2/365.3/365	Phosphorus, Total	MCAWW	EET ORL
5030C	Purge and Trap	SW846	EET ORL
537 IDA	EPA 537 Isotope Dilution	EPA	ELLE

**Protocol References:**

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300





# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area

Job ID: 670-12969-1

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Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-12969-1	IA-IDW01-20230113	Water	01/13/23 10:05	01/13/23 13:23
670-12969-2	IA-IDW02-20230113	Water	01/13/23 11:15	01/13/23 13:23

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- 13
- 14
- 15
- 16

**CHAIN OF CUSTODY AND ANALYTICAL REQUEST RECORD**

COC No. \_\_\_\_\_ Page: **1** of **1**

Project Name: NASA KSC - Industrial Area  
 Site Location: Industrial Area IDW  
 TO No.: 80KSC019F0071  
 AECOM Project Manager: **Chris Marshall cc: Greg Kusel**

PO No. 148674  
 Project No. 60610906, Subs 2021-23-Subs 2021-23  
 Phase: \_\_\_\_\_

Send Invoice To: Instructions in MSA # 195-24548-GV03  
 Deliver Sample Kits To: AECOM Depot, 523 18th Street, Orlando  
 Deliver Samples To: Eurofins Orlando  
 EDD to: Jennifer Chastain Cc: Teresa Ament, Jennings  
 Report to: Jennifer Chastain Cc: Teresa Ament, Jennings  
 Site-Specific WS#15 from QAPP: 15-39 & 15-2

Lab Name: Eurofins  
 Turnaround Time(specific): Standard 14 day

Lab ID	Sample ID (sys_samp_code)	Location ID (sys_loc_code)	Date (YYYYMMDD)	Time (Military) (hhmm)	Matrix Code (1)	Sample Type (2)	G=Grab C=Comp	Sample Analysis Requested (Enter number of containers for each test)				Comments	
(3)	HCL	4 DEG C	4 DEG	H2SO4 <2									
	<b>Total No. of Containers</b>												
	9	3	2	2	2	2	2	Nitrate by EPA 300.0		365.4			
	Vinyl chloride by SW8260B							Select PFAS by 537					
	IA-IDW01-20230113	IA-IDW01	20230113	1055	IDW	IDW	G						
	IA-IDW02-20230113	IA-IDW02	20230113	1115	IDW	IDW	G						
GK	IA-IDW03-202301	IA-IDW03	202301		IDW	IDW	G						
GK	IA-TB01-202301	IA-TB01	202301		WG	TB	G						



**Field Comments:**  
 Report only per QAPP WS #15-39 & 15-2

**Lab Comments:**  
 Received by (signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 1. *Greg Kusel* 1/13/23 1320  
 2. \_\_\_\_\_ 1/13/23 1323  
 3. \_\_\_\_\_

**Sample Shipment and Delivery Details**  
 Number of coolers in shipment: \_\_\_\_\_  
 Samples Tested?(check) Yes: \_\_\_\_\_ No: \_\_\_\_\_  
 Shipping Company: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_  
 Date Shipped: \_\_\_\_\_

(1) AA=Ambient air, AQ=Air quality control, ASB=Asbestos, CK=Caulk, DS=Storm drain sediment, GS=Soil gas, IC=IDW Concrete, IDD=IDW Solid, IDS=IDW Soil, IDW=IDW Water, IF=Free Product, MA=Mastic, PC=Paint Chps, SC=Cement/Concrete, SE=Sediment, SL=Sludge, SO=Soil, SQ=Soil/Solid quality control, SSD=Subsurface sediment, SU=Surface soil (<6 in), SW=Swab or wipe, TA=Animal tissue, TP=Plant tissue, TQ=Tissue quality control, WG=Ground water, WL=Leachate, WO=Ocean water, WP=Drinking water, WQ=Water quality control, WR=Ground water effluent, WS=Surface water, WU=Storm water, WW=Waste water

(2) Sample Type: AB=Ambient Blk, EB=Equipment Blk, FB=Field Blk, FD=Field Duplicate Sample, IDW=Investigative-Derived Waste, MIS=Incremental Sampling Methodology, N=Normal Environmental Sample, TB=Trip Blk

(3) Preservative added: 4 DEG C=Cool to 4 degrees, Dark=Store in Darkness, store cool at 4 degrees, H2SO4 <2=Adjust to pH < 2 with sulfuric acid, H3PO4 <2=Adjust to pH < 2 with phosphoric acid, HCl <2=Adjust to pH < 2 with hydrochloric acid, HNaO4S=Sodium bisulfate preservation, HNO3 <2=Adjust to pH < 2 with nitric acid, MeOH=Methanol preservation, Na2O3S2=3/gal=Add 3 mL 10% sodium thiosulfate, Na2O3S2 4/gal=Add 4 drops of 10% sodium thiosulfate to 4 oz, NaHSO4 <2=Adjust to pH < 2 with sodium hydrogen sulfate, NaOH > 12=Adjust to pH > 12 with sodium hydroxide, NaOH > 9=Adjust to pH > 9 with sodium hydroxide, VHC 0.6/500=0.6 g of ascorbic acid to 500mLs, ZnAct 2/500=Add 2 mL of zinc acetate to 500mLs, ZnAct+NaOH > 9=Zinc acetate and NaOH to pH > 9, store cool at 4C. If NO preservative added leave blank

Rev 8/19

5.7 / 5.2



**WORKSHEET# 15**  
**TABLE 15-2 FOR PFAS SITES**  
**REFERENCE LIMITS AND EVALUATION TABLE FOR GROUNDWATER MATRIX**  
**TO# 80KSC019F0072**

**ENVIRONMENTAL COMPLIANCE AND RESTORATION**  
**PRIME CONTRACT # 80KSC019D0010**  
**KENNEDY SPACE CENTER, FLORIDA**  
**NOVEMBER 2022**

Analyte	Abbreviation	CAS Number	Data Quality Objectives			Laboratory Specific Limits	
			PAL	PAL Reference	PQL Goal	PQL	MDL
<b>Analytical Group: PFAS by EPA Method 537M in µg/L</b>							
Hexafluoropropylene oxide dimer acid	HFPO-DA (GenX)	13252-13-6	0.006	RSL/DoD <sup>1</sup>			
N-ethyl perfluorooctanesulfonamideacetic acid	NEFOSAA	2991-50-6					
N-methyl perfluorooctanesulfonamideacetic acid	NMeFOSAA	2355-31-9					
Perfluorobutanesulfonic acid	PFBS	375-73-5	0.601	RSL/DoD <sup>1</sup>			
Perfluorodecanoic acid	PFDA	335-76-2					
Perfluorododecanoic acid	PFDoA	307-55-1					
Perfluorooheptanoic acid	PFHpA	375-85-9	0.01	UCMR3 <sup>2</sup>			
Perfluorohexanesulfonic acid	PFHxS	355-46-4	0.039	RSL/DoD <sup>1</sup>			
Perfluorohexanoic acid	PFHxA	307-24-4					
Perfluorononanoic acid	PFNA	375-95-1	0.0059	RSL/DoD <sup>1</sup>			
Perfluorooctane sulfonate	PFOS	1763-23-1	0.004	RSL/DoD <sup>1</sup>			
Perfluorooctanoic acid	PFOA	335-67-1	0.006	RSL/DoD <sup>1</sup>			
Perfluorotetradecanoic acid	PFTeA	376-06-7					
Perfluoroundecanoic acid	PFTTA	72629-94-8					
Perfluoroundecanoic acid	PFUnA	2058-94-8					
11-Chloroicosaffluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUS	763051-92-9					
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	756426-58-1					
4,8-dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4					
Fluorotelomer sulphonic acid 4 2	4 2 FTS	757124-72-4					
Fluorotelomer sulphonic acid 6 2	6 2 FTS	27619-97-2					
Fluorotelomer sulphonic acid 8 2	8 2 FTS	39108-34-4					
N-methyl perfluorooctanesulfonamide	MeFOSA	31506-32-8					
Perfluorobutanoic acid	PFBA	375-22-4					
Perfluorodecanesulfonic acid	PFDS	335-77-3					
Perfluorooheptanesulfonic acid	PFHpS	375-92-8					
Perfluorononanesulfonic acid	PFNS	68259-12-1					
Perfluorooctanesulfonamide	PFOSA	754-91-6					
Perfluoropentanesulfonic acid	PFPeS	2706-91-4					
Perfluoropentanoic acid	PFPeA	2706-90-3					



**Eurofins Orlando**

481 Newburyport Avenue  
 Altamonte Springs, FL 32701  
 Phone: 407-339-5984 Fax: 407-260-6110

**Chain of Custody Record**



Environment Testing

<b>Client Information (Sub Contract Lab)</b>		Sampler:		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s):		COC No: 670-3746.1			
Client Contact: Shipping/Receiving		Phone:		E-Mail: kaitlin.dylnicki@et.eurofinsus.com		State of Origin: Florida		Page: Page 1 of 1			
Company: Eurofins Lancaster Laboratories Environm				Accreditations Required (See note): NELAP - Florida				Job #: 670-12969-1			
Address: 2425 New Holland Pike, City: Lancaster State, Zip: PA, 17601 Phone: 717-656-2300(Tel) Email:		Due Date Requested: 2/1/2023 TAT Requested (days):		<b>Analysis Requested</b>						<b>Preservation Codes:</b> A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Y - Trizma Z - other (specify)  Other:	
Project Name: NASA KSC Industrial Area Site:		Project #: 67001282 SSOW#:									
<b>Sample Identification - Client ID (Lab ID)</b>		<b>Sample Date</b>	<b>Sample Time</b>	<b>Sample Type (C=Comp, G=grab)</b>	<b>Matrix (W=water, S=solid, O=waste/soil, BT=Tissue, A=Air)</b>	<b>Field Filtered Sample (Yes or No)</b>	<b>Perform MS/MSD (Yes or No)</b>	PFC_IDA/J3535_PFC (MOD) NASA KCS WS#15-2 DOD	PRE_SCREEN_PFAS/PFAS_PreScn_W_P	<b>Total Number of containers</b>	<b>Special Instructions/Note:</b>
				Preservation Code:							
IA-IDW01-20230113 (670-12969-1)		1/13/23	10:05 Eastern		Water		X	X		2	
IA-IDW02-20230113 (670-12969-2)		1/13/23	11:15 Eastern		Water		X	X		2	
<p>Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte &amp; accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.</p>											
<b>Possible Hazard Identification</b>						<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b>					
Unconfirmed						<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months					
Deliverable Requested: I, II, III, IV, Other (specify)				Primary Deliverable Rank: 2		Special Instructions/QC Requirements:					
Empty Kit Relinquished by:				Date:		Time:		Method of Shipment:			
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
		1/12/23 1130									
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Company:		Received by:		Date/Time:		Company:	
								1/18/23 09:50		ELLET	
Custody Seals Intact: Δ Yes Δ No		Custody Seal No.:				Cooler Temperature(s) °C and Other Remarks: 0.3/-0.1					

*dm*

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## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12969-1

**Login Number: 12969**

**List Number: 1**

**Creator: Clerisier, Meline**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-12969-1

**Login Number: 12969**

**List Number: 2**

**Creator: McBeth, Jessica**

**List Source: Eurofins Lancaster Laboratories Environment Testing, LLC**

**List Creation: 01/18/23 01:30 PM**

Question	Answer	Comment
The cooler's custody seal is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (<math>\leq 6^{\circ}\text{C}</math>, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
Sample custody seals are intact.	N/A	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	N/A	



# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 4/7/2023 9:01:28 AM

## JOB DESCRIPTION

NASA KSC Industrial Area EHF

## JOB NUMBER

670-17020-1


# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



Generated  
4/7/2023 9:01:28 AM

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





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# Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

## Qualifiers

### GC/MS VOA

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

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

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**Job ID: 670-17020-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative  
670-17020-1**

**Receipt**

The samples were received on 3/28/2023 5:35 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.6°C

**GC/MS VOA**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0004-010.0-20230327**

**Lab Sample ID: 670-17020-1**

No Detections.

**Client Sample ID: EHF-DPT0004-015.0-20230327**

**Lab Sample ID: 670-17020-2**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	1.7		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0004-020.0-20230327**

**Lab Sample ID: 670-17020-3**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	3.9		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0004-030.0-20230327**

**Lab Sample ID: 670-17020-4**

No Detections.

**Client Sample ID: EHF-DPT0004-040.0-20230327**

**Lab Sample ID: 670-17020-5**

No Detections.

**Client Sample ID: EHF-DPT0005-010.0-20230327**

**Lab Sample ID: 670-17020-6**

No Detections.

**Client Sample ID: EHF-DPT0005-015.0-20230327**

**Lab Sample ID: 670-17020-7**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	8.9		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0005-020.0-20230327**

**Lab Sample ID: 670-17020-8**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.9		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0005-030.0-20230327**

**Lab Sample ID: 670-17020-9**

No Detections.

**Client Sample ID: EHF-DPT0005-040.0-20230327**

**Lab Sample ID: 670-17020-10**

No Detections.

**Client Sample ID: EHF-DPT0006-010.0-20230327**

**Lab Sample ID: 670-17020-11**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	1.1		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0006-015.0-20230327**

**Lab Sample ID: 670-17020-12**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	3.0		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0006-020.0-20230327**

**Lab Sample ID: 670-17020-13**

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.1		1.0	0.71	ug/L	1		8260D	Total/NA

**Client Sample ID: EHF-DPT0006-030.0-20230327**

**Lab Sample ID: 670-17020-14**

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

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**Client Sample ID: EHF-DPT0006-040.0-20230327**

**Lab Sample ID: 670-17020-15**

No Detections.

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**Client Sample ID: EHF-TB01-20230327**

**Lab Sample ID: 670-17020-16**

No Detections.

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This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0004-010.0-20230327**

**Lab Sample ID: 670-17020-1**

Date Collected: 03/27/23 09:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 13:41	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					04/06/23 13:41	1
4-Bromofluorobenzene (Surr)	106		41 - 142					04/06/23 13:41	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 13:41	1

**Client Sample ID: EHF-DPT0004-015.0-20230327**

**Lab Sample ID: 670-17020-2**

Date Collected: 03/27/23 09:20

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.7		1.0	0.71	ug/L			04/06/23 13:57	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					04/06/23 13:57	1
4-Bromofluorobenzene (Surr)	101		41 - 142					04/06/23 13:57	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 13:57	1

**Client Sample ID: EHF-DPT0004-020.0-20230327**

**Lab Sample ID: 670-17020-3**

Date Collected: 03/27/23 09:45

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	3.9		1.0	0.71	ug/L			04/06/23 14:13	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					04/06/23 14:13	1
4-Bromofluorobenzene (Surr)	100		41 - 142					04/06/23 14:13	1
Dibromofluoromethane (Surr)	100		53 - 146					04/06/23 14:13	1

**Client Sample ID: EHF-DPT0004-030.0-20230327**

**Lab Sample ID: 670-17020-4**

Date Collected: 03/27/23 10:10

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 14:29	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 14:29	1
4-Bromofluorobenzene (Surr)	102		41 - 142					04/06/23 14:29	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 14:29	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0004-040.0-20230327**

**Lab Sample ID: 670-17020-5**

Date Collected: 03/27/23 10:35

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 14:45	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					04/06/23 14:45	1
4-Bromofluorobenzene (Surr)	100		41 - 142					04/06/23 14:45	1
Dibromofluoromethane (Surr)	99		53 - 146					04/06/23 14:45	1

**Client Sample ID: EHF-DPT0005-010.0-20230327**

**Lab Sample ID: 670-17020-6**

Date Collected: 03/27/23 11:20

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 15:01	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					04/06/23 15:01	1
4-Bromofluorobenzene (Surr)	104		41 - 142					04/06/23 15:01	1
Dibromofluoromethane (Surr)	100		53 - 146					04/06/23 15:01	1

**Client Sample ID: EHF-DPT0005-015.0-20230327**

**Lab Sample ID: 670-17020-7**

Date Collected: 03/27/23 11:40

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	8.9		1.0	0.71	ug/L			04/06/23 15:17	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					04/06/23 15:17	1
4-Bromofluorobenzene (Surr)	99		41 - 142					04/06/23 15:17	1
Dibromofluoromethane (Surr)	99		53 - 146					04/06/23 15:17	1

**Client Sample ID: EHF-DPT0005-020.0-20230327**

**Lab Sample ID: 670-17020-8**

Date Collected: 03/27/23 12:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	2.9		1.0	0.71	ug/L			04/06/23 15:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 15:33	1
4-Bromofluorobenzene (Surr)	105		41 - 142					04/06/23 15:33	1
Dibromofluoromethane (Surr)	100		53 - 146					04/06/23 15:33	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0005-030.0-20230327**

**Lab Sample ID: 670-17020-9**

Date Collected: 03/27/23 13:05

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 15:48	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 15:48	1
4-Bromofluorobenzene (Surr)	105		41 - 142					04/06/23 15:48	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 15:48	1

**Client Sample ID: EHF-DPT0005-040.0-20230327**

**Lab Sample ID: 670-17020-10**

Date Collected: 03/27/23 13:30

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 16:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 16:04	1
4-Bromofluorobenzene (Surr)	104		41 - 142					04/06/23 16:04	1
Dibromofluoromethane (Surr)	95		53 - 146					04/06/23 16:04	1

**Client Sample ID: EHF-DPT0006-010.0-20230327**

**Lab Sample ID: 670-17020-11**

Date Collected: 03/27/23 14:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	1.1		1.0	0.71	ug/L			04/06/23 16:20	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	98		40 - 146					04/06/23 16:20	1
4-Bromofluorobenzene (Surr)	105		41 - 142					04/06/23 16:20	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 16:20	1

**Client Sample ID: EHF-DPT0006-015.0-20230327**

**Lab Sample ID: 670-17020-12**

Date Collected: 03/27/23 14:20

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	3.0		1.0	0.71	ug/L			04/06/23 16:36	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 16:36	1
4-Bromofluorobenzene (Surr)	105		41 - 142					04/06/23 16:36	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 16:36	1



# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0006-020.0-20230327**

**Lab Sample ID: 670-17020-13**

Date Collected: 03/27/23 14:40

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	2.1		1.0	0.71	ug/L			04/06/23 16:52	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					04/06/23 16:52	1
4-Bromofluorobenzene (Surr)	103		41 - 142					04/06/23 16:52	1
Dibromofluoromethane (Surr)	101		53 - 146					04/06/23 16:52	1

**Client Sample ID: EHF-DPT0006-030.0-20230327**

**Lab Sample ID: 670-17020-14**

Date Collected: 03/27/23 15:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:08	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					04/06/23 17:08	1
4-Bromofluorobenzene (Surr)	101		41 - 142					04/06/23 17:08	1
Dibromofluoromethane (Surr)	101		53 - 146					04/06/23 17:08	1

**Client Sample ID: EHF-DPT0006-040.0-20230327**

**Lab Sample ID: 670-17020-15**

Date Collected: 03/27/23 15:25

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:24	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	97		40 - 146					04/06/23 17:24	1
4-Bromofluorobenzene (Surr)	107		41 - 142					04/06/23 17:24	1
Dibromofluoromethane (Surr)	99		53 - 146					04/06/23 17:24	1

**Client Sample ID: EHF-TB01-20230327**

**Lab Sample ID: 670-17020-16**

Date Collected: 03/27/23 07:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 13:25	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	99		40 - 146					04/06/23 13:25	1
4-Bromofluorobenzene (Surr)	103		41 - 142					04/06/23 13:25	1
Dibromofluoromethane (Surr)	102		53 - 146					04/06/23 13:25	1

# Surrogate Summary

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
670-17020-1	EHF-DPT0004-010.0-20230327	99	106	102
670-17020-2	EHF-DPT0004-015.0-20230327	98	101	102
670-17020-3	EHF-DPT0004-020.0-20230327	99	100	100
670-17020-4	EHF-DPT0004-030.0-20230327	97	102	102
670-17020-5	EHF-DPT0004-040.0-20230327	98	100	99
670-17020-6	EHF-DPT0005-010.0-20230327	98	104	100
670-17020-7	EHF-DPT0005-015.0-20230327	98	99	99
670-17020-8	EHF-DPT0005-020.0-20230327	97	105	100
670-17020-9	EHF-DPT0005-030.0-20230327	97	105	102
670-17020-10	EHF-DPT0005-040.0-20230327	97	104	95
670-17020-11	EHF-DPT0006-010.0-20230327	98	105	102
670-17020-12	EHF-DPT0006-015.0-20230327	97	105	102
670-17020-13	EHF-DPT0006-020.0-20230327	100	103	101
670-17020-14	EHF-DPT0006-030.0-20230327	99	101	101
670-17020-15	EHF-DPT0006-040.0-20230327	97	107	99
670-17020-16	EHF-TB01-20230327	99	103	102
670-17111-F-5 MS	Matrix Spike	97	99	101
670-17111-F-8 DU	Duplicate	98	106	99
LCS 670-29203/4	Lab Control Sample	101	98	100
MB 670-29203/7	Method Blank	100	104	101

### Surrogate Legend

- TOL = Toluene-d8 (Surr)
- BFB = 4-Bromofluorobenzene (Surr)
- DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
 Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

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

**Lab Sample ID: MB 670-29203/7**

**Matrix: Water**

**Analysis Batch: 29203**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 11:23	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	100		40 - 146					04/06/23 11:23	1
4-Bromofluorobenzene (Surr)	104		41 - 142					04/06/23 11:23	1
Dibromofluoromethane (Surr)	101		53 - 146					04/06/23 11:23	1

**Lab Sample ID: LCS 670-29203/4**

**Matrix: Water**

**Analysis Batch: 29203**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	17.9		ug/L		90	20 - 167
Surrogate	%Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	101		40 - 146				
4-Bromofluorobenzene (Surr)	98		41 - 142				
Dibromofluoromethane (Surr)	100		53 - 146				

**Lab Sample ID: 670-17111-F-5 MS**

**Matrix: Water**

**Analysis Batch: 29203**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	3.6	U	100	113		ug/L		113	20 - 167
Surrogate	%Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	97		40 - 146						
4-Bromofluorobenzene (Surr)	99		41 - 142						
Dibromofluoromethane (Surr)	101		53 - 146						

**Lab Sample ID: 670-17111-F-8 DU**

**Matrix: Water**

**Analysis Batch: 29203**

**Client Sample ID: Duplicate**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30
Surrogate	%Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	98		40 - 146					
4-Bromofluorobenzene (Surr)	106		41 - 142					
Dibromofluoromethane (Surr)	99		53 - 146					

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

## GC/MS VOA

### Analysis Batch: 29203

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-17020-1	EHF-DPT0004-010.0-20230327	Total/NA	Water	8260D	
670-17020-2	EHF-DPT0004-015.0-20230327	Total/NA	Water	8260D	
670-17020-3	EHF-DPT0004-020.0-20230327	Total/NA	Water	8260D	
670-17020-4	EHF-DPT0004-030.0-20230327	Total/NA	Water	8260D	
670-17020-5	EHF-DPT0004-040.0-20230327	Total/NA	Water	8260D	
670-17020-6	EHF-DPT0005-010.0-20230327	Total/NA	Water	8260D	
670-17020-7	EHF-DPT0005-015.0-20230327	Total/NA	Water	8260D	
670-17020-8	EHF-DPT0005-020.0-20230327	Total/NA	Water	8260D	
670-17020-9	EHF-DPT0005-030.0-20230327	Total/NA	Water	8260D	
670-17020-10	EHF-DPT0005-040.0-20230327	Total/NA	Water	8260D	
670-17020-11	EHF-DPT0006-010.0-20230327	Total/NA	Water	8260D	
670-17020-12	EHF-DPT0006-015.0-20230327	Total/NA	Water	8260D	
670-17020-13	EHF-DPT0006-020.0-20230327	Total/NA	Water	8260D	
670-17020-14	EHF-DPT0006-030.0-20230327	Total/NA	Water	8260D	
670-17020-15	EHF-DPT0006-040.0-20230327	Total/NA	Water	8260D	
670-17020-16	EHF-TB01-20230327	Total/NA	Water	8260D	
MB 670-29203/7	Method Blank	Total/NA	Water	8260D	
LCS 670-29203/4	Lab Control Sample	Total/NA	Water	8260D	
670-17111-F-5 MS	Matrix Spike	Total/NA	Water	8260D	
670-17111-F-8 DU	Duplicate	Total/NA	Water	8260D	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0004-010.0-20230327**

**Lab Sample ID: 670-17020-1**

Date Collected: 03/27/23 09:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 13:41

**Client Sample ID: EHF-DPT0004-015.0-20230327**

**Lab Sample ID: 670-17020-2**

Date Collected: 03/27/23 09:20

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 13:57

**Client Sample ID: EHF-DPT0004-020.0-20230327**

**Lab Sample ID: 670-17020-3**

Date Collected: 03/27/23 09:45

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 14:13

**Client Sample ID: EHF-DPT0004-030.0-20230327**

**Lab Sample ID: 670-17020-4**

Date Collected: 03/27/23 10:10

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 14:29

**Client Sample ID: EHF-DPT0004-040.0-20230327**

**Lab Sample ID: 670-17020-5**

Date Collected: 03/27/23 10:35

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 14:45

**Client Sample ID: EHF-DPT0005-010.0-20230327**

**Lab Sample ID: 670-17020-6**

Date Collected: 03/27/23 11:20

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 15:01

**Client Sample ID: EHF-DPT0005-015.0-20230327**

**Lab Sample ID: 670-17020-7**

Date Collected: 03/27/23 11:40

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 15:17

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0005-020.0-20230327**

**Lab Sample ID: 670-17020-8**

Date Collected: 03/27/23 12:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 15:33

**Client Sample ID: EHF-DPT0005-030.0-20230327**

**Lab Sample ID: 670-17020-9**

Date Collected: 03/27/23 13:05

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 15:48

**Client Sample ID: EHF-DPT0005-040.0-20230327**

**Lab Sample ID: 670-17020-10**

Date Collected: 03/27/23 13:30

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 16:04

**Client Sample ID: EHF-DPT0006-010.0-20230327**

**Lab Sample ID: 670-17020-11**

Date Collected: 03/27/23 14:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 16:20

**Client Sample ID: EHF-DPT0006-015.0-20230327**

**Lab Sample ID: 670-17020-12**

Date Collected: 03/27/23 14:20

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 16:36

**Client Sample ID: EHF-DPT0006-020.0-20230327**

**Lab Sample ID: 670-17020-13**

Date Collected: 03/27/23 14:40

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 16:52

**Client Sample ID: EHF-DPT0006-030.0-20230327**

**Lab Sample ID: 670-17020-14**

Date Collected: 03/27/23 15:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 17:08

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

**Client Sample ID: EHF-DPT0006-040.0-20230327**

**Lab Sample ID: 670-17020-15**

Date Collected: 03/27/23 15:25

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 17:24

**Client Sample ID: EHF-TB01-20230327**

**Lab Sample ID: 670-17020-16**

Date Collected: 03/27/23 07:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29203	KG	EET ORL	04/06/23 13:25

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15



# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC Industrial Area EHF

Job ID: 670-17020-1

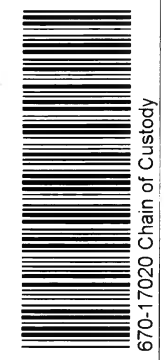
Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-17020-1	EHF-DPT0004-010.0-20230327	Water	03/27/23 09:00	03/28/23 17:35
670-17020-2	EHF-DPT0004-015.0-20230327	Water	03/27/23 09:20	03/28/23 17:35
670-17020-3	EHF-DPT0004-020.0-20230327	Water	03/27/23 09:45	03/28/23 17:35
670-17020-4	EHF-DPT0004-030.0-20230327	Water	03/27/23 10:10	03/28/23 17:35
670-17020-5	EHF-DPT0004-040.0-20230327	Water	03/27/23 10:35	03/28/23 17:35
670-17020-6	EHF-DPT0005-010.0-20230327	Water	03/27/23 11:20	03/28/23 17:35
670-17020-7	EHF-DPT0005-015.0-20230327	Water	03/27/23 11:40	03/28/23 17:35
670-17020-8	EHF-DPT0005-020.0-20230327	Water	03/27/23 12:00	03/28/23 17:35
670-17020-9	EHF-DPT0005-030.0-20230327	Water	03/27/23 13:05	03/28/23 17:35
670-17020-10	EHF-DPT0005-040.0-20230327	Water	03/27/23 13:30	03/28/23 17:35
670-17020-11	EHF-DPT0006-010.0-20230327	Water	03/27/23 14:00	03/28/23 17:35
670-17020-12	EHF-DPT0006-015.0-20230327	Water	03/27/23 14:20	03/28/23 17:35
670-17020-13	EHF-DPT0006-020.0-20230327	Water	03/27/23 14:40	03/28/23 17:35
670-17020-14	EHF-DPT0006-030.0-20230327	Water	03/27/23 15:00	03/28/23 17:35
670-17020-15	EHF-DPT0006-040.0-20230327	Water	03/27/23 15:25	03/28/23 17:35
670-17020-16	EHF-TB01-20230327	Water	03/27/23 07:00	03/28/23 17:35




**Chain of Custody Record**



<b>Client Information</b>		Sampler: <i>Greg Kusel</i>		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s): 670-6215-2731.1	
Client Contact: Teresa Arment Jennings		Phone: 772-631-7426		E-Mail: kaitlin.dylnicki@et.eurofinsus.com		State of Origin:	
Company: AECOM Technical Services Inc.		PWSID:		Analysis Requested		Job #: Page 1 of 2	
Address: 150 North Orange Avenue Suite 200		Due Date Requested:		Perform MS/MSD (Yes or No)		Preservation Codes:	
City: Orlando		TAT Requested (days):		Field Filtered Sample (Yes or No)		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Y - Trizma Z - other (specify)	
State, Zip: FL, 32801		Compliance Project: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		8260 - (MOD) VC		Other:	
Phone: 919-461-1282(Tel)		PO #: 148674		Matrix (W=water, S=solid, O=soil, M=metal, A=air)		Total Number of Containers	
Email: teresa.ament.jennings@aecom.com		WO #: 60610905		Sample Type (C=comp, G=grab)			
Project Name: NASA KSC Industrial Area		Project #: 67001282		Sample Time			
Site: EHF		SSOW#:		Sample Date			
				Preservation Code:			
<b>Sample Identification</b>							
EHF-DPT0004-010.0-20230327		3/27/23		0900		Water	
EHF-DPT0004-015.0-20230327				0920		Water	
EHF-DPT0004-020.0-20230327				0945		Water	
EHF-DPT0004-030.0-20230327				1010		Water	
EHF-DPT0004-040.0-20230327				1035		Water	
EHF-DPT0005-010.0-20230327				1120		Water	
EHF-DPT0005-015.0-20230327				1140		Water	
EHF-DPT0005-020.0-20230327				1200		Water	
EHF-DPT0005-030.0-20230327				1305		Water	
EHF-DPT0005-040.0-20230327				1330		Water	
EHF-DPT0006-010.0-20230327				1400		Water	
<b>Possible Hazard Identification</b>							
<input type="checkbox"/> Non-Hazard		<input type="checkbox"/> Flammable		<input type="checkbox"/> Skin Irritant		<input type="checkbox"/> Poison B	
<input type="checkbox"/> Unknown		<input type="checkbox"/> Unknown		<input type="checkbox"/> Unknown		<input type="checkbox"/> Radiological	
Deliverable Requested: I, II, III, IV, Other (specify)							
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: <i>Greg Kusel</i>		3/28/23		1733		Company: AECOM	
Relinquished by:		Date/Time:		Date/Time:		Company:	
Relinquished by:		Date/Time:		Date/Time:		Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			





<b>Client Information</b>		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s): 670-6215-2731.1	
Client Contact: Teresa Arment Jennings		E-Mail: kaitlin.dylnicki@et.eurofins.com		Page: Page 1 of 2	
Company: AECOM Technical Services Inc.		PWSID:		Job #:	
Address: 150 North Orange Avenue Suite 200		Due Date Requested:		Preservation Codes:	
City: Orlando		TAT Requested (days):		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:	
State, Zip: FL, 32801		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
Phone: 919-461-1282(Tel)		PO #: 148674		Total Number of Containers	
Email: teresa.arment.jennings@aecom.com		WO #: 60610905		3	
Project Name: NASA KSC Industrial Area		Project #: 67001282		3	
Site: EHF		SSOW#:		3	
<b>Sample Identification</b>		Field Filtered Sample (Yes or No)		Special Instructions/Note:	
EHF-DPT0004-010.0-20230327	Sample Date: 3/27/23	Sample Time: 0900	Matrix (W=Water, S=Solid, O=Water/Oil, ST=Stem, A=Air)	Perform MS/MSD (Yes or No)	 670-17020 Chain of Custody
EHF-DPT0004-015.0-20230327		0920	Water	M N 3	
EHF-DPT0004-020.0-20230327		0945	Water	M N 3	
EHF-DPT0004-030.0-20230327		1010	Water	M N 3	
EHF-DPT0004-040.0-20230327		1035	Water	M N 3	
EHF-DPT0005-010.0-20230327		1120	Water	M N 3	
EHF-DPT0005-015.0-20230327		1140	Water	M N 3	
EHF-DPT0005-020.0-20230327		1200	Water	M N 3	
EHF-DPT0005-030.0-20230327		1305	Water	M N 3	
EHF-DPT0006-010.0-20230327		1400	Water	M N 3	
<b>Possible Hazard Identification</b>		Sample Type (C=Comp, G=grab)		8260 - (MOD) VC	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Preservation Code:		A	
Deliverable Requested: I, II, III, IV, Other (specify)		Sample Date		Field Filtered Sample (Yes or No)	
Empty Kit Relinquished by:		Sample Time		Perform MS/MSD (Yes or No)	
Relinquished by: Greg Kusel		Sample Date		8260 - (MOD) VC	
Relinquished by: Greg Kusel		Sample Time		Field Filtered Sample (Yes or No)	
Relinquished by:		Sample Date		Perform MS/MSD (Yes or No)	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Sample Time		8260 - (MOD) VC	
Custody Seal No.:		Sample Date		Field Filtered Sample (Yes or No)	
Cooler Temperature(s) °C and Other Remarks: 170.6		Sample Time		Perform MS/MSD (Yes or No)	

<b>Client Information</b>		Sampler: <i>Greg Kusel</i>		Lab PM: Dylnicki, Kaitlin		Carrier Tracking No(s): 670-6215-2731.2	
Client Contact: Teresa Amendt Jennings		Phone: 772-631-7426		E-Mail: kaitlin.dylnicki@et.eurofins.com		Page: Page 2 of 2	
Company: AECOM Technical Services Inc.		PWSID:		Analysis Requested		Job #:	
Address: 150 North Orange Avenue Suite 200		Due Date Requested:		8260 - (MOD) VC		Preservation Codes:	
City: Orlando		TAT Requested (days):		Perform MS/MSD (Yes or No)		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SO4 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
State, Zip: FL, 32801		Compliance Project: <input type="checkbox"/> Yes <input type="checkbox"/> No		Field Filtered Sample (Yes or No)		Other:	
Phone: 919-461-1282(Tel)		PO #: 148674		X			
Email: teresa.amendt.jennings@aecom.com		WO #: 60610905		X			
Project Name: NASA KSC Industrial Area		Project #: 67001282		X			
Site: <i>EHF</i>		SSOW#:		X			
Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (Water, Solid, Other/Oil)	Preservation Code: (BT=Tissue, A=Al)	Total Number of Containers	Special Instructions/Note:
<del>EHF-DPT0006-015-0-20230327</del>	<del>3/27/23</del>	<del>1420</del>	<del>G</del>	<del>Water</del>	<del>Water</del>	<del>3</del>	<del></del>
<del>EHF-DPT0006-020-0-20230327</del>	<del>↓</del>	<del>1440</del>	<del>↓</del>	<del>Water</del>	<del>Water</del>	<del>3</del>	<del></del>
<del>EHF-DPT0006-030-0-20230327</del>	<del>↓</del>	<del>1500</del>	<del>↓</del>	<del>Water</del>	<del>Water</del>	<del>3</del>	<del></del>
<del>EHF-DPT0006-040-0-20230327</del>	<del>↓</del>	<del>1525</del>	<del>↓</del>	<del>Water</del>	<del>Water</del>	<del>3</del>	<del></del>
<del>EHF-TB01-20230327</del>	<del>↓</del>	<del>0700</del>	<del>↓</del>	<del>Water</del>	<del>Water</del>	<del>2</del>	<del></del>
<b>Possible Hazard Identification</b> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other (specify)							
<b>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</b> <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months Special Instructions/QC Requirements:							
Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by: <i>Greg Kusel</i>		Date: 3/29/23		Time: 1735		Company: AECOM	
Relinquished by:		Date:		Time:		Company:	
Relinquished by:		Date:		Time:		Company:	
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:			



## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-17020-1

**Login Number: 17020**

**List Number: 1**

**Creator: Bittle, David W**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





# ANALYTICAL REPORT

## PREPARED FOR

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

Generated 4/7/2023 4:25:07 PM

## JOB DESCRIPTION

NASA KSC IA RRLF

## JOB NUMBER

670-17019-1




# Eurofins Orlando

## Job Notes

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

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

## Authorization



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



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## Definitions/Glossary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

### Qualifiers

#### GC/MS VOA

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

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

# Case Narrative

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

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**Job ID: 670-17019-1**

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**Laboratory: Eurofins Orlando**

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**Narrative**

**Job Narrative**  
**670-17019-1**

**Receipt**

The samples were received on 3/28/2023 5:35 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 0.5°C

**GC/MS VOA**

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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- 13
- 14
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# Detection Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

## Client Sample ID: RRLF-DPT0023-008.0-20230328

Lab Sample ID: 670-17019-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	8.2		1.0	0.71	ug/L	1		8260D	Total/NA

## Client Sample ID: RRLF-DPT0023-018.0-20230328

Lab Sample ID: 670-17019-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	5.8		1.0	0.71	ug/L	1		8260D	Total/NA

## Client Sample ID: RRLF-DPT0023-028.0-20230328

Lab Sample ID: 670-17019-3

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	6.7		1.0	0.71	ug/L	1		8260D	Total/NA

## Client Sample ID: RRLF-DPT0023-038.0-20230328

Lab Sample ID: 670-17019-4

No Detections.

## Client Sample ID: RRLF-DPT0023-048.0-20230328

Lab Sample ID: 670-17019-5

No Detections.

## Client Sample ID: RRLF-DPT0024-008.0-20230328

Lab Sample ID: 670-17019-6

No Detections.

## Client Sample ID: RRLF-DPT0024-018.0-20230328

Lab Sample ID: 670-17019-7

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Vinyl chloride	2.3		1.0	0.71	ug/L	1		8260D	Total/NA

## Client Sample ID: RRLF-DPT0024-028.0-20230328

Lab Sample ID: 670-17019-8

No Detections.

## Client Sample ID: RRLF-DPT0024-038.0-20230328

Lab Sample ID: 670-17019-9

No Detections.

## Client Sample ID: RRLF-DPT0024-048.0-20230328

Lab Sample ID: 670-17019-10

No Detections.

## Client Sample ID: RRLF-TB01-20230327

Lab Sample ID: 670-17019-11

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Orlando

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

**Client Sample ID: RRLF-DPT0023-008.0-20230328**

**Lab Sample ID: 670-17019-1**

Date Collected: 03/28/23 09:20

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	8.2		1.0	0.71	ug/L			04/06/23 15:51	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					04/06/23 15:51	1
4-Bromofluorobenzene (Surr)	100		41 - 142					04/06/23 15:51	1
Dibromofluoromethane (Surr)	104		53 - 146					04/06/23 15:51	1

**Client Sample ID: RRLF-DPT0023-018.0-20230328**

**Lab Sample ID: 670-17019-2**

Date Collected: 03/28/23 09:40

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	5.8		1.0	0.71	ug/L			04/06/23 16:10	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					04/06/23 16:10	1
4-Bromofluorobenzene (Surr)	100		41 - 142					04/06/23 16:10	1
Dibromofluoromethane (Surr)	92		53 - 146					04/06/23 16:10	1

**Client Sample ID: RRLF-DPT0023-028.0-20230328**

**Lab Sample ID: 670-17019-3**

Date Collected: 03/28/23 10:10

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	6.7		1.0	0.71	ug/L			04/06/23 16:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	105		40 - 146					04/06/23 16:28	1
4-Bromofluorobenzene (Surr)	105		41 - 142					04/06/23 16:28	1
Dibromofluoromethane (Surr)	104		53 - 146					04/06/23 16:28	1

**Client Sample ID: RRLF-DPT0023-038.0-20230328**

**Lab Sample ID: 670-17019-4**

Date Collected: 03/28/23 10:35

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 18:16	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					04/06/23 18:16	1
4-Bromofluorobenzene (Surr)	99		41 - 142					04/06/23 18:16	1
Dibromofluoromethane (Surr)	97		53 - 146					04/06/23 18:16	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

**Client Sample ID: RRLF-DPT0023-048.0-20230328**

**Lab Sample ID: 670-17019-5**

Date Collected: 03/28/23 11:20

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 14:02	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146					04/06/23 14:02	1
4-Bromofluorobenzene (Surr)	97		41 - 142					04/06/23 14:02	1
Dibromofluoromethane (Surr)	84		53 - 146					04/06/23 14:02	1

**Client Sample ID: RRLF-DPT0024-008.0-20230328**

**Lab Sample ID: 670-17019-6**

Date Collected: 03/28/23 12:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 15:33	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146					04/06/23 15:33	1
4-Bromofluorobenzene (Surr)	97		41 - 142					04/06/23 15:33	1
Dibromofluoromethane (Surr)	105		53 - 146					04/06/23 15:33	1

**Client Sample ID: RRLF-DPT0024-018.0-20230328**

**Lab Sample ID: 670-17019-7**

Date Collected: 03/28/23 12:45

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	2.3		1.0	0.71	ug/L			04/06/23 16:46	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		40 - 146					04/06/23 16:46	1
4-Bromofluorobenzene (Surr)	103		41 - 142					04/06/23 16:46	1
Dibromofluoromethane (Surr)	104		53 - 146					04/06/23 16:46	1

**Client Sample ID: RRLF-DPT0024-028.0-20230328**

**Lab Sample ID: 670-17019-8**

Date Collected: 03/28/23 13:05

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:58	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146					04/06/23 17:58	1
4-Bromofluorobenzene (Surr)	99		41 - 142					04/06/23 17:58	1
Dibromofluoromethane (Surr)	101		53 - 146					04/06/23 17:58	1

# Client Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

**Client Sample ID: RRLF-DPT0024-038.0-20230328**

**Lab Sample ID: 670-17019-9**

Date Collected: 03/28/23 13:30

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:04	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	104		40 - 146					04/06/23 17:04	1
4-Bromofluorobenzene (Surr)	106		41 - 142					04/06/23 17:04	1
Dibromofluoromethane (Surr)	103		53 - 146					04/06/23 17:04	1

**Client Sample ID: RRLF-DPT0024-048.0-20230328**

**Lab Sample ID: 670-17019-10**

Date Collected: 03/28/23 13:55

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:22	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	101		40 - 146					04/06/23 17:22	1
4-Bromofluorobenzene (Surr)	100		41 - 142					04/06/23 17:22	1
Dibromofluoromethane (Surr)	103		53 - 146					04/06/23 17:22	1

**Client Sample ID: RRLF-TB01-20230327**

**Lab Sample ID: 670-17019-11**

Date Collected: 03/27/23 07:00

Matrix: Water

Date Received: 03/28/23 17:35

**Method: SW846 8260D - Volatile Organic Compounds by GC/MS**

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 17:40	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		40 - 146					04/06/23 17:40	1
4-Bromofluorobenzene (Surr)	101		41 - 142					04/06/23 17:40	1
Dibromofluoromethane (Surr)	105		53 - 146					04/06/23 17:40	1



# Surrogate Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)		
		TOL (40-146)	BFB (41-142)	DBFM (53-146)
670-16969-C-1 DU	Duplicate	100	101	104
670-17019-1	RRLF-DPT0023-008.0-20230328	101	100	104
670-17019-2	RRLF-DPT0023-018.0-20230328	101	100	92
670-17019-3	RRLF-DPT0023-028.0-20230328	105	105	104
670-17019-4	RRLF-DPT0023-038.0-20230328	101	99	97
670-17019-5	RRLF-DPT0023-048.0-20230328	102	97	84
670-17019-6	RRLF-DPT0024-008.0-20230328	102	97	105
670-17019-7	RRLF-DPT0024-018.0-20230328	103	103	104
670-17019-8	RRLF-DPT0024-028.0-20230328	102	99	101
670-17019-9	RRLF-DPT0024-038.0-20230328	104	106	103
670-17019-10	RRLF-DPT0024-048.0-20230328	101	100	103
670-17019-11	RRLF-TB01-20230327	103	101	105
670-17047-A-1 MS	Matrix Spike	100	96	101
LCS 670-29188/4	Lab Control Sample	102	99	103
MB 670-29188/7	Method Blank	102	98	104

### Surrogate Legend

TOL = Toluene-d8 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

# QC Sample Results

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

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

**Lab Sample ID: MB 670-29188/7**

**Matrix: Water**

**Analysis Batch: 29188**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.71	U	1.0	0.71	ug/L			04/06/23 11:14	1
Surrogate	MB %Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		40 - 146					04/06/23 11:14	1
4-Bromofluorobenzene (Surr)	98		41 - 142					04/06/23 11:14	1
Dibromofluoromethane (Surr)	104		53 - 146					04/06/23 11:14	1

**Lab Sample ID: LCS 670-29188/4**

**Matrix: Water**

**Analysis Batch: 29188**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	20.0	20.7		ug/L		103	20 - 167
Surrogate	LCS %Recovery	LCS Qualifier	Limits				
Toluene-d8 (Surr)	102		40 - 146				
4-Bromofluorobenzene (Surr)	99		41 - 142				
Dibromofluoromethane (Surr)	103		53 - 146				

**Lab Sample ID: 670-17047-A-1 MS**

**Matrix: Water**

**Analysis Batch: 29188**

**Client Sample ID: Matrix Spike**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Vinyl chloride	0.71	U	20.0	12.4		ug/L		62	20 - 167
Surrogate	MS %Recovery	MS Qualifier	Limits						
Toluene-d8 (Surr)	100		40 - 146						
4-Bromofluorobenzene (Surr)	96		41 - 142						
Dibromofluoromethane (Surr)	101		53 - 146						

**Lab Sample ID: 670-16969-C-1 DU**

**Matrix: Water**

**Analysis Batch: 29188**

**Client Sample ID: Duplicate**

**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Vinyl chloride	0.71	U	0.71	U	ug/L		NC	30
Surrogate	DU %Recovery	DU Qualifier	Limits					
Toluene-d8 (Surr)	100		40 - 146					
4-Bromofluorobenzene (Surr)	101		41 - 142					
Dibromofluoromethane (Surr)	104		53 - 146					

# QC Association Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

## GC/MS VOA

### Analysis Batch: 29188

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
670-17019-1	RRLF-DPT0023-008.0-20230328	Total/NA	Water	8260D	
670-17019-2	RRLF-DPT0023-018.0-20230328	Total/NA	Water	8260D	
670-17019-3	RRLF-DPT0023-028.0-20230328	Total/NA	Water	8260D	
670-17019-4	RRLF-DPT0023-038.0-20230328	Total/NA	Water	8260D	
670-17019-5	RRLF-DPT0023-048.0-20230328	Total/NA	Water	8260D	
670-17019-6	RRLF-DPT0024-008.0-20230328	Total/NA	Water	8260D	
670-17019-7	RRLF-DPT0024-018.0-20230328	Total/NA	Water	8260D	
670-17019-8	RRLF-DPT0024-028.0-20230328	Total/NA	Water	8260D	
670-17019-9	RRLF-DPT0024-038.0-20230328	Total/NA	Water	8260D	
670-17019-10	RRLF-DPT0024-048.0-20230328	Total/NA	Water	8260D	
670-17019-11	RRLF-TB01-20230327	Total/NA	Water	8260D	
MB 670-29188/7	Method Blank	Total/NA	Water	8260D	
LCS 670-29188/4	Lab Control Sample	Total/NA	Water	8260D	
670-17047-A-1 MS	Matrix Spike	Total/NA	Water	8260D	
670-16969-C-1 DU	Duplicate	Total/NA	Water	8260D	

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

**Client Sample ID: RRLF-DPT0023-008.0-20230328**

**Lab Sample ID: 670-17019-1**

Date Collected: 03/28/23 09:20

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 15:51

**Client Sample ID: RRLF-DPT0023-018.0-20230328**

**Lab Sample ID: 670-17019-2**

Date Collected: 03/28/23 09:40

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 16:10

**Client Sample ID: RRLF-DPT0023-028.0-20230328**

**Lab Sample ID: 670-17019-3**

Date Collected: 03/28/23 10:10

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 16:28

**Client Sample ID: RRLF-DPT0023-038.0-20230328**

**Lab Sample ID: 670-17019-4**

Date Collected: 03/28/23 10:35

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 18:16

**Client Sample ID: RRLF-DPT0023-048.0-20230328**

**Lab Sample ID: 670-17019-5**

Date Collected: 03/28/23 11:20

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 14:02

**Client Sample ID: RRLF-DPT0024-008.0-20230328**

**Lab Sample ID: 670-17019-6**

Date Collected: 03/28/23 12:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 15:33

**Client Sample ID: RRLF-DPT0024-018.0-20230328**

**Lab Sample ID: 670-17019-7**

Date Collected: 03/28/23 12:45

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 16:46

# Lab Chronicle

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

**Client Sample ID: RRLF-DPT0024-028.0-20230328**

**Lab Sample ID: 670-17019-8**

Date Collected: 03/28/23 13:05

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 17:58

**Client Sample ID: RRLF-DPT0024-038.0-20230328**

**Lab Sample ID: 670-17019-9**

Date Collected: 03/28/23 13:30

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 17:04

**Client Sample ID: RRLF-DPT0024-048.0-20230328**

**Lab Sample ID: 670-17019-10**

Date Collected: 03/28/23 13:55

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 17:22

**Client Sample ID: RRLF-TB01-20230327**

**Lab Sample ID: 670-17019-11**

Date Collected: 03/27/23 07:00

Matrix: Water

Date Received: 03/28/23 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	29188	P1K	EET ORL	04/06/23 17:40

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

# Accreditation/Certification Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

## Laboratory: Eurofins Orlando

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

Authority	Program	Identification Number	Expiration Date
Florida	NELAP	E83018	06-30-23

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

# Method Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET ORL
5030C	Purge and Trap	SW846	EET ORL

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984



# Sample Summary

Client: AECOM Technical Services Inc.  
Project/Site: NASA KSC IA RRLF

Job ID: 670-17019-1


Lab Sample ID	Client Sample ID	Matrix	Collected	Received
670-17019-1	RRLF-DPT0023-008.0-20230328	Water	03/28/23 09:20	03/28/23 17:35
670-17019-2	RRLF-DPT0023-018.0-20230328	Water	03/28/23 09:40	03/28/23 17:35
670-17019-3	RRLF-DPT0023-028.0-20230328	Water	03/28/23 10:10	03/28/23 17:35
670-17019-4	RRLF-DPT0023-038.0-20230328	Water	03/28/23 10:35	03/28/23 17:35
670-17019-5	RRLF-DPT0023-048.0-20230328	Water	03/28/23 11:20	03/28/23 17:35
670-17019-6	RRLF-DPT0024-008.0-20230328	Water	03/28/23 12:00	03/28/23 17:35
670-17019-7	RRLF-DPT0024-018.0-20230328	Water	03/28/23 12:45	03/28/23 17:35
670-17019-8	RRLF-DPT0024-028.0-20230328	Water	03/28/23 13:05	03/28/23 17:35
670-17019-9	RRLF-DPT0024-038.0-20230328	Water	03/28/23 13:30	03/28/23 17:35
670-17019-10	RRLF-DPT0024-048.0-20230328	Water	03/28/23 13:55	03/28/23 17:35
670-17019-11	RRLF-TB01-20230327	Water	03/27/23 07:00	03/28/23 17:35





**Chain of Custody Record**

<b>Client Information</b>		Sampler: <u>Greg Kusel</u>		Lab PM: <u>Dylnicki, Kaitlin</u>		Carrier Tracking No(s): <u>670-6221-2735.1</u>	
Client Contact: <u>Teresa Amentt Jennings</u>		Phone: <u>772-631-7426</u>		E-Mail: <u>kaitlin.dylnicki@et.eurofins.com</u>		Page: <u>Page 1 of 1</u>	
Company: <u>AECOM Technical Services Inc.</u>		PWSID: <u></u>		Analysis Requested		Job #: <u></u>	
Address: <u>150 North Orange Avenue Suite 200</u>		Due Date Requested: <u></u>		Perform MS/MSD (Yes or No)		Preservation Codes:	
City: <u>Orlando</u>		TAT Requested (days): <u></u>		Field Filtered Sample (Yes or No)		A - HCl B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA M - Hexane N - None O - AsNaO2 P - Na2O4S Q - Na2SO3 R - Na2SZO3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4-5 Y - Trizma Z - other (specify)	
State, Zip: <u>FL, 32801</u>		Compliance Project: <u>Δ Yes Δ No</u>		8260D - (MOD) VC		Total Number of Containers	
Phone: <u>919-461-1282(Tel)</u>		PO #: <u>148674</u>		Matrix (W=water, S=solid, O=soil, W=water, A=air)			
Email: <u>teresa.amentt.jennings@aecom.com</u>		WO #: <u>60610905</u>		Sample Type (C=comp, G=grab)			
Project Name: <u>NASA KSC RRLF</u>		Project #: <u>67001282</u>		Sample Time			
Site: <u>RRLF</u>		SSOW#: <u></u>		Sample Date			
<b>Sample Identification</b>		Sample Date		Sample Time		Sample Preservation Code	
RRLF-DPT0023-008.0-202303 28		3/28/23		0920		Water	
RRLF-DPT0023-018.0-202303 28				0940		Water	
RRLF-DPT0023-028.0-202303 28				1010		Water	
RRLF-DPT0023-038.0-202303 28				1035		Water	
RRLF-DPT0023-048.0-202303 28				1120		Water	
RRLF-DPT0024-008.0-202303 28				1200		Water	
RRLF-DPT0024-018.0-202303 28				1245		Water	
RRLF-DPT0024-028.0-202303 28				1305		Water	
RRLF-DPT0024-038.0-202303 28				1330		Water	
RRLF-DPT0024-048.0-202303 28				1355		Water	
RRLF-TB01-202303 27		3/27/23		0700		Water	



670-17019 Chain of Custody

<b>Possible Hazard Identification</b>		Return To Client <input type="checkbox"/> Archive For <u>Months</u>	
<input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological		Special Instructions/QC Requirements:	
Deliverable Requested: I, II, III, IV, Other (specify)		Method of Shipment:	
Empty Kit Relinquished by:		Time:	
Relinquished by: <u>Greg Kusel</u>		Date: <u>3/28/23</u>	
Relinquished by: <u>Bryce Miller</u>		Date: <u>1735</u>	
Relinquished by:		Date/Time: <u>3/28/23 1735</u>	
Relinquished by:		Date/Time:	
Custody Seals Intact: <u>Δ Yes Δ No</u>		Custody Seal No.:	
Cooler Temperature(s) °C and Other Remarks: <u>10005</u>		Received by: <u>Greg Kusel</u>	
		Date/Time: <u>3/28/23 1735</u>	
		Company: <u>AECOM</u>	
		Company:	
		Company:	



## Login Sample Receipt Checklist

Client: AECOM Technical Services Inc.

Job Number: 670-17019-1

**Login Number: 17019**

**List Number: 1**

**Creator: Wehr, Alex C**

**List Source: Eurofins Orlando**

Question	Answer	Comment
Radioactivity wasn't checked or is <=/ background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



**APPENDIX F**  
**IDW INVENTORY LOGS**

Site	Generation Date	Media	Source	% Full	Pallet ID	Drum/Tank ID Number	Contact	Location of Drums/Tanks	IDW Origination	pH	Concentrations (µg/L)	Tie Down Strap Yes/No
KP1	09/16/21	Liquid	MW0003, MW0022, and MW0035	80%	Pallet 222842	Drum 222843	Greg Kusel (772) 631-7426	CCF	Groundwater sampling (purge and decon water)	7.09	Previous Lab Report: AE07201  Lab Report: AE09082 PCE = 0.76 U TCE = 0.89 U cDCE = 0.53 U tDCE = 0.73 U VC = 0.80 I Naph = 0.05 U TPH = 110 PFHxA = 0.00555 PFHxS = 0.00866 PFHpA = 0.00498 PFOA = 0.00950 PFBS = 0.00148 I PFOS = 0.0284	Yes
ORSY	09/16/21	Liquid	EXC-MW0001I and EXC-MW0003I									
HMF South	09/22/21	Liquid	NLP-IW0004I and MW-0006IR									
GSSP	11/22/21	Liquid	MW0013, MW0019, MW0020, MW0024R, MW0034, MW0035, MW0036, MW0044R, MW0053, MW0059, MW0060, MW0061, MW0062, and MW0063									
LETF	11/23/21	Liquid	MW0001, MW0002, MW0005, MW0007, PSB-MW0001I, and PSB-MW0002I									
FSA1	11/30/21	Liquid	MW0001, MW0002, MW0012R, MW0014, MW0021, MW0022R, MW0023, MW0027, and MW0028									

**IA LTM IDW Notes:**

KP1 = Kennedy Athletic, Recreation, and Social Park 1

ORSY = Orsino Storage Yard

HMF South = Hypergol Maintenance Facility Hazardous Waste South Staging Area

GSSP = General Services Administration Seized Property

LETF = Launch Equipment Test Facility

FSA1 = Fuel Storage Area #1 Underground Storage Tank

µg/L = micrograms per liter

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit

I = The analyte was detected between method detection limit and practical quantitation level

PCE = tetrachloroethylene

TCE = trichloroethene

cDCE = cis-1,2-dichloroethylene

tDCE = trans-1,2-dichloroethylene

VC = vinyl chloride

Naph = Naphthalene

TPH = Total Petroleum Hydrocarbons

PFHxA = Perfluorohexanoic acid

PFHxS = Perfluorohexane sulfonic acid

PFHpA = Perfluoroheptanoic acid

PFOA = Perfluorooctanoic acid

PFBS = Perfluorobutane sulfonic acid

PFOS = Perfluorooctane sulfonic acid

Site	Generation Date	Media	Source	Contact	IDW Origination	Location of Drums/Tanks	Tie Down Strap Yes/No	Pallet ID	Drum/Tank ID Number	pH	Concentrations (µg/L)
RRLF	05/10/22	Liquid	MW0033, MW0038I, MW0039I, and MW0040I	Greg Kusel (772) 631-7426	Groundwater sampling (purge and decon water)	CCF	Yes	Pallet 220930	Drum 222332 80% Full  Drum 222333 25% Full	7.08  and  7.16	Lab Report: AF03378 Benzene = 0.71 U TCE = 0.89 U cDCE = 1.4 VC = 0.71 U Naph = 0.050 U 1-Methyl = 0.050 U 2-Methyl = 0.050 U TPH = 100 U Lead = 2.50 U PFHxA = 0.00725 PFHxS = 0.0128 PFHpA = 0.00462 PFOA = 0.0154 PFBS = 0.00232 PFOS = 0.0208
M505	05/11/22	Liquid	MW0013, MW0032, MW0033, MW0039, MW0049, MW0051, MW0055, and MW0059								
O&C	05/09/22	Liquid	MW0005I and MW0007I								
VPF	05/12/22	Liquid	IW0008I, IW0018I, MW0021, MW0022, MW0025, and MW0027								
KP1 LOC9	05/12/22	Liquid	MW0022								
SSPF	05/10/22	Liquid	MW0004, MW0006, MW0013, MW0014, and MW0016								
CGO	05/11/22	Liquid	MW0006, MW0018, and MW0019								
FSA1	05/09/22	Liquid	MW0001, MW0002, MW0012R, MW0014, MW0017A, MW0021, MW0022R, MW0023, MW0027, and MW0028								

**IA LTM IDW Notes:**

RRLF = Ransom Road Landfill  
M505 = Building M7-0505 Treatment Tank Area  
O&C = Operation and Checkout Building  
VPF = Vertical Processing Facility  
KP1 = Kennedy Athletic, Recreation, and Social Park 1  
SSPF = Space Station Processing Facility  
CGO = Citgo Service Station  
FSA1 = Fuel Storage Area #1 Underground Storage Tank  
µg/L = micrograms per liter  
U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit  
I = The analyte was detected between method detection limit and practical quantitation level  
TCE = trichloroethene

cDCE = cis-1,2-dichloroethylene  
VC = vinyl chloride  
Naph = naphthalene  
1-Methyl = 1-methylnaphthalene  
2-Methyl = 2-methylnaphthalene  
TPH = Total Petroleum Hydrocarbons  
PFHxA =perfluorohexanoic acid  
PFHxS = perfluorohexane sulfonic acid  
PFHpA = perfluoroheptanoic acid  
PFOA = perfluorooctanoic acid  
PFBS = perfluorobutane sulfonic acid  
PFOS = perfluorooctane sulfonic acid

Site	Generation Date	Media	Source	Contact	IDW Origination	Location of Drums/Tanks	Tie Down Strap Yes/No	Pallet ID	Drum/Tank ID Number	pH	Concentrations (µg/L)
EHF	11/15/22	Liquid	MW0001, MW0004, MW0005	Greg Kusel (772) 631-7426	Groundwater sampling (purge and decon water)	CCF	Yes	Pallet 220341	Drum 228463 40% Full	7.67	Lab Report: J9608 PCE = 0.50 U TCE = 0.50 U tDCE = 0.50 U cDCE = 0.50 U VC = 0.91 I Naph = 0.050 U J3 N = 420 I P = 180 PFBS = 0.00067 I PFBA = 0.0056 PFHpA = 0.0019 PFHxS = 0.0018 PFHxA = 0.0019 PFNA = 0.00048 I J PFOS = 0.0035 PFOA = 0.0046 PFPeA = 0.00092 I
EDL	11/15/22	Liquid	MW0004, MW0006R								
GSSP	11/08/22	Liquid	MW0013, MW0019, MW0020, MW0024R, MW0034, MW0035, MW0036, MW0044R, MW0053, MW0059, MW0060, MW0061, MW0062, MW0063								

**IA LTM IDW Notes:**

EHF = Ransom Road Landfill

EDL = Building M7-0505 Treatment Tank Area

GSSP = Operation and Checkout Building

µg/L = micrograms per liter

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit

I = The analyte was detected between the laboratory method detection limit and the laboratory practical quantitation limit.

J = Estimated value; value may not be accurate.

J3 = Estimated value; value may not be accurate. Spike recovery of RPD outside of criteria.

PCE = tetrachloroethene

TCE = trichloroethene

tDCE = trans-1,2-dichloroethylene

cDCE = cis-1,2-dichloroethylene

VC = vinyl chloride

Naph = naphthalene

N = nitrate

P = total phosphorus

PFBS = perfluorobutane sulfonic acid

PFBA = perfluorobutanoic acid

PFHpA = perfluoroheptanoic acid

PFHxS = perfluorohexane sulfonic acid

PFHxA = perfluorohexanoic acid

PFNA = perfluorononanoic acid

PFOS = perfluorooctane sulfonic acid

PFOA = perfluorooctanoic acid

PFPeA = perfluoropentanoic acid

## **APPENDIX G**

### **MANN-KENDALL ANALYSES**

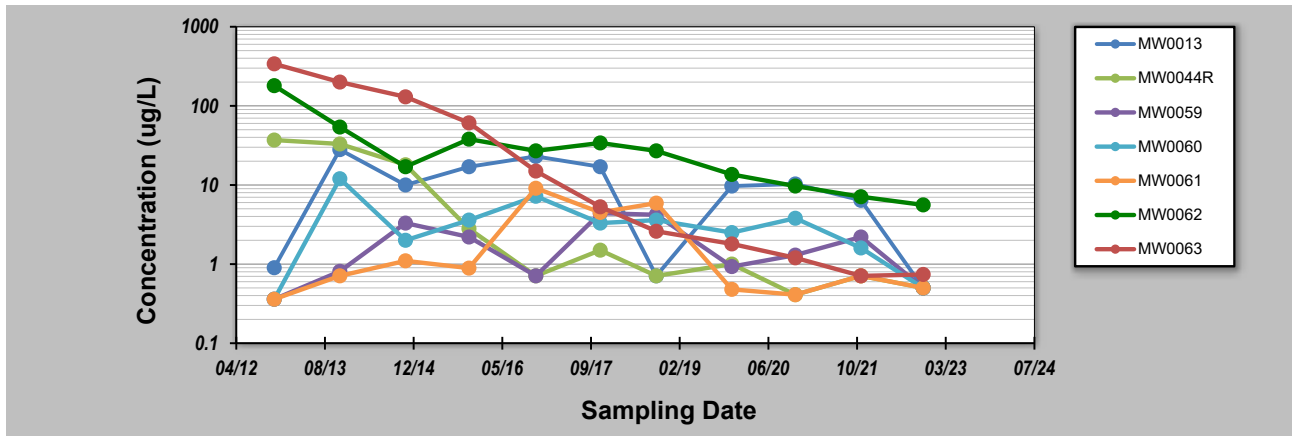
# GSI MANN-KENDALL TOOLKIT for Constituent Trend Analysis

Evaluation Date: **14-Dec-22**  
 Facility Name: **NASA KSC IA LTM**  
 Conducted By: **Greg Kusel**

Job ID: **GSSP Source Area**  
 Constituent: **Vinyl Chloride**  
 Concentration Units: **ug/L**

Sampling Point ID: **MW0013**   **MW0044R**   **MW0059**   **MW0060**   **MW0061**   **MW0062**   **MW0063**

Sampling Event	Sampling Date	VINYL CHLORIDE CONCENTRATION (ug/L)						
		MW0013	MW0044R	MW0059	MW0060	MW0061	MW0062	MW0063
1	1-Nov-12	0.9	37	0.36	0.36	0.36	180	340
2	6-Nov-13	28	33	0.81	12	0.71	54	200
3	11-Nov-14	10	18	3.3	2	1.1	17	130
4	4-Nov-15	17	2.8	2.2	3.6	0.89	38	61
5	15-Nov-16	23	0.71	0.71	7.2	9.1	27	15
6	13-Nov-17	17	1.5	4.4	3.3	4.5	34	5.3
7	25-Sep-18	0.71	0.71	4.2	3.6	5.9	27	2.6
8	25-Nov-19	9.7	1	0.93	2.5	0.48	13.6	1.8
9	17-Nov-20	10.3	0.41	1.3	3.8	0.41	9.7	1.2
10	22-Nov-21	6.4	0.71	2.2	1.6	0.71	7.1	0.71
11	8-Nov-22	0.5	0.5	0.5	0.5	0.5	5.6	0.74
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		0.82	1.59	0.78	0.91	1.31	1.32	1.62
Mann-Kendall Statistic (S):		-20	-42	4	-10	-2	-44	-53
Confidence Factor:		92.9%	>99.9%	59.0%	75.3%	53.0%	>99.9%	>99.9%
Concentration Trend:		Prob. Decreasing	Decreasing	No Trend	Stable	No Trend	Decreasing	Decreasing



**Notes:**

- At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
- Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
- Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

**DISCLAIMER:** The GSI Mann-Kendall Toolkit is available "as is". Considerable care has been exercised in preparing this software product; however, no party, including without limitation GSI Environmental Inc., makes any representation or warranty regarding the accuracy, correctness, or completeness of the information contained herein, and no such party shall be liable for any direct, indirect, consequential, incidental or other damages resulting from the use of this product or the information contained herein. Information in this publication is subject to change without notice. GSI Environmental Inc., disclaims any responsibility or obligation to update the information contained herein.



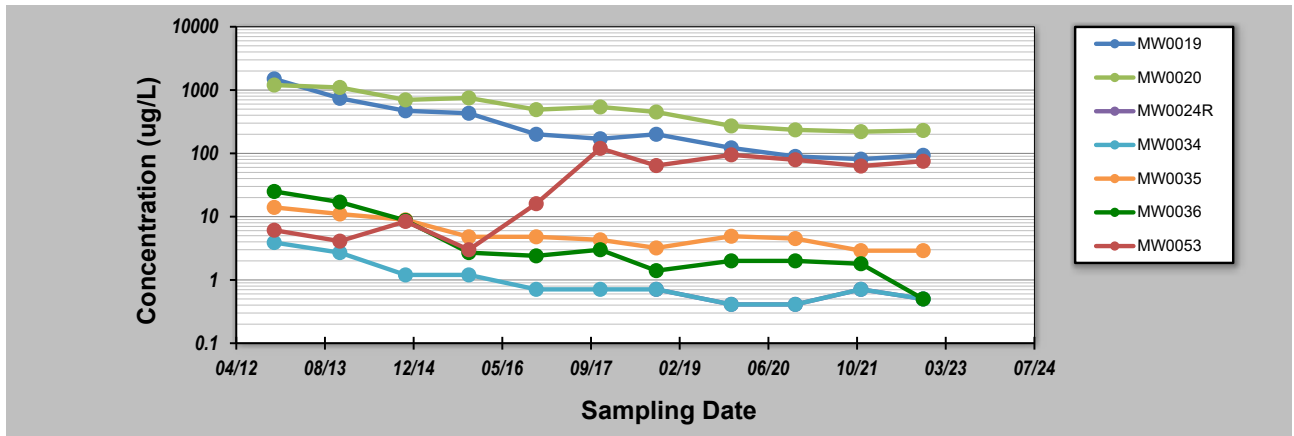
# GSI MANN-KENDALL TOOLKIT for Constituent Trend Analysis

Evaluation Date: **14-Dec-22**  
 Facility Name: **NASA KSC IA LTM**  
 Conducted By: **Greg Kusel**

Job ID: **GSSP Downgradient**  
 Constituent: **Vinyl Chloride**  
 Concentration Units: **ug/L**

Sampling Point ID: **MW0019**    **MW0020**    **MW0024R**    **MW0034**    **MW0035**    **MW0036**    **MW0053**

Sampling Event	Sampling Date	VINYL CHLORIDE CONCENTRATION (ug/L)						
		MW0019	MW0020	MW0024R	MW0034	MW0035	MW0036	MW0053
1	1-Nov-12	1500	1200		3.9	14	25	6.1
2	6-Nov-13	740	1100		2.7	11	17	4.1
3	11-Nov-14	470	700		1.2	8.9	8.7	8.4
4	3-Nov-15	430	750		1.2	4.8	2.7	3
5	17-Nov-16	200	490		0.71	4.8	2.4	16
6	13-Nov-17	170	540		0.71	4.3	3	120
7	25-Sep-18	200	450	0.71	0.71	3.2	1.4	64
8	22-Nov-19	122	271	0.41	0.41	4.9	2	94.7
9	17-Nov-20	89.4	235	0.41	0.41	4.5	2	79.1
10	22-Nov-21	81	220	0.71	0.71	2.9	1.8	63
11	8-Nov-22	93	230	0.5	0.5	2.9	0.5	75
12								
13								
14								
15								
16								
17								
18								
19								
20								
Coefficient of Variation:		1.15	0.61	0.28	0.92	0.61	1.31	0.87
Mann-Kendall Statistic (S):		-48	-49	0	-39	-41	-44	25
Confidence Factor:		>99.9%	>99.9%	40.8%	99.9%	100.0%	>99.9%	97.0%
Concentration Trend:		Decreasing	Decreasing	Stable	Decreasing	Decreasing	Decreasing	Increasing



**Notes:**

- At least four independent sampling events per well are required for calculating the trend. *Methodology is valid for 4 to 40 samples.*
- Confidence in Trend = Confidence (in percent) that constituent concentration is increasing (S>0) or decreasing (S<0): >95% = Increasing or Decreasing; ≥ 90% = Probably Increasing or Probably Decreasing; < 90% and S>0 = No Trend; < 90%, S≤0, and COV ≥ 1 = No Trend; < 90% and COV < 1 = Stable.
- Methodology based on "MAROS: A Decision Support System for Optimizing Monitoring Plans", J.J. Aziz, M. Ling, H.S. Rifai, C.J. Newell, and J.R. Gonzales, *Ground Water*, 41(3):355-367, 2003.

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## **APPENDIX H**

**ORSY LETTER REPORT - 2023**

June 2023

Mr. Ryan O'Meara  
Remediation Project Manager  
National Aeronautics and Space Administration  
Mail Code SI-E2  
Building K6-1547 (Logistics Facility)  
John F. Kennedy Space Center  
Kennedy Space Center, FL 32899-0001

**Subject: Request for Discontinuation of Long-Term Monitoring  
Orsino Storage Yard  
Solid Waste Management Unit 004  
Kennedy Space Center, Florida**

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

Dear Mr. O'Meara:

AECOM Technical Services, Inc. (AECOM) is pleased to provide Kennedy Space Center (KSC), National Aeronautics and Space Administration (NASA), with this letter report for the Orsino Storage Yard (ORSY). The purpose of this letter report is to present the site history, groundwater data, and recommendations resulting from assessments and long-term monitoring (LTM) activities at ORSY. This letter report was prepared for NASA under Contract 80KSC019D0010, Task Order 80KSC019F0071.

#### **EXECUTIVE SUMMARY**

This report presents the site history, groundwater sampling results, and recommendations from the 2021 Industrial Area (IA) LTM activities at ORSY. ORSY has been used as a staging facility for electrical equipment since 1966 (EG&G 1991). Initial investigations conducted between 1986 and 1992 focused on polychlorinated biphenyls (PCBs) in soil. A series of soil excavation interim measures (IMs) were conducted to remove soils containing total PCB concentrations of greater than 25 milligrams per kilogram (mg/kg).

A Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) was completed in several phases at ORSY from 1998 through 2005, with PCBs in soil and volatile organic compounds (VOCs) in groundwater identified as contaminants of concern. Between 2000 and 2004, additional soil IMs were completed to remove soil with PCB concentrations greater than the State of Florida Industrial Soil Cleanup Target Level (SCTL) of 2.1 mg/kg given in Chapter 62-777, Florida Administrative Code (F.A.C.). A land use control (LUC) is in place at ORSY due to the presence of PCBs in soils at concentrations exceeding the Residential SCTL. In 2005, a statement of basis was issued to prevent residential exposure to site surface soils, prohibit the use of groundwater as a potable water supply, and initiate monitored natural attenuation (MNA). ORSY entered the IA LTM program at an annual sampling frequency with the goal of reducing groundwater concentrations to below the State of Florida Groundwater Cleanup Target Levels (GCTLs) given in Chapter 62-777, F.A.C.

In November 2020, concentrations of VOCs declined to below GCTLs. Therefore, the next sampling event was accelerated to September 2021 and a downgradient monitoring well was added into the sampling

program. The September 2021 ORSY sampling data indicated VOC concentrations remained below GCTLs, marking the second consecutive sampling event with results below GCTLs.

The September 2021 groundwater sampling activities at ORSY were conducted in accordance with the KSC Sampling and Analysis Plan (SAP) (Geosyntec 2017), Florida Department of Environmental Protection (FDEP) April 2022 regulatory comments on the 2019-2020 IA LTM report, and the KSC Remediation Team (KSCRT) decisions from the February 2021 meeting. The April 2022 regulatory comments are included in **Appendix A**. The KSCRT meeting minutes are included in **Appendix B**.

Based on the 2020 and 2021 groundwater sampling results, discontinuation of MNA at ORSY is recommended. The existing LUC at ORSY will remain for PCB soil exceedances.

### **SITE DESCRIPTION AND HISTORY**

ORSY is located to the southeast of the C Avenue and 5th Street Southeast intersection. A power substation borders ORSY to the west. The storage yard has been utilized since 1966 as a staging area for electrical equipment, consisting of wooden electric poles, transformers containing PCBs, electrical cables, control panels, and oil-based switches. The site is predominantly gravel-paved with several sheds situated on concrete pads along the western side of the site (NASA 2005). Refer to **Figure 1** for a site map.

### **PREVIOUS SITE INVESTIGATIONS**

Based on evidence of apparent spills, ORSY was identified as a potential spill site in 1991. Initial site investigations focused on PCBs, which led to IM activities being conducted from 1986 through 1992 to remove soils with PCB concentrations exceeding 25 mg/kg as specified in the Toxic Substances Control Act (TSCA). A total of 921 tons of soil were excavated, transported, and properly disposed of during this time.

An RFI and RFI Addendum were completed between 1998 and 2005 that identified VOCs, including vinyl chloride (VC), chlorobenzene, 1,3-dichlorobenzene (DCB), 1,4-DCB, 1,2,3-trichlorobenzene (TCB), and 1,2,4-TCB, at concentrations in groundwater above their respective GCTLs (Geosyntec 2003, 2005). A risk evaluation determined these VOCs may cause an unacceptable human health risk if groundwater was to be used as a source of drinking water. MNA of groundwater was selected as the remediation strategy and ORSY was incorporated into the LTM program in 2005 at an annual sampling frequency. Concurrent with the RFI, soil with PCB concentrations greater than the Industrial SCTL of 2.1 mg/kg were delineated and several soil IMs were conducted, resulting in the excavation and disposal of approximately 2,340 tons of soil with PCB concentrations between 2.1 mg/kg and 25 mg/kg. Approximately 375 tons were excavated and disposed of with PCB concentrations greater than the TSCA level of 25 mg/kg. A LUC was recommended to prevent residential exposure to site soils.

VC concentrations have remained below the GCTL since 2006. Chlorobenzene, 1,3-DCB, and 1,4-DCB concentrations have remained below their respective GCTLs since 2007; however, 1,2,3-TCB and 1,2,4-TCB remained at concentrations exceeding their FDEP GCTLs. In 2012, the ORSY LTM groundwater sampling interval was changed to biennial frequency.

November 2020 sampling results from monitoring well ORSY-EXC-MW0001I revealed that both the 1,2,3-TCB and 1,2,4-TCB concentrations were below the Chapter 62-777, F.A.C. GCTL (70 µg/L) for the

first time. Rather than wait until the next scheduled biennial event in 2022, the sampling was accelerated in 2021 to obtain a second consecutive sample below the GCTL within 12 months.

### FIELD SAMPLING ACTIVITIES

The ORSY site was sampled using low-flow sampling techniques, where each monitoring well was purged and sampled with a peristaltic pump and high-density polyethylene tubing. The sample tubing was placed at the mid-point of the well screen at each intermediate monitoring well to obtain a representative groundwater sample of aquifer conditions. Purge water, generated during sampling activities, was containerized in 55-gallon steel drums staged on spill containment pallets at the Components Cleaning Facility. The storage drums of purge water were sampled at the end of the sampling event and characterized for disposal. Upon receipt, analytical data were provided to the NASA Remediation Project Manager along with an inventory of the storage tank for disposal.

During purging of monitoring wells, geochemical parameters consisting of pH, specific conductivity, turbidity, dissolved oxygen, temperature, oxidation reduction potential, and salinity were monitored and recorded. Samples were collected once the geochemical parameters reached stabilization in accordance with FDEP Standard Operating Procedures (FDEP 2017) and the SAP. Daily Field Activity Logs are included in **Appendix C**. Groundwater Sampling Logs, which include the geochemical data, are included in **Appendix D**.

On September 16, 2021, Groundwater elevations were measured at five monitoring wells, and samples from two monitoring wells were collected. ORSY-EXC-MW0003I was added to the sampling event as a background well, as requested by FDEP. The following table shows the wells used for the groundwater level measurements and sampling at ORSY.

Well Name	Screen Interval (ft bls)	Analysis
ORSY-DRM-MW0001I	20-25	WL Only
ORSY-EXC-MW0001I	20-25	WL + select VOCs
ORSY-EXC-MW0002I	20-25	WL Only
ORSY-EXC-MW0003I	20-25	WL + select VOCs
ORSY-EXC-MW0004I	20-30	WL Only

WL = water level measurement

Select VOCs = monitoring well sampled for 1,2,3-TCB and 1,2,4-TCB by Method 8260B

The groundwater samples collected from ORSY-EXC-MW0001I and ORSY-EXC-MW0003I during the September 2021 sampling event were analyzed for select VOCs by Method 8260B. Analytes detected in the groundwater at each site were compared to GCTLs and State of Florida Natural Attenuation Default Concentration (NADC) levels established in Chapter 62-777, F.A.C., which are listed below.

COC	GCTL (µg/L)	NADC (µg/L)
1,2,3-TCB	70	700
1,2,4-TCB	70	700

µg/L = micrograms per liter

### WATER LEVEL COLLECTION AND GROUNDWATER FLOW DIRECTION

At the onset of each scheduled LTM sampling event and prior to collection of samples, predetermined monitoring wells were vented to allow for atmospheric equilibration. Once stabilized, groundwater

elevations were measured in site monitoring wells to determine the groundwater gradient and flow direction. Water levels in each well were measured to the nearest 0.01 foot using an electronic water level meter. Measurements were recorded from a permanent point identified on the top of each monitoring well casing (TOC), typically the northernmost point, for consistency. Groundwater elevations are calculated by subtracting the measured depth to water from the surveyed TOC elevation relative to the North American Vertical Datum of 1988 (NAVD88). Additionally, observations of the condition of the monitoring wells, surrounding vegetation, and biological hazards were noted.

The groundwater elevation data collected during the September 2021 sampling event, as well as historical data from 2014 through 2020, are presented in **Table 1**. Groundwater levels collected during the September 2021 event were used to determine the contours and flow direction for the intermediate aquifer zone (20 ft bls to 30 ft bls) at ORSY, presented on **Figure 2**. The flow direction during the September 2021 sampling event was toward the southeast, which is consistent with the observed historical groundwater flow at ORSY.

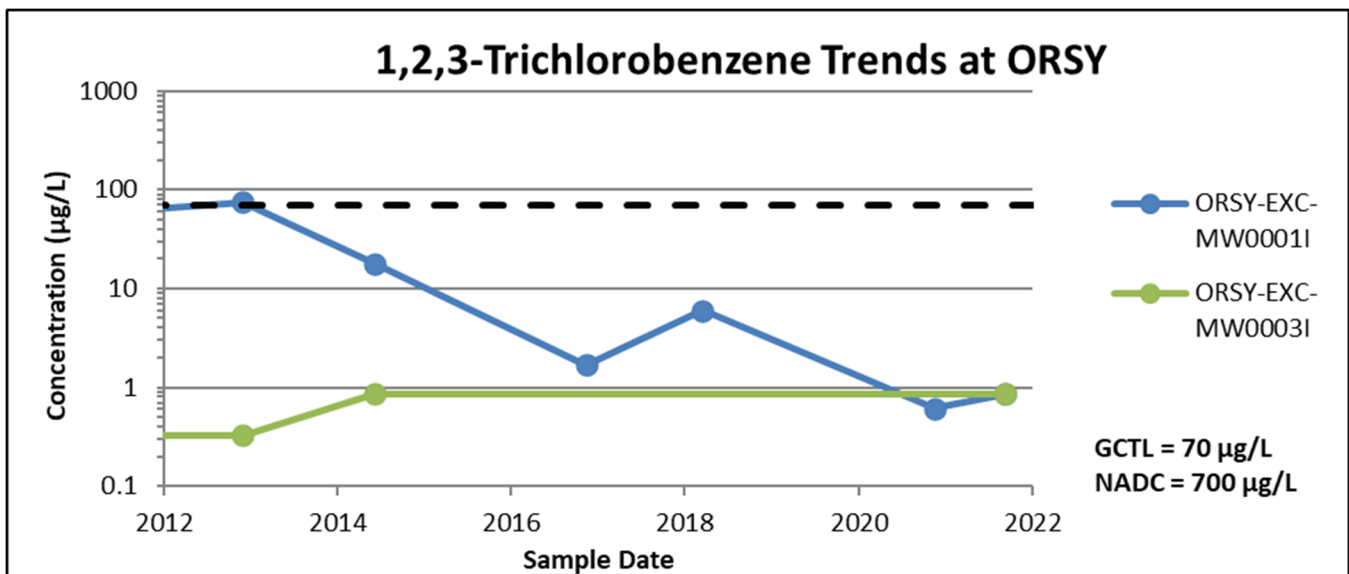
**ANALYTICAL RESULTS**

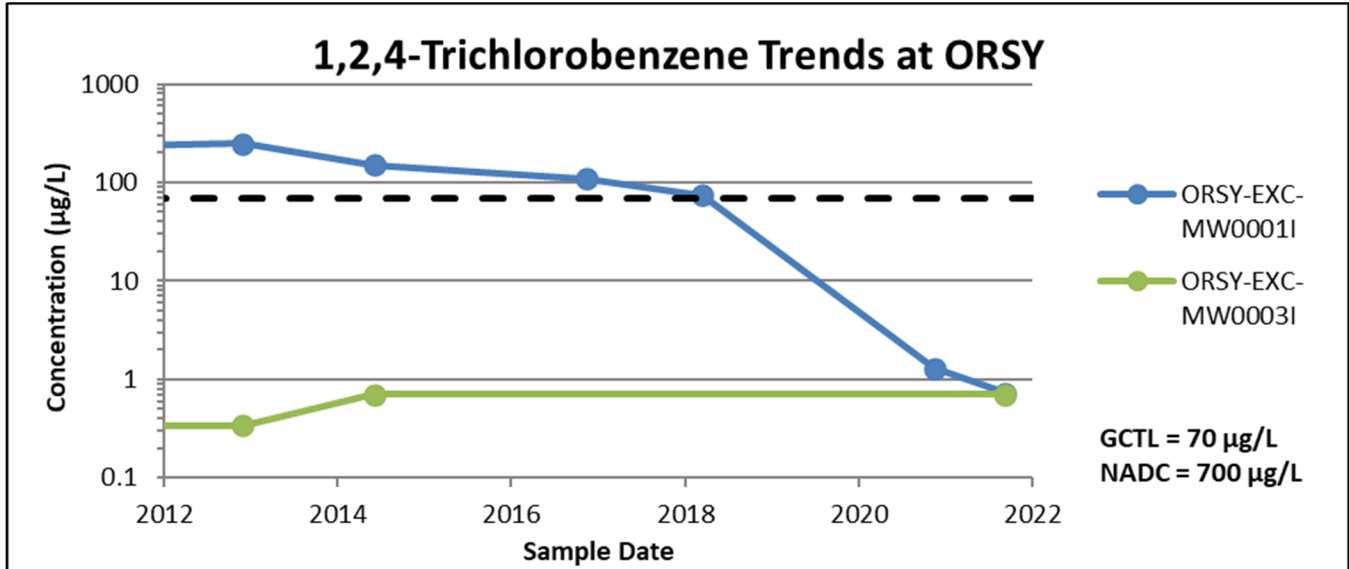
During the September 2021 sampling event, groundwater from monitoring wells ORSY-EXC-MW0001I and ORSY-EXC-MW0003I was sampled for select VOCs. The analytical results determined the concentration of 1,2,4-TCB was below the GCTL for the second consecutive event at ORSY-EXC-MW0001I (0.73 I µg/L) and 1,2,3-TCB has remained below its GCTL for five consecutive sampling events. Site contaminants of concern (COCs) remain non-detect in downgradient monitoring well ORSY-EXC-MW0003I.

Currently, no COC concentrations exceed GCTLs in the sampled wells at ORSY. A summary of recent and historical analytical results is presented in **Table 2**. Analytical results are depicted on **Figure 3**. Data upload confirmation to the KSC Remediation Information System (RIS) database is provided in **Appendix E**. Laboratory analytical data are provided in **Appendix F**.

**TREND ANALYSIS**

Concentrations of 1,2,3-TCB and 1,2,4-TCB have declined below GCTLs, as shown in the following trend analyses.





**CONCLUSIONS AND RECOMMENDATIONS**

Groundwater COC concentrations remained below GCTLs for two consecutive sampling events in November 2020 and September 2021. Groundwater MNA sampling at ORSY is recommended to discontinue. The LUC will remain in place for soil at the site.

Should you need additional information, please contact Chris Marshall at [chris.marshall@aecom.com](mailto:chris.marshall@aecom.com) or via phone at 407.513.8230.

Sincerely,

**AECOM Technical Services, Inc.**

In accordance with the provisions of Florida Statutes, Chapter 471, this Request for Discontinuation of LTM at the Kennedy Space Center Orsino Storage Yard, located in Merritt Island, Florida, has been prepared under the direct supervision of a Professional Engineer registered in the State of Florida. This work was performed in accordance with generally accepted professional engineering practices under Chapter 471 of the Florida Statutes. The data, findings, recommendations, specifications, or professional opinions were prepared solely for the use of the National Aeronautics and Space Administration and the Florida Department of Environmental Protection. AECOM makes no other warranty, either expressed or implied, and is not responsible for the interpretation by others of these data.

This item has been digitally signed and sealed by:

---

Jennifer Gootee, P.E. Date  
 Program Manager  
 Florida License No. 57964  
 Engineering Business No. 8115  
 Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.



**TABLES**

Table 1	ORSY Monitoring Well Groundwater Elevations
Table 2	ORSY Summary of Groundwater Analytical Results

**FIGURES**

Figure 1	ORSY Site Map
Figure 2	ORSY Groundwater Elevation Map – September 2021
Figure 3	ORSY Groundwater Sampling Analytical Results

**APPENDICES**

Appendix A	FDEP April 2022 Regulatory Comments
Appendix B	KSC Remediation Team Meeting Minutes – February 2021
Appendix C	Daily Field Activity Logs
Appendix D	Groundwater Sampling Logs
Appendix E	RIS Completion Tickets
Appendix F	Laboratory Analytical Data

**REFERENCES**

- EG&G Florida, Inc. 1991. *Kennedy Space Center (KSC) Orsino Storage Yard PCB Contaminated Soil Remediation, SWMU 004*, Kennedy Space Center, Florida.
- Florida Department of Environmental Protection (FDEP). 2017. *DEP-SOP-001/01, FS 2200 Groundwater Sampling*.
- Geosyntec Consultants. 2003. *RCRA Facility Investigation Report, Orsino Storage Yard Storage Facility, SWMU 004*, Kennedy Space Center, Florida.
- Geosyntec Consultants. 2005. *RCRA Facility Investigation Report Addendum, Orsino Storage Yard Facility, SWMU 004*, Kennedy Space Center, Florida.
- Geosyntec Consultants. 2017. *Sampling and Analysis Plan for the RCRA Corrective Action Program at the Kennedy Space Center, Florida*. Boca Raton, Florida.
- NASA. 2005. *Statement of Basis, Orsino Storage Yard, SWMU 004*. Kennedy Space Center, Florida.

## **Tables**

**Table 1**  
**Orsino Storage Yard - Long Term Monitoring (LTM)**  
**Monitoring Well Groundwater Elevations**

<b>INTERMEDIATE WELL ID:</b>	<b>ORSY-DRM-MW0001I</b>		<b>ORSY-EXC-MW0001I</b>		<b>ORSY-EXC-MW0002I</b>	
<b>Screen Interval (ft bls):</b>	20 - 25		20 - 25		20 - 25	
<b>TOC Elevation (ft NAVD88):</b>	7.54		6.35		10.11	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	5.95	1.59	4.43	1.92	8.29	1.82
November 2016	5.11	2.43	3.65	2.70	7.44	2.67
March 2018	5.53	2.01	4.01	2.34	7.78	2.33
November 2020	4.31	3.23	3.43	2.92	7.22	2.89
September 2021	4.33	3.21	3.38	2.97	7.21	2.90

<b>INTERMEDIATE WELL ID:</b>	<b>ORSY-EXC-MW0003I</b>		<b>ORSY-EXC-MW0004I</b>	
<b>Screen Interval (ft bls):</b>	20 - 25		20 - 30	
<b>TOC Elevation (ft NAVD88):</b>	9.45		7.20	
<b>Date</b>	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)	Depth to Water (ft BTOC)	Water Elevation (ft NAVD88)
May 2014	7.7	1.75	5.13	2.07
November 2016	6.89	2.56	4.18	3.02
March 2018	7.21	2.24	4.64	2.56
November 2020	6.76	2.69	3.87	3.33
September 2021	6.72	2.73	3.98	3.22

**Notes:**

ORSY = Orsino Storage Yard

ft. = feet

bls = Below Land Surface

NAVD88 = North American Vertical Datum of 1988

TOC = Top of Casing

BTOC = Below Top of Casing

**Table 2**  
**Orsino Storage Yard - Long Term Monitoring (LTM)**  
**Summary of Groundwater Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260					
Analyte			1,2,3- TRICHLOROBENZENE	1,2,4- TRICHLOROBENZENE	1,3- DICHLOROBENZENE	1,4- DICHLOROBENZENE	CHLOROBENZENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			70	70	210	75	100	1
FDEP NADCs (µg/L)			700	700	2100	7500	1000	100
Location ID	Sample Date	Screened Interval (ft bls)						
ORSY-DRM-MW0001I	7/28/1999	20 - 25	NA	NA	3.8	2.2	0.18 U	0.18 U
	7/28/1999	20 - 25	NA	NA	4.3	2.5	0.18 U	0.18 U
	9/20/2002	20 - 25	NA	NA	20	67	0.63 U	0.5 U
	9/20/2002	20 - 25	NA	NA	25	96	0.63 U	0.5 U
	11/9/2005	20 - 25	0.5 U	16.6	18.8	59.4	0.5 U	0.5 U
	5/23/2006	20 - 25	0.66 I	5.5 I	13	43	0.55 I	0.12 U
	11/7/2006	20 - 25	0.2 U	20	19	45	0.45 I	0.12 U
ORSY-EXC-MW0001I	10/14/1998	20 - 25	NA	NA	NA	NA	0.18 U	0.18 U
	7/28/1999	20 - 25	NA	NA	22	57	0.72 U	0.72 U
	9/19/2002	20 - 25	NA	NA	22	53	6.3 U	5.0 U
	11/9/2005	20 - 25	163	367	47.2	71.3	0.50 U	0.5 U
	5/23/2006	20 - 25	0.20 UJ	0.20 UJ	5.5	15	5.9	0.12 U
	11/7/2006	20 - 25	210	440	62	84	0.10 U	0.12 U
	5/9/2007	20 - 25	160	280	46	69	0.10 U	0.12 U
	11/6/2007	20 - 25	170	310	35	59	0.10 U	0.12 U
	5/6/2008	20 - 25	150	300	26	46	0.19 U	0.23 U
	11/4/2008	20 - 25	170	390	23	51	0.15 U	0.25 U
	5/12/2009	20 - 25	120	290	24	45	0.15 U	0.25 U
	11/10/2009	20 - 25	170	310	31	44	0.15 U	0.25 U
	5/18/2010	20 - 25	170	420	25	38	0.42 U	0.16 U
	5/9/2011	20 - 25	59.3	237	19.3	32.9	0.16 U	0.36 U
	11/28/2012	20 - 25	75	250	31	46	0.18 I	0.36 U
	6/5/2014	20 - 25	18	150	22	54	0.72 U	0.71 U
	11/16/2016	20 - 25	1.7 U	110	29	50	1.4 U	1.4 U
3/20/2018	20 - 25	6.0	74	19	47	0.72 U	0.71 U	
11/20/2020	20 - 25	0.61 U	1.3 I	NA	NA	NA	NA	
9/16/2021	20 - 25	0.86 U	0.73 I	NA	NA	NA	NA	
ORSY-MNT-MW0001I	10/14/1998	20 - 25	NA	NA	NA	NA	0.18 U	1.3
	7/28/1999	20 - 25	NA	NA	1.6 U	1.9 U	1.8 U	1.8 U
	9/20/2002	20 - 25	NA	NA	0.64 U	0.52 U	0.63 U	2.2
	2/14/2005	20 - 25	NA	0.32 U	0.18 U	0.19 U	0.15 U	3.6
	11/9/2005	20 - 25	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.5
	5/23/2006	20 - 25	0.2 UJ	0.2 UJ	0.14 U	0.085 U	0.1 U	0.12 U
	11/7/2006	20 - 25	0.2 UJ	0.2 U	0.14 U	0.085 U	0.60 I	0.88 I
ORSY-MW0001S	10/14/1998	10 - 15	NA	NA	NA	NA	0.18 U	0.18 U
	7/28/1999	10 - 15	NA	NA	0.8 U	0.95 U	0.9 U	0.9 U
	9/20/2002	10 - 15	NA	NA	0.64 U	0.52 U	0.63 U	0.5 U
ORSY-DRM-MW0001S	9/19/2002	5 - 15	NA	NA	9.8	31	0.63 U	0.5 U
ORSY-EXC-MW0001S	10/14/1998	10 - 15	NA	NA	NA	NA	20	1.3
	7/28/1999	10 - 15	NA	NA	120	160	1.8 U	1.8 U
	9/19/2002	10 - 15	NA	NA	71	170	110	2.5 U
	11/24/2004	10 - 15	NA	0.35 J	8.8	32	4.6	0.43 U

**Table 2**  
**Orsino Storage Yard - Long Term Monitoring (LTM)**  
**Summary of Groundwater Analytical Results**

Category			Volatile Organic Compounds (VOC) by Method 8260					
Analyte			1,2,3- TRICHLOROBENZENE	1,2,4- TRICHLOROBENZENE	1,3- DICHLOROBENZENE	1,4- DICHLOROBENZENE	CHLOROBENZENE	VINYL CHLORIDE
FDEP GCTLs (µg/L)			70	70	210	75	100	1
FDEP NADCs (µg/L)			700	700	2100	7500	1000	100
Location ID	Sample Date	Screened Interval (ft bls)						
ORSY-SW-MW0001S	9/20/2002	5 - 15	NA	NA	0.64 U	0.52 U	0.63 U	0.5 U
ORSY-WEP-MW0001S	10/14/1998	10 - 15	NA	NA	NA	NA	0.18 U	0.18 U
	10/14/1998	10 - 15	NA	NA	NA	NA	0.18 U	0.18 U
	7/28/1999	10 - 15	NA	NA	0.16 U	0.19 U	0.18 U	0.18 U
	9/20/2002	10 - 15	NA	NA	0.64 U	0.52 U	0.63 U	0.5 U
ORSY-MW0002I	7/28/1999	20 - 25	NA	NA	0.16 U	0.19 U	0.18 U	0.18 U
	9/20/2002	20 - 25	NA	NA	0.64 U	0.52 U	0.63 U	0.5 U
ORSY-EXC-MW0002I	8/5/2005	20 - 25	NA	0.32 U	0.18 U	0.19 U	0.15 U	0.43 U
	11/9/2005	20 - 25	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	5/23/2006	20 - 25	0.2 UJ	0.2 UJ	0.14 U	0.085 U	0.1 U	0.12 U
	11/7/2006	20 - 25	0.2 U	<b>1.1 I</b>	0.14 U	0.085 U	0.1 U	0.12 U
ORSY-EXC-MW0003I	8/5/2005	20 - 25	NA	0.32 U	0.18 U	0.19 U	0.15 U	0.43 U
	11/9/2005	20 - 25	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
	5/23/2006	20 - 25	0.2 U	<b>0.60 I</b>	0.14 U	<b>0.37 I</b>	0.1 U	0.12 U
	11/7/2006	20 - 25	0.2 U	0.2 U	0.14 U	0.085 U	0.1 U	0.12 U
	5/9/2007	20 - 25	<b>57</b>	<b>38</b>	0.14 U	0.085 U	0.1 U	0.12 U
	11/6/2007	20 - 25	0.2 U	0.2 U	0.14 U	0.085 U	0.1 U	0.12 U
	5/6/2008	20 - 25	<b>7.7 I</b>	<b>8.2 I</b>	0.34 U	0.21 U	0.19 U	0.23 U
	11/4/2008	20 - 25	0.35 U	0.3 U	0.14 U	0.14 U	0.15 U	0.25 U
	5/12/2009	20 - 25	0.35 UJ	0.3 UJ	0.14 U	0.14 U	0.15 U	0.25 U
	11/10/2009	20 - 25	0.35 U	0.3 U	0.14 U	0.14 U	0.15 U	0.25 U
	5/18/2010	20 - 25	0.31 U	0.91 U	0.38 U	0.46 U	0.42 U	0.16 U
	5/9/2011	20 - 25	0.33 U	0.34 U	0.22 U	0.16 U	0.16 U	0.36 U
	11/28/2012	20 - 25	0.33 U	0.34 U	0.22 U	0.16 U	0.16 U	0.36 U
	6/5/2014	20 - 25	0.86 U	0.70 U	0.77 U	0.76 U	0.72 U	0.71 U
9/16/2021	20 - 25	0.86 U	0.70 U	NA	NA	NA	NA	
ORSY-EXC-MW0004I	5/6/2008	20 - 30	1.7 U	<b>1.7 I</b>	0.34 U	0.21 U	0.19 U	0.23 U
	11/4/2008	20 - 30	<b>2.6 I</b>	<b>3.2 I</b>	0.14 U	0.14 U	0.15 U	0.25 U
	5/12/2009	20 - 30	0.35 UJ	0.3 UJ	0.14 U	0.14 U	0.15 U	0.25 U
	11/10/2009	20 - 30	0.35 U	0.3 U	0.14 U	0.14 U	0.15 U	0.25 U
	5/18/2010	20 - 30	0.31 U	0.91 U	0.38 U	0.46 U	0.42 U	0.16 U
	5/9/2011	20 - 30	0.33 U	0.34 U	0.22 U	0.16 U	0.16 U	0.36 U
	11/28/2012	20 - 30	0.33 U	0.34 U	0.22 U	0.16 U	0.16 U	0.36 U
6/5/2014	20 - 30	0.86 U	0.7 U	0.77 U	0.76 U	0.72 U	0.71 U	

Notes:

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

U = Analyte not detected

I = Analyte greater than or equal to the method detection limit,  
but less than the practical quantitation limit

J = Estimated value

The numeric value presented for non-detects is the sample-specific reporting detection limit

FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels,  
Chapter 62-777 Florida Administrative Code, Table 1 (2005)

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

NA = Not Analyzed




ft bls = feet below land surface

## **FIGURES**

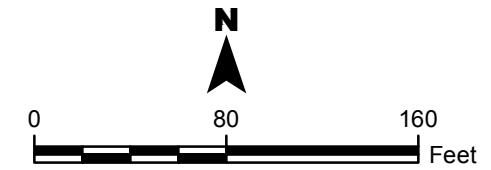
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**Legend**

-  Monitoring Well (LTM)
-  Monitoring Well (LTM - Water Level Only)
-  Monitoring Well (Non - LTM)

- Notes:**
- (20-25) = Monitoring well screen interval in feet below land surface
  - LTM = Long Term Monitoring
  - SWMU = Solid Waste Management Unit
  - Aerial Source: FDOT 2018







**FIGURE 1**  
**Site Map**  
 2022 - Industrial Area Long Term Monitoring  
 Orsino Storage Yard (ORSY)  
 SWMU 004  
 NASA Kennedy Space Center, Florida

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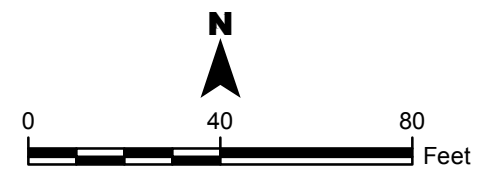


**Legend**

-  Intermediate Monitoring Well (20-30 ft bls)
-  Approximate Direction of Groundwater Flow
-  Groundwater Contour (NAVD88 ft)
-  (2.73) Groundwater Elevation Contour (NAVD88 ft)

**Notes:**

- Vertical Datum is NAVD88 (US Foot)
- Monitoring Wells Were Gauged in September 2021
- Groundwater Contour Interval = 0.20 ft
- ft bls = feet below land surface
- SWMU = Solid Waste Management Unit
- Aerial Source: FDOT 2018



**FIGURE 2**  
**Groundwater Elevation Map – September 2021**

2022 - Industrial Area Long Term Monitoring  
 Orsino Storage Yard (ORSY)  
 SWMU 004  
 NASA Kennedy Space Center, Florida





ORSY-EXC-MW0001I						
Location ID	ORSY-EXC-MW0001I	ORSY-EXC-MW0001I	ORSY-EXC-MW0001I	ORSY-EXC-MW0001I	ORSY-EXC-MW0001I	ORSY-EXC-MW0001I
Date	11/28/2012	06/05/2014	11/16/2016	03/20/2018	11/20/2020	09/16/2021
Screen Interval	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0
Sample Type	NM	NM	NM	NM	NM	NM
Analyte						
1,2,3-TRICHLOROBENZENE	<b>75</b>	<b>18</b>	1.7 U	6	0.61 U	0.86 U
1,2,4-TRICHLOROBENZENE	<b>250</b>	<b>150</b>	<b>110</b>	<b>74</b>	<b>1.3 I</b>	<b>0.73 I</b>

ORSY-EXC-MW0003I			
Location ID	ORSY-EXC-MW0003I	ORSY-EXC-MW0003I	ORSY-EXC-MW0003I
Date	11/28/2012	06/05/2014	09/16/2021
Screen Interval	20.0 - 25.0	20.0 - 25.0	20.0 - 25.0
Sample Type	NM	NM	NM
Analyte			
1,2,3-TRICHLOROBENZENE	0.33 U	0.86 U	0.86 U
1,2,4-TRICHLOROBENZENE	0.34 U	0.7 U	0.70 U

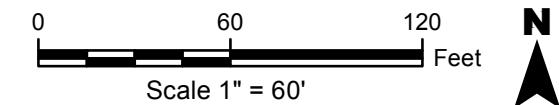
**Legend**

- Intermediate LTM Well, Sample Results Below GCTL
- Non-LTM, No Sample Results
- Intermediate Groundwater Elevation Contours - September 2021
- Direction of Groundwater Flow

**Notes:**

1. I = Result is greater than or equal to the Method Detection Limit (MDL) but less than the Practical Quantitation limit (PQL)
2. SWMU = Solid Waste Management Unit
3. LTM = Long Term Monitoring
4. MW = Monitoring Well
5. NM = Normal Sample
6. U = Result was below the laboratory Method Detection Limit (MDL)
7. FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels 62-777, F.A.C.
8. Aerial Source: ESRI 2018.
9. All results and screening criteria presented in µg/L.
10. Blue font indicates an exceedance of FDEP GCTLs.
11. Bolded results indicate the presence of an analyte at the specified concentration.
12. Depth of monitoring well screen interval is presented in feet below land surface.

Analyte	GCTL
1,2,3-TRICHLOROBENZENE	<b>70</b>
1,2,4-TRICHLOROBENZENE	<b>70</b>



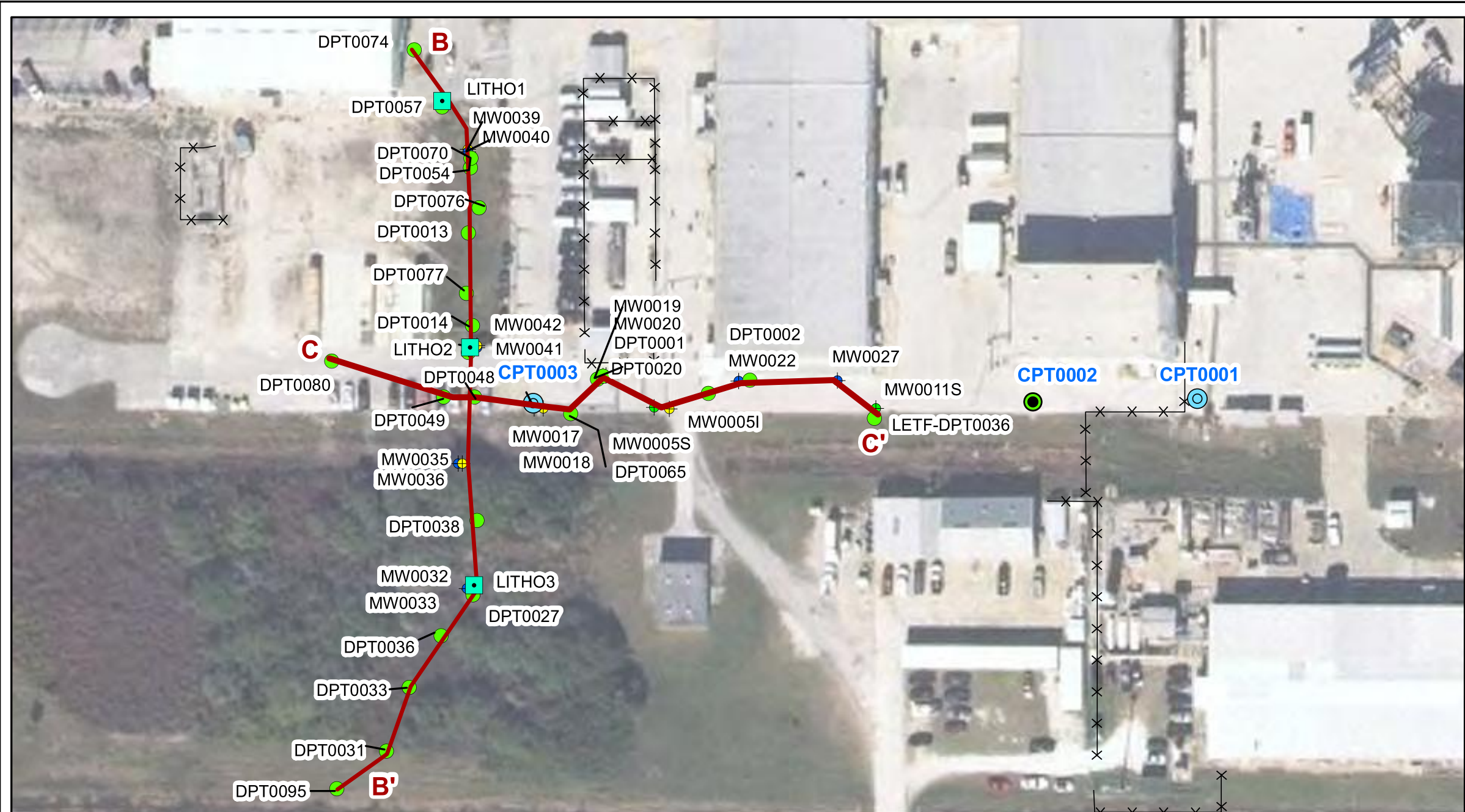
**FIGURE 3**  
**Groundwater Sampling Analytical Results**

2022 - Industrial Area Long Term Monitoring  
 Orsino Storage Yard (ORSY)  
 SWMU 004  
 NASA Kennedy Space Center, Florida

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## **APPENDIX I**

### **M505 ANALYTICAL CROSS SECTION DOCUMENTS**

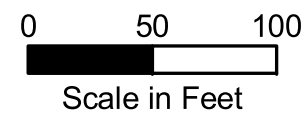


**Legend**

- ×—× Fence
- ◆ Monitoring Well Screened 5 to 15 ft bls
- ◆ Monitoring Well Screened 23 to 28 ft bls
- ◆ Monitoring Well Screened 33 to 38 ft bls
- DPT Groundwater Sample
- ⊙ CPT Location
- CPT and Soil Core Location
- Lithologic Sample Location

**Notes**

- CPT - cone penetration test location
- DPT - direct push technology
- ft bls - feet below land surface
- LETF - launch equipment test facility
- LITHO - lithologic sample location
- MW - monitoring well



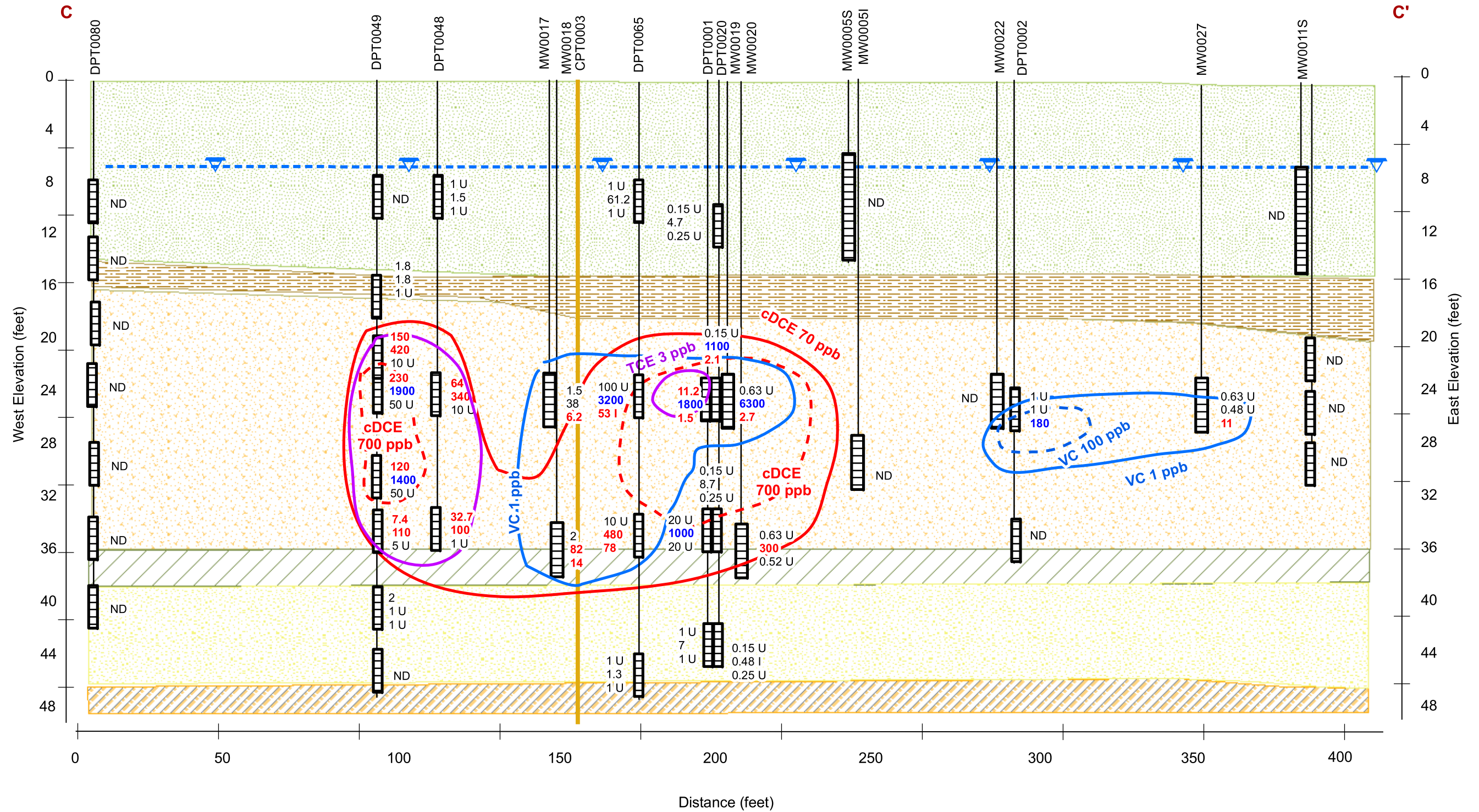
**Cross Section Location Map**

Building M7-505 Treatment Tank  
NASA Kennedy Space Center, Florida

Project Number: 004-11302-19

**Figure**

# Lithologic Cross-Section West-East with COC Contours



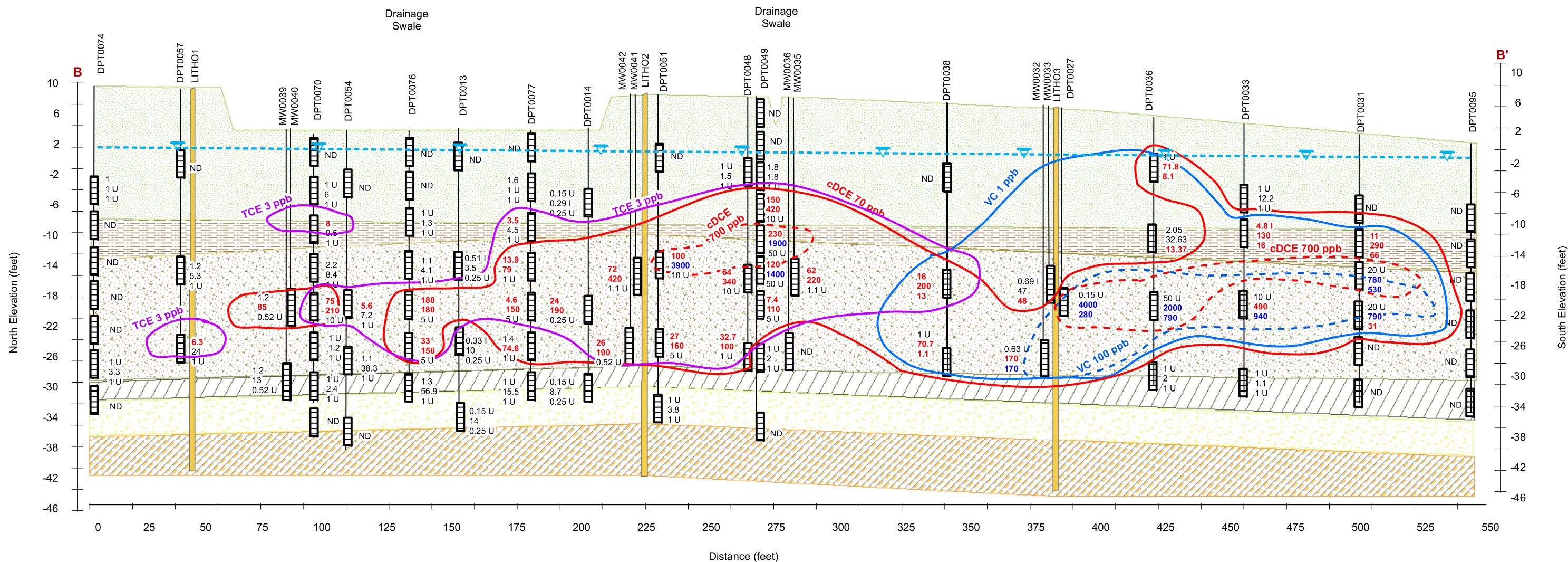
## Legend

- Silty Sand, light brown to dark brown, sand with little to no trace silts, trace organics, loose to low density
- Silty Sand, dark olive gray, sand and some silts, low density
- Shelly Silty Sand, olive gray, sand with little to some silt and shell, low to medium dense to dense
- Silty Sandy Clay, dark olive green, clay with trace silt and fine sands, fat clay, soft to stiff, low to high plasticity
- Shelly Sand, sand and some shell, dark olive to greenish gray, medium dense to very dense
- Shelly Silty Clayey Sand; dark olive grayish green, sand with some to little to trace clay and shell with silt, moderate stiffness to dense, low to medium plasticity
- Groundwater Elevation (ft)

- TCE 3 ppb Contour
- cDCE 70 ppb Contour
- cDCE 700 ppb Contour
- Vinyl Chloride 1 ppb Contour
- Vinyl Chloride 100 ppb Contour
- 1 U TCE concentration
- 2 cDCE concentration
- 1 U Vinyl chloride concentration

Notes:  
 Vertical exagerration is 9x  
 cDCE - cis-1,2-dichloroethene  
 CPT - cone penetrometer test  
 ft - feet  
 M505 - Building M7-505 Treatment Tank  
 MDL - method detection limit  
 NASA - National Aeronautics and Space Administration  
 PQL - practical quantitation limit  
 TCE - trichloroethene  
 U - detected between MDL and PQL, estimated  
 µg/l - micrograms per liter

# Lithologic Cross-Section North-South with COC Contours



### Legend

- Silty Sand, light brown to dark brown, sand with little to no trace silts, trace organics, loose to low density
- Silty Sand, dark olive gray, sand and some silts, low density
- Shelly Silty Sand, olive gray, sand with little to some silt and shell, low to medium dense to dense
- Silty Sandy Clay, dark olive green, clay with trace silt and fine sands, fat clay, soft to stiff, low to high plasticity
- Shelly Sand, sand and some shell, dark olive to greenish gray, medium dense to very dense
- Shelly Silty Clayey Sand; dark olive grayish green, sand with some to little to trace clay and shell with silt, moderate stiffness to dense, low to medium plasticity
- Lithology Sample Location
- Groundwater Elevation (ft)
- TCE 3 µg/l Contour
- cDCE 70 µg/l Contour
- cDCE 700 µg/l Contour
- Vinyl Chloride 1 µg/l Contour
- Vinyl Chloride 100 µg/l Contour
- 1 U TCE concentration
- 2 cDCE concentration
- 1 U Vinyl chloride concentration

Notes:  
 Vertical exaggeration is 10x  
 cDCE - cis-1,2-dichloroethene  
 CPT - cone penetrometer test  
 ft - feet  
 M505 - Building M7-505 Treatment Tank  
 MDL - method detection limit  
 NASA - National Aeronautics and Space Administration  
 PQL - practical quantitation limit  
 TCE - trichloroethene  
 U - detected between MDL and PQL, estimated  
 µg/l - micrograms per liter

## **APPENDIX J**

### **HMF SOUTH HISTORICAL TCFM GROUNDWATER DATA TABLE**

**Table 2-2. Groundwater Data Summary by Monitoring Well**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
NLP-IW1S	HMF-NLP-IW0001S-013.5-20050908	09-08-2005	0.5 U
	HMF-NLP-IW0001S-013.0-20051026	10-26-2005	721
	HMF-NLP-IW0001S-013.0-20051201	12-01-2005	57
	HMF-NLP-IW0001-013.5-122805	12-28-2005	9.3
	HMF-NLP-MW0001-013-20060125	01-25-2006	15.8
	HMF-NLP-MW0001-013.0-20060227	02-27-2006	37
	HMF-NLP-MW0001-013.0-20060328	03-28-2006	36.2
	HMF-NLP-MW0001-013.0-20060424	04-25-2006	25.2
	HMF-NLP-MW0001-013.0-20060525	05-25-2006	8.8
	HMF-NLP-MW0001-013.0-20060621	06-21-2006	3.4
	HMF-NLP-MW0001-013.0-20060726	07-26-2006	14
	HMF-NLP-MW0001-013.0-20060901	09-01-2006	384
	HMF-NLP-MW0001-013.0-20060928	09-28-2006	701
	HMF-NLP-MW0001-013.0-20061025	10-25-2006	<b>2,280</b>
	HMF-NLP-MW0001-013.0-20061129	11-29-2006	<b>4,000</b>
	HMF-NLP-MW0001-013.0-20061228	12-28-2006	2,010
	HMF-NLP-MW0001-013.0-20070131	01-31-2007	<b>8,780</b>
	HMF-NLP-MW0001-013.0-20070227	02-27-2007	<b>15,300</b>
	HMF-NLP-MW0001-013.0-20070329	03-29-2007	<b>7,430</b>
	HMF-NLP-MW0001-013.0-20070430	04-30-2007	<b>7,540</b>
	HMF-NLP-MW0001-013.0-20070531	05-31-2007	<b>3,890</b>
	HMF-NLP-MW0001-013.0-20070628	06-28-2007	<b>3,830</b>
	HMF-NLP-MW0001-013.0-20070731	07-31-2007	<b>9,640</b>
	HMF-NLP-MW0001-013.0-20070828	08-28-2007	<b>4,320</b>
	HMF-NLP-MW0001-013.0-20070926	09-26-2007	<b>2,870</b>
	HMF-NLP-MW0001-013.0-20071128	11-28-2007	463
	HMF-NLP-MW0001-013.0-20080131	01-31-2008	217
	HMF-NLP-MW0001-013.0-20080327	03-27-2008	197
	HMF-NLP-MW0001-013.0-20080528	05-28-2008	146
	HMF-NLP-MW0001-013.0-20080729	07-29-2008	178
	HMF-NLP-MW0001-013.0-20080925	09-25-2008	127
	HMF-NLP-MW0001-013.0-20081124	11-24-2008	1,770
	HMF-NLP-MW0001-013.0-20090130	01-30-2009	289
	HMF-NLP-MW0001-013.0-20090401	04-01-2009	<b>2,280</b>
	HMF-NLP-MW0001-013.0-20090526	05-26-2009	150
	HMF-NLP-MW0001-013.0-20090701	07-01-2009	594
	HMF-NLP-MW0001-013.0-20090729	07-29-2009	1,750
	HMF-NLP-MW0001-013.0-20090925	09-25-2009	<b>4,020</b>
	HMF-NLP-MW0001-013.0-20091027	10-27-2009	<b>8,280</b>
	HMF-NLP-MW0001-008.5-20091124	11-24-2009	511
HMF-NLP-MW0001-008.5-20091229	12-29-2009	695	
HMF-NLP-MW0001-008.5-20100128	01-28-2010	122	
HMF-NLP-MW0001-008.5-20100224	02-24-2010	90.2	
HMF-NLP-MW0001-008.5-20100331	03-31-2010	41.1	
HMF-NLP-MW0001-008.5-20100527	05-27-2010	54.1	
HMF-NLP-MW0001-008.5-20100727	07-27-2010	43.6	
HMF-NLP-MW0001-008.5-20100831	08-31-2010	57.4	
HMF-NLP-MW0001-008.5-20100922	09-23-2010	94.3	
HMF-NLP-MW0001-008.5-20101229	12-29-2010	296	



**Table 2-2. Groundwater Data Summary by Monitoring Well (continued)**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
NLP-IW1S (continued)	HMF-NLP-MW0001-008.5-20110324	03-24-2011	1,010 E
	HMF-NLP-MW0001-008.5-20110622	06-22-2011	1,480
	HMF-NLP-MW0001-008.5-20110915	09-15-2011	753
	HMF-NLP-MW0001-008.5-20111216	12-16-2011	502
	HMF-NLP-MW0001-008.5-20120329	03-29-2012	1,200
	HMF-NLP-MW0001-008.5-20120621	06-21-2012	10.7
	HMF-NLP-MW0001-008.5-2012	12-27-2012	12.1
	HMF-NLP-MW0001-008.5-20130327	03-27-2013	95.2
	HMF-NLP-MW0001-008.5-20130627	06-27-2013	123
	HMF-NLP-MW0001-008.5-20130926	09-26-2013	51.4
	HMF-NLP-MW0001-008.5-20131219	12-19-2013	83.9
	HMF-NLP-MW0001-008.5-20140327	03-27-2014	192
	HMF-NLP-MW0001-008.5-20140710	07-10-2014	117
	HMF-NLP-MW0001-008.5-20140923	09-23-2014	132
	HMF-NLP-MW0001-008.5-20141223	12-23-2014	54.9
	HMF-NLP-MW0001-008.5-20150331	03-31-2015	81.4
	HMF-NLP-MW0001-008.5-20150625	06-25-2015	117
HMF-NLP-MW0001-008.5-20150923	09-23-2015	52	
NLP-IW1I	HMF-NLP-IW0001I-040.0-20050908	09-08-2005	<b>400,000</b>
	HMF-NLP-IW0001I-042.0-20051026	10-26-2005	<b>48,400</b>
	HMF-NLP-IW0001I-040.0-20051201	12-01-2005	<b>3,660</b>
	HMF-NLP-IW0001-040.0-122805	12-28-2005	<b>9,190</b>
	HMF-NLP-MW0001-040-20060126	01-26-2006	<b>184,000</b>
	HMF-NLP-MW0001-042.0-20060227	02-27-2006	<b>34,600</b>
	HMF-NLP-MW0001-042.0-20060328	03-28-2006	1520
	HMF-NLP-MW0001-042.0-20060424	04-24-2006	<b>3,950</b>
	HMF-NLP-MW0001-042.0-20060525	05-25-2006	<b>2,320</b>
	HMF-NLP-MW0001-042.0-20060621	06-21-2006	<b>4,180</b>
	HMF-NLP-MW0001-042.0-20060726	07-26-2006	<b>15,700</b>
	HMF-NLP-MW0001-042.0-20060901	09-01-2006	<b>9,380</b>
	HMF-NLP-MW0001-042.0-20060928	09-28-2006	<b>8,790</b>
	HMF-NLP-MW0001-042.0-20061025	10-25-2006	<b>3,930</b>
	HMF-NLP-MW0001-042.0-20061129	11-29-2006	<b>14,900</b>
	HMF-NLP-MW0001-042.0-20061228	12-28-2006	<b>4,260</b>
	HMF-NLP-MW0001-042.0-20070131	01-31-2007	<b>14,800</b>
	HMF-NLP-MW0001-042.0-20070227	02-27-2007	<b>12,400</b>
	HMF-NLP-MW0001-042.0-20070329	03-29-2007	<b>11,200 L</b>
	HMF-NLP-MW0001-042.0-20070430	04-30-2007	<b>7,590</b>
	HMF-NLP-MW0001-042.0-20070531	05-31-2007	447
	HMF-NLP-MW0001-042.0-20070628	06-28-2007	<b>8,090</b>
	HMF-NLP-MW0001-042.0-20070731	07-31-2007	7
	HMF-NLP-MW0001-042.0-20070828	08-28-2007	<b>5,330</b>
	HMF-NLP-MW0001-042.0-20070926	09-26-2007	<b>2,970</b>
	HMF-NLP-MW0001-042.0-20071128	11-28-2007	<b>4,550</b>
	HMF-NLP-MW0001-042.0-20080131	01-31-2008	1,140
	HMF-NLP-MW0001-042.0-20080327	03-27-2008	<b>3,950</b>
	HMF-NLP-MW0001-042.0-20080528	05-28-2008	<b>6,590</b>
	HMF-NLP-MW0001-042.0-20080729	07-29-2008	312

Table 2-2. Groundwater Data Summary by Monitoring Well (continued)

MONITORING WELL	SAMPLE ID	SAMPLE DATE	TCFM RESULT (µg/L)
NLP-IW11 (continued)	HMF-NLP-MW0001-042.0-20080925	09-25-2008	25.1
	HMF-NLP-MW0001-042.0-20081124	11-24-2008	1.5
	HMF-NLP-MW0001-042.0-20090130	01-30-2009	68.4
	HMF-NLP-MW0001-042.0-20090401	04-01-2009	2.5
	HMF-NLP-MW0001-042.0-20090526	05-26-2009	1.6 I
	HMF-NLP-MW0001-042.0-20090701	07-01-2009	88.6
	HMF-NLP-MW0001-042.0-20090729	07-29-2009	464
	HMF-NLP-MW0001-042.0-20090925	09-25-2009	2.7
	HMF-NLP-MW0001-042.0-20091027	10-27-2009	59
	HMF-NLP-MW0001-037.5-20091124	11-24-2009	<b>17,000</b>
	HMF-NLP-MW0001-037.5-20091229	12-29-2009	755
	HMF-NLP-MW0001-037.5-20100128	01-28-2010	38.3
	HMF-NLP-MW0001-037.5-20100224	02-24-2010	65
	HMF-NLP-MW0001-037.5-20100331	03-31-2010	5.8
	HMF-NLP-MW0001-037.5-20100527	05-27-2010	2.0 U
	HMF-NLP-MW0001-037.5-20100727	07-27-2010	0.44 I
	HMF-NLP-MW0001-037.5-20100831	08-31-2010	1.9 I
	HMF-NLP-MW0001-037.5-20100922	09-23-2010	36.5
	HMF-NLP-MW0001-037.5-20101229	12-29-2010	0.8 I
	HMF-NLP-MW0001-037.5-20110324	03-24-2011	0.5 U
	HMF-NLP-MW0001-037.5-20110622	06-22-2011	5.7
	HMF-NLP-MW0001-037.5-20110915	09-15-2011	0.85 I
	HMF-NLP-MW0001-037.5-20111216	12-16-2011	0.5 U
	HMF-NLP-MW0001-037.5-20120329	03-29-2012	0.5 U
	HMF-NLP-MW0001-037.5-20120621	06-21-2012	0.5 U
	HMF-NLP-MW0001-037.5-2012	12-27-2012	50
	HMF-NLP-MW0001-037.5-20130327	03-27-2013	4.5
	HMF-NLP-MW0001-037.5-20130627	06-27-2013	3.2
	HMF-NLP-MW0001-037.5-20130926	09-26-2013	0.5 U
	HMF-NLP-MW0001-037.5-20131219	12-19-2013	0.5 U
	HMF-NLP-MW0001-037.5-20140327	03-27-2014	0.79 I
	HMF-NLP-MW0001-037.5-20140710	07-10-2014	51.2
	HMF-NLP-MW0001-037.5-20140923	09-23-2014	1.1 I
HMF-NLP-MW0001-037.5-20141223	12-23-2014	0.5 U	
HMF-NLP-MW0001-037.5-20150331	03-31-2015	2.3	
HMF-NLP-MW0001-037.5-20150625	06-25-2015	0.86 I	
HMF-NLP-MW0001-037.5-20150923	09-23-2015	0.5 U	
NLP-IW1D	HMF-NLP-MW0001-053-20050908	09-08-2005	12.8
	HMF-NLP-MW0001-053-20060328	03-28-2006	0.5 U
	HMF-NLP-MW0001-053-20060928	09-28-2006	9.2
	HMF-NLP-MW0001-053-20070329	03-29-2007	82.5
	HMF-NLP-MW0001-053-20070926	09-26-2007	6.8
	HMF-NLP-MW0001-053-20080327	03-27-2008	29.8
	HMF-NLP-MW0001-053-20080925	09-25-2008	167
	HMF-NLP-MW0001-053-20090401	04-01-2009	0.5 U
	HMF-NLP-MW0001-053-20090925	09-25-2009	0.5 U
	HMF-NLP-MW0001-053-20100331	03-31-2010	0.4 U

**Table 3-2. Groundwater Data Summary by Monitoring Well (continued)**

MONITORING WELL	SAMPLE ID	SAMPLE DATE	TCFM RESULT (µg/L)
NLP-IW1D (continued)	HMF-NLP-MW0001-053-20100922	09-23-2010	0.4 U
	HMF-NLP-MW0001-050.5-20110915	09-15-2011	0.5 U
	HMF-NLP-MW0001-050.5-20130926	09-26-2013	0.5 U
	HMF-NLP-MW0001-050.5-20140922	09-22-2014	10.3
	HMF-NLP-MW0001-050.5-20150923	09-23-2015	3.1
NLP-IW2I	HMF-NLP-IW0002I-042.0-20050909	09-09-2005	<b>3,080</b>
	HMF-NLP-IW0002I-042.0-20051026	10-26-2005	<b>3,710</b>
	HMF-NLP-IW0002I-042.5-20070227	02-27-2007	0.5 U
	HMF-NLP-IW0002I-042.5-20070329	03-29-2007	16 U
	HMF-NLP-IW0002I-042.5-20070430	04-30-2007	4.2
	HMF-NLP-IW0002I-042.5-20070531	05-31-2007	14.1
	HMF-NLP-IW0002I-042.5-20070628	06-28-2007	0.8 I
	HMF-NLP-IW0002I-042.5-20070731	07-31-2007	0.43 U
	HMF-NLP-IW0002I-042.5-20070828	08-28-2007	21.5
	HMF-NLP-IW0002I-042.5-20070926	09-26-2007	22.4
	HMF-NLP-IW0002I-042.5-20071128	11-28-2007	0.43 U
	HMF-NLP-IW0002I-042.5-20080131	01-31-2008	23.6
	HMF-NLP-IW0002I-042.5-20080327	03-27-2008	35.6
	HMF-NLP-IW0002I-042.5-20080925	09-25-2008	73.7
	HMF-NLP-IW0002I-042.5-20090401	04-01-2009	10
	HMF-NLP-IW0002I-042.5-20090925	09-25-2009	32.2
	HMF-NLP-IW0002I-042.5-20100331	03-31-2010	0.4 U
	HMF-NLP-IW0002I-042.5-20100922	09-23-2010	67.3
	NLP-IW3I	HMF-NLP-IW0003I-040.5-20050909	09-09-2005
HMF-NLP-IW0003I-040.0-20051027		10-27-2005	0.5 U
HMF-NLP-IW0003I-040.0-20051201		12-01-2005	24.5
HMF-NLP-IW0003-040.0-122805		12-28-2008	10.6
HMF-NLP-MW0003-045-20060126		01-26-2006	0.54 I
HMF-NLP-MW0003-030.0-20060228		02-28-2006	0.5 U
HMF-NLP-MW0003-040.0-20060328		03-28-2006	2 U
HMF-NLP-MW0003-040.0-20060424		04-24-2006	1.8
HMF-NLP-MW0003-040.0-20060525		05-25-2006	1
HMF-NLP-MW0003-040.0-20060424		04-24-2006	1.8
HMF-NLP-MW0003-040.0-20060621		06-21-2006	0.5
HMF-NLP-MW0003-040.0-20060726		07-26-2006	14.9
HMF-NLP-MW0003-040.0-20060901		09-01-2006	0.5
HMF-NLP-MW0003-040.0-20060928		09-28-2006	0.87 I
HMF-NLP-MW0003-040.0-20061025		10-25-2006	11.2
HMF-NLP-MW0003-040.0-20061129		11-29-2006	19.8
HMF-NLP-MW0003-040.0-20061228		12-28-2006	0.5 U
HMF-NLP-MW0003-040.0-20070131		01-31-2007	0.5 U
HMF-NLP-MW0003-040.0-20070227		02-27-2007	0.5 U
HMF-NLP-MW0003-040.0-20070329		03-29-2007	0.5 U
HMF-NLP-MW0003-040.0-20070430		04-30-2007	14.7
HMF-NLP-MW0003-040.0-20070531		05-31-2007	0.5 U
HMF-NLP-MW0003-040.0-20070628		06-28-2007	0.5 U
HMF-NLP-MW0003-040.0-20070731	07-31-2007	<b>13,600</b>	
HMF-NLP-MW0003-040.0-20070828	08-28-2007	0.43 U	

Table 2-2. Groundwater Data Summary by Monitoring Well (continued)

MONITORING WELL	SAMPLE ID	SAMPLE DATE	TCFM RESULT (µg/L)
NLP-IW3I (continued)	HMF-NLP-MW0003-040.0-20070926	09-26-2007	57.1
	HMF-NLP-MW0003-040.0-20071128	11-28-2007	0.43 U
	HMF-NLP-MW0003-040.0-20080131	01-31-2008	0.43 U
	HMF-NLP-MW0003-040.0-20080327	03-27-2008	0.43 U
	HMF-NLP-MW0003-040.0-20080925	09-25-2008	0.5 U
	HMF-NLP-MW0003-040.0-20090401	04-01-2009	3.2
	HMF-NLP-MW0003-040.0-20090925	09-25-2009	15.9
	HMF-NLP-MW0003-040.0-20100331	03-31-2010	0.4 U
	HMF-NLP-MW0003-040.0-20100922	09-23-2010	35.7
NLP-IW4I	HMF-NLP-IW0004I-040.0-20050908	09-08-2005	396,000
	HMF-NLP-IW0004I-040.0-20051026	10-26-2005	23,500
	HMF-NLP-IW0004I-040.0-20051201	12-01-2005	21,200
	HMF-NLP-IW0004-040.0-122805	12-28-2005	54,700
	HMF-NLP-MW0004-040-20060126	01-26-2006	49,700
	HMF-NLP-MW0004-040.0-20060228	02-28-2006	9,230
	HMF-NLP-MW0004-040.0-20060328	03-28-2006	27,200
	HMF-NLP-MW0004-040.0-20060424	04-24-2006	34,800
	HMF-NLP-MW0004-040.0-20060525	05-25-2006	2,380
	HMF-NLP-MW0004-040.0-20060621	06-21-2006	17,000
	HMF-NLP-MW0004-040.0-20060726	07-26-2006	40,600
	HMF-NLP-MW0004-040.0-20060901	09-01-2006	6,370
	HMF-NLP-MW0004-040.0-20060928	09-28-2006	48,900
	HMF-NLP-MW0004-040.0-20061025	10-25-2006	25,700
	HMF-NLP-MW0004-040.0-20061129	11-29-2006	21,400
	HMF-NLP-MW0004-040.0-20061228	12-28-2006	12,500
	HMF-NLP-MW0004-040.0-20070131	01-31-2007	45,800
	HMF-NLP-MW0004-040.0-20070227	02-27-2007	65,300
	HMF-NLP-MW0004-040.0-20070329	03-29-2007	36,200
	HMF-NLP-MW0004-040.0-20070430	04-30-2007	8,180
	HMF-NLP-MW0004-040.0-20070531	05-31-2007	583
	HMF-NLP-MW0004-040.0-20070628	06-28-2007	19,500
	HMF-NLP-MW0004-040.0-20070731	07-31-2007	67,000
	HMF-NLP-MW0004-040.0-20070828	08-28-2007	13,000
	HMF-NLP-MW0004-040.0-20070926	09-26-2007	24,000
	HMF-NLP-MW0004-040.0-20071128	11-28-2007	4,590
	HMF-NLP-MW0004-040.0-20080131	01-31-2008	2,580
	HMF-NLP-MW0004-040.0-20080327	03-27-2008	5,220
	HMF-NLP-MW0004-040.0-20080528	05-28-2008	9,330
	HMF-NLP-MW0004-040.0-20080729	07-29-2008	953
	HMF-NLP-MW0004-040.0-20080925	09-25-2008	437
	HMF-NLP-MW0004-040.2-20081124	11-24-2008	183
	HMF-NLP-MW0004-040.0-20080130	01-30-2009	90.5
HMF-NLP-MW0004-040.0-20090401	04-01-2009	4,470	
HMF-NLP-MW0004-040.0-20090526	05-26-2009	5,610	
HMF-NLP-MW0004-040.0-20090701	07-01-2009	352	
HMF-NLP-MW0004-040.0-20090729	07-29-2009	918	
HMF-NLP-MW0004-040.0-20090924	09-25-2009	22,800	
HMF-NLP-MW0004-037.5-20091124	11-24-2009	7,240	
HMF-NLP-MW0004-040.0-20091027	10-27-2009	21,900	

**Table 2-2. Groundwater Data Summary by Monitoring Well (continued)**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
NLP-IW4I (continued)	HMF-NLP-MW0004-037.5-20091229	12-29-2009	<b>6,840</b>
	HMF-NLP-MW0004-037.5-20100128	01-28-2010	90.7
	HMF-NLP-MW0004-037.5-20100224	02-24-2010	529
	HMF-NLP-MW0004-037.5-20100331	03-31-2010	107
	HMF-NLP-MW0004-037.5-20100527	05-27-2010	507
	HMF-NLP-MW0004-037.5-20100727	07-27-2010	<b>3,350</b>
	HMF-NLP-MW0004-037.5-20100831	08-31-2010	<b>3,100</b>
	HMF-NLP-MW0004-037.5-20100922	09-23-2010	<b>3,670</b>
	HMF-NLP-MW0004-037.5-20101229	12-29-2010	<b>2,750</b>
	HMF-NLP-MW0004-037.5-20110324	03-24-2011	1,190
	HMF-NLP-MW0004-037.5-20110622	06-22-2011	<b>2,940</b>
	HMF-NLP-MW0004-037.5-20110915	09-15-2011	<b>7,210</b>
	HMF-NLP-MW0004-037.5-20111216	12-16-2011	<b>9,660</b>
	HMF-NLP-MW0004-037.5-20120329	03-29-2012	723
	HMF-NLP-MW0004-037.5-20120621	06-21-2012	<b>9,250</b>
	HMF-NLP-MW0004-037.5-20121120	11-20-2012	166
	HMF-NLP-MW0004-037.5-2012	12-27-2012	76.4
	HMF-NLP-MW0004-037.5-20130327	03-27-2013	272
	HMF-NLP-MW0004-037.5-20130627	06-27-2013	1,480
	HMF-NLP-MW0004-037.5-20130926	09-26-2013	<b>6,730</b>
	HMF-NLP-MW0004-037.5-20131219	12-19-2013	<b>10,300</b>
	HMF-NLP-MW0004-037.5-20131219	02-13-2014	<b>14,600</b>
	HMF-NLP-MW0004-037.5-20140327	03-27-2014	26
	HMF-NLP-MW0004-037.5-20140710	07-10-2014	123
	HMF-NLP-MW0004-037.5-20140923	09-23-2014	<b>3,370</b>
	HMF-NLP-MW0004-037.5-20141223	12-23-2014	75.1
	HMF-NLP-MW0004-037.5-20150331	03-31-2015	<b>3,910</b>
	HMF-NLP-MW0004-037.5-20150626	06-25-2015	<b>4,670</b>
HMF-NLP-MW0004-037.5-20150923	09-23-2015	<b>5,410</b>	
HMF-MW51	HMF-MW0005I-040.0-20050908	09-08-2005	<b>49,200</b>
	HMF-MW0005I-040.0-20051026	10-26-2005	<b>36,200</b>
	HMF-MW0005I-040.0-20051201	12-01-2005	<b>2,660</b>
	HMF-MW0005-040.0-122805	12-28-2005	<b>60,600</b>
	HMF-MW0005-040-20060125	01-25-2006	<b>71,700</b>
	HMF-MW0005-040.0-20060227	02-27-2006	<b>51,000</b>
	HMF-MW0005-040.0-20060328	03-28-2006	<b>51,900</b>
	HMF-MW0005-040.0-20060424	04-25-2006	<b>8,240</b>
	HMF-MW0005-040.0-20060525	05-25-2006	<b>25,800</b>
	HMF-MW0005-040.0-20060621	06-21-2006	<b>87,900</b>
	HMF-MW0005-040.0-20060726	07-26-2006	<b>75,700</b>
	HMF-MW0005-040.0-20060901	09-01-2006	<b>42,800</b>
	HMF-MW0005-040.0-20060928	09-28-2006	<b>34,800</b>
	HMF-MW0005-040.0-20061025	10-25-2006	<b>18,600</b>
	HMF-MW0005-040.0-20061129	11-29-2006	<b>89,500</b>
	HMF-MW0005-040.0-20061228	12-28-2006	<b>51,500</b>
	HMF-MW0005-040.0-20070131	01-31-2007	<b>81,200</b>
	HMF-MW0005-040.0-20070227	02-27-2007	<b>78,100</b>
	HMF-MW0005-040.0-20070329	03-29-2007	<b>40,900</b>

**Table 2-2. Groundwater Data Summary by Monitoring Well (continued)**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
HMF-MW51 (continued)	HMF-MW0005-040.0-20070430	04-30-2007	<b>15,000</b>
	HMF-MW0005-040.0-20070531	05-31-2007	<b>6,310</b>
	HMF-MW0005-040.0-20070628	06-28-2007	<b>4,290</b>
	HMF-MW0005-040.0-20070731	07-31-2007	<b>2,420</b>
	HMF-MW0005-040.0-20070828	08-28-2007	826
	HMF-MW0005-040.0-20070926	09-26-2007	<b>2,900</b>
	HMF-MW0005-040.0-20071128	11-28-2007	698
	HMF-MW0005-040.0-20080131	01-31-2008	547
	HMF-MW0005-040.0-20080327	03-27-2008	469
	HMF-MW0005-040.0-20080528	05-28-2008	519
	HMF-MW0005-040.0-20080729	07-29-2008	69.6
	HMF-MW0005-040.0-20080925	09-25-2008	35.1
	HMF-MW0005-040.0-20081124	11-24-2008	328
	HMF-MW0005-040.0-20080130	01-30-2009	178
	HMF-MW0005-040.0-20090401	04-01-2009	290
	HMF-MW0005-040.0-20090526	05-26-2009	309
	HMF-MW0005-040.0-20090701	07-01-2009	82.2
	HMF-MW0005-040.0-20090729	07-29-2009	194
	HMF-MW0005-040.0-20090924	09-25-2009	315
	HMF-MW0005-040.0-20091027	10-27-2009	155
	HMF-MW0005-037.5-20091124	11-24-2009	142
	HMF-MW0005-037.5-20091229	12-29-2009	46.2
	HMF-MW0005-037.5-20100128	01-28-2010	71.6
	HMF-MW0005-037.5-20100224	02-24-2010	101
	HMF-MW0005-037.5-20100331	03-31-2010	51.1
	HMF-MW0005-037.5-20100527	05-27-2010	61.4
	HMF-MW0005-037.5-20100727	07-27-2010	3.8
	HMF-MW0005-037.5-20100831	08-31-2010	334
	HMF-MW0005-037.5-20100922	09-23-2010	89.4
	HMF-MW0005-037.5-20101229	12-29-2010	104
	HMF-MW0005-037.5-20110324	03-24-2011	197
	HMF-MW0005-037.5-20110622	06-22-2011	125
	HMF-MW0005-037.5-20110915	09-15-2011	118
	HMF-MW0005-037.5-20111216	12-16-2011	4.9
	HMF-MW0005-037.5-20120329	03-29-2012	4.5
	HMF-MW0005-037.5-20120621	06-21-2012	0.5 U
	HMF-MW0005-037.5-20121227	12-27-2012	3.4
	HMF-MW0005-037.5-20130327	03-27-2013	16.5
	HMF-MW0005-037.5-20130627	06-27-2013	58.6
	HMF-MW0005-037.5-20130926	09-26-2013	49.7
	HMF-MW0005-037.5-20131219	12-19-2013	30.3
	HMF-MW0005-037.5-20140327	03-27-2014	286
	HMF-MW0005-037.5-20140710	07-10-2014	<b>2,650</b>
HMF-MW0005-037.5-20140923	09-23-2014	<b>2,130</b>	
HMF-MW0005-037.5-20141223	12-23-2014	506	
HMF-MW0005-037.5-20150331	03-31-2015	489	
HMF-MW0005-037.5-20150625	06-25-2015	337	
HMF-MW0005-037.5-20150923	09-23-2015	568	
HMF-MW61	HMF-MW0006I-040.0-20050907	09-07-2005	2 U

**Table 2-2. Groundwater Data Summary by Monitoring Well (continued)**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
HMF-MW61 (continued)	HMF-MW0006I-040.0-20051026	10-26-2005	41.7
	HMF-MW0006I-040.0-20051201	12-01-2005	3.4
	HMF-MW0006-040.0-122805	12-28-2005	15.1
	HMF-MW0006-040-20060125	01-25-2006	17.5
	HMF-MW0006-040.0-20060227	02-27-2006	9.8
	HMF-MW0006-040.0-20060328	03-28-2006	5
	HMF-MW0006-040.0-20060424	04-24-2006	2.3
	HMF-MW0006-040.0-20060525	05-25-2006	0.7
	HMF-MW0006-040.0-20060621	06-21-2006	0.5 U
	HMF-MW0006-040.0-20060726	07-26-2006	0.5 U
	HMF-MW0006-040.0-20060901	09-01-2006	0.5 U
	HMF-MW0006-040.0-20060928	09-28-2006	2.7
	HMF-MW0006-040.0-20061025	10-25-2006	2.7 U
	HMF-MW0006-040.0-20061129	11-29-2006	2.7 U
	HMF-MW0006-040.0-20061228	12-28-2006	1.6 I
	HMF-MW0006-040.0-20070131	01-31-2007	0.5 U
	HMF-MW0006-040.0-20070226	02-27-2007	0.5 U
	HMF-MW0006-040.0-20070329	03-29-2007	0.5 U
	HMF-MW0006-040.0-20070430	04-30-2007	4
	HMF-MW0006-040.0-20070531	05-31-2007	5.8
	HMF-MW0006-040.0-20070628	06-28-2007	0.5 U
	HMF-MW0006-040.0-20070731	07-31-2007	69.7
	HMF-MW0006-040.0-20070828	08-28-2007	2.1
	HMF-MW0006-040.0-20070926	09-26-2007	2.6
	HMF-MW0006-040.0-20071128	11-28-2007	2.2
	HMF-MW0006-040.0-20080131	01-31-2008	2.1
	HMF-MW0006-040.0-20080327	03-27-2008	5.2
	HMF-MW0006-040.0-20080925	09-25-2008	4.5
	HMF-MW0006-040.0-20090401	04-01-2009	1.4 I
	HMF-MW0006-040.0-20090924	09-25-2009	1.0 I
	HMF-MW0006-040.0-20100331	03-31-2010	0.4 U
	HMF-MW0006-040.0-20100922	09-23-2010	2.6
	HMF-MW0006-037.5-20110915	09-15-2011	0.5 U
HMF-MW0006-037.5-20130926	09-26-2013	0.5 U	
HMF-MW0006-037.5-20140923	09-23-2014	14.1	
HMF-MW0006-037.5-20150923	09-23-2015	0.5 U	
HMF-MW71	HMF-MW0007I-040.0-20050909	09-09-2005	0.5 U
	HMF-MW0007I-040.0-20051026	10-26-2005	6.3
	HMF-MW0007I-040.0-20051201	12-01-2005	37.1
	HMF-MW0007-040.0-122805	12-28-2005	10.7
	HMF-MW0007-040-20060125	01-25-2006	11.4
	HMF-MW0007-040.0-20060227	02-27-2006	20.5
	HMF-MW0007-040.0-20060328	03-28-2006	17.3
	HMF-MW0007-040.0-20060424	04-24-2006	28
	HMF-MW0007-040.0-20060525	05-25-2006	2.3
	HMF-MW0007-040.0-20060621	06-21-2006	2
	HMF-MW0007-040.0-20060726	07-26-2006	51.2
	HMF-MW0007-040.0-20060901	09-01-2006	0.5

Table 2-2. Groundwater Data Summary by Monitoring Well (continued)

MONITORING WELL	SAMPLE ID	SAMPLE DATE	TCFM RESULT (µg/L)
HMF-MW71 (continued)	HMF-MW0007-040.0-20060928	09-28-2006	2.3
	HMF-MW0007-040.0-20061025	10-25-2006	2.3 U
	HMF-MW0007-040.0-20061129	11-29-2006	2.3 U
	HMF-MW0007-040.0-20061228	12-28-2006	0.5 U
	HMF-MW0007-040.0-20070131	01-31-2007	0.5 U
	HMF-MW0007-040.0-20070226	02-27-2007	0.5 U
	HMF-MW0007-040.0-20070329	03-29-2007	40.3
	HMF-MW0007-040.0-20070430	04-30-2007	2.6
	HMF-MW0007-040.0-20070531	05-31-2007	2.9
	HMF-MW0007-040.0-20070628	06-28-2007	0.5 U
	HMF-MW0007-040.0-20070731	07-31-2007	<b>13,100</b>
	HMF-MW0007-040.0-20070828	08-28-2007	4.2
	HMF-MW0007-040.0-20070926	09-26-2007	6.1
	HMF-MW0007-040.0-20071128	11-28-2007	4.8
	HMF-MW0007-040.0-20080131	01-31-2008	4.3
	HMF-MW0007-040.0-20080327	03-27-2008	7.5
	HMF-MW0007-040.0-20080327	03-27-2008	7.5
	HMF-MW0007-040.0-20080925	09-25-2008	11.4
	HMF-MW0007-040.0-20090401	04-01-2009	12.8
	HMF-MW0007-040.0-20090924	09-25-2009	10.5
	HMF-MW0007-040.0-20100331	03-31-2010	1.1 I
	HMF-MW0007-040.0-20100922	09-23-2010	7.1
	HMF-MW0007-037.5-20110915	09-15-2011	6.5
	HMF-MW0007-037.5-20130926	09-26-2013	0.5 U
	HMF-MW0007-037.5-20140923	09-23-2014	0.5 U
	HMF-MW0007-037.5-20150923	09-23-2015	0.5 U
HMF-MW8I	HMF-MW0008-039-20060126	01-26-2006	0.56 I
	HMF-MW0008-040.0-20060227	02-27-2006	9.2
	HMF-MW0008-040.0-20060326	03-26-2006	5 U
	HMF-MW0008-040.0-20060424	04-24-2006	4.7
	HMF-MW0008-040.0-20060525	05-25-2006	4.7
	HMF-MW0008-040.0-20060621	06-21-2006	0.5 U
	HMF-MW0008-040.0-20060726	07-26-2006	0.5 U
	HMF-MW0008-040.0-20060901	09-01-2006	0.5 U
	HMF-MW0008-040.0-20060928	09-28-2006	0.5 U
	HMF-MW0008-040.0-20061025	10-25-2006	0.5 U
	HMF-MW0008-040.0-20061129	11-29-2006	0.73 I
	HMF-MW0008-040.0-20061228	12-28-2006	0.84 I
	HMF-MW0008-040.0-20070131	01-31-2007	4.4
	HMF-MW0008-040.0-20070226	02-27-2007	0.5 U
	HMF-MW0008-040.0-20070329	03-29-2007	5.3
	HMF-MW0008-040.0-20070430	04-30-2007	2.5
	HMF-MW0008-040.0-20070531	05-31-2007	5.5
	HMF-MW0008-040.0-20070628	06-28-2007	0.68
	HMF-MW0008-040.0-20070731	07-31-2007	68.5
	HMF-MW0008-040.0-20070828	08-28-2007	0.51 U
HMF-MW0008-040.0-20070926	09-26-2007	0.43 U	
HMF-MW0008-040.0-20071128	11-28-2007	0.43 U	
HMF-MW0008-040.0-20080131	01-31-2008	0.81 I	



**Table 2-2. Groundwater Data Summary by Monitoring Well (continued)**

<b>MONITORING WELL</b>	<b>SAMPLE ID</b>	<b>SAMPLE DATE</b>	<b>TCFM RESULT (µg/L)</b>
HMF-MW81 (continued)	HMF-MW0008-040.0-20080327	03-27-2008	1.3 I
	HMF-MW0008-040.0-20080925	09-25-2008	5.1
	HMF-MW0008-040.0-20090401	04-01-2009	6
	HMF-MW0008-040.0-20090924	09-25-2009	0.5 U
	HMF-MW0008-040.0-20100331	03-31-2010	0.4 U
	HMF-MW0008-040.0-20100922	09-23-2010	0.4 U
	HMF-MW0008-037.5-20110915	09-15-2011	0.5 U
	HMF-MW0008-037.5-20130926	09-26-2013	0.5 U
	HMF-MW0008-037.5-20140923	09-23-2014	0.93 I
HMF-MW0008-037.5-20150923	09-23-2015	0.5 U	
HMF-MW91	HMF-MW0009-040.0-20060126	01-26-2006	4.7
	HMF-MW0009-040.0-20060227	02-27-2006	0.69 I
	HMF-MW0009-040.0-20060328	03-28-2006	3.2
	HMF-MW0009-040.0-20060424	04-24-2006	5.3
	HMF-MW0009-040.0-20060525	05-25-2006	10.5
	HMF-MW0009-040.0-20060621	06-21-2006	31.5
	HMF-MW0009-040.0-20060726	07-26-2006	40.6
	HMF-MW0009-040.0-20060901	09-01-2006	1.6 I
	HMF-MW0009-040.0-20060928	09-28-2006	0.5 U
	HMF-MW0009-040.0-20061025	10-25-2006	94.3
	HMF-MW0009-040.0-20061129	11-29-2006	0.78
	HMF-MW0009-040.0-20061228	12-28-2006	3.8
	HMF-MW0009-040.0-20070131	01-31-2007	0.51 I
	HMF-MW0009-040.0-20070227	02-27-2007	0.5 U
	HMF-MW0009-040.0-20070329	03-29-2007	3.8
	HMF-MW0009-040.0-20070430	04-30-2007	2
	HMF-MW0009-040.0-20070531	05-31-2007	5
	HMF-MW0009-040.0-20070628	06-28-2007	0.92
	HMF-MW0009-040.0-20070731	07-31-2007	117
	HMF-MW0009-040.0-20070828	08-28-2007	1.7 I
	HMF-MW0009-040.0-20070926	09-26-2007	1.9 I
	HMF-MW0009-040.0-20070927	11-28-2007	3.2
	HMF-MW0009-040.0-20070928	01-31-2008	1.2 I
	HMF-MW0009-040.0-20080327	03-27-2008	3.1
	HMF-MW0009-040.0-20080925	09-25-2008	5.2
	HMF-MW0009-040.0-20090401	04-01-2009	0.5 U
	HMF-MW0009-040.0-20090924	09-25-2009	0.55 I
	HMF-MW0009-040.0-20100331	03-31-2010	0.4 U
	HMF-MW0009-040.0-20100922	09-23-2010	7.2
	HMF-MW0009-037.5-20110915	09-15-2011	0.5 U
	HMF-MW0009-037.5-20130926	09-26-2013	0.5 U
	HMF-MW0009-037.5-20140923	09-23-2014	45.4
HMF-MW0009-037.5-20150923	09-23-2015	0.5 U	

Bolded values indicate TCFM results greater than the GCTL (2,100 µg/L).

Shaded cells indicate TCFM results greater than the MNA-DV (21,000 µg/L).

I - Reported value is between method detection limit and practical quantitation limit.

U - Not detected at associated detection limit.

E - Above calibration range.

L - Exceeds calibration limit.

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## **APPENDIX K**

### **HMF SOUTH 95% UCL ANALYSIS**

**Navigation Panel**

Name

- Work Sheet.xls
- 95UCL\_w.o.SED
- 95UCL\_w.SED**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1	<b>Gamma UCL Statistics for Uncensored Full Data Sets</b>														
2															
3	User Selected Options														
4	Date/Time of Computation		ProUCL 5.2 3/30/2023 4:45:44 PM												
5	From File		WorkSheet.xls												
6	Full Precision		OFF												
7	Confidence Coefficient		95%												
8	Number of Bootstrap Operations		2000												
9															
10															
11	<b>PCBs</b>														
12															
13	<b>General Statistics</b>														
14	Total Number of Observations				20		Number of Distinct Observations				19				
15							Number of Missing Observations				13				
16	Minimum				0.0036		Mean				0.182				
17	Maximum				1		Median				0.049				
18	SD				0.271		SD of logged Data				1.599				
19	Coefficient of Variation				1.488		Skewness				1.983				
20															
21	<b>Gamma GOF Test</b>														
22	A-D Test Statistic		0.761		<b>Anderson-Darling Gamma GOF Test</b>										
23	5% A-D Critical Value		0.796		Data appear Gamma Distributed at 5% Significance Level										
24	K-S Test Statistic		0.24		<b>Kolmogorov-Smirnov Gamma GOF Test</b>										
25	5% K-S Critical Value		0.204		Data Not Gamma Distributed at 5% Significance Level										
26	<b>Data appear to Follow Approximate Gamma Distribution at 5% Significance Level</b>														
27															
28	<b>Gamma Statistics</b>														
29	k hat (MLE)		0.574		k star (bias corrected MLE)				0.522						
30	Theta hat (MLE)		0.317		Theta star (bias corrected MLE)				0.349						
31	nu hat (MLE)		22.98		nu star (bias corrected)				20.87						
32	MLE Mean (bias corrected)		0.182		MLE Sd (bias corrected)				0.252						
33					Approximate Chi Square Value (0.05)				11.49						
34	Adjusted Level of Significance		0.038		Adjusted Chi Square Value				10.94						
35															
36	<b>Assuming Gamma Distribution</b>														
37	95% Approximate Gamma UCL		0.331		95% Adjusted Gamma UCL				0.347						
38															
39	<b>Suggested UCL to Use</b>														
40	95% Adjusted Gamma UCL		0.347												
41															
42	When a data set follows an approximate distribution passing only one of the GOF tests,														
43	it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL														
44															
45	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.														
46	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.														
47	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.														
48															
49															

LOG: 4:45:36 PM >[Information] UCLwNDsLog.xls closed!  
 LOG: 4:45:45 PM >[Information] Generated Gamma UCLs results for uncensored data!  
 LOG: 4:46:11 PM >[Information] C:\Users\greg.kusel\Desktop\95UCL\_w.SED successfully exported!

## **APPENDIX L**

### **HMF SOUTH PROFESSIONAL SURVEY DATA**

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KUGELMANN LAND SURVEYING, INC.

1/10/2022

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30 N. TROPICAL TRL., STE B, MERRITT ISLAND, FL 32953

LB 6575

[klsinc@cfl.rr.com](mailto:klsinc@cfl.rr.com)

KLS#2022005

HGL, INC.

HYPERGOL MAINTENANCE FACILITY (HMF), KENNEDY SPACE CENTER

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POINT #	NORTHING (FT)	EASTING (FT)	NORTHING (M)	EASTING (M)	TOC EL (FT)	GND EL (FT)	DESC	ID
13	1518029.23	771257.15	462696.238	235079.652	5.58	1.9	MW	HMF-MW0006IR

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SURVEYOR'S NOTES:

1. THE PURPOSE OF THIS SURVEY IS TO DETERMINE THE HORIZONTAL AND VERTICAL POSITION OF MONITORING WELL.
2. THE PHYSICAL COORDINATES IN THE EXCEL FILE ARE REFERENCED TO THE FLORIDA STATE PLANE COORDINATE SYSTEM, EAST ZONE, NORTH AMERICAN DATUM OF 1983 (NAD83), 1990 ADJUSTMENT AND ARE BASED ON UNITED STATES COAST AND GEODETIC MONUMENT "WRIGHT", HAVING COORDINATES OF NORTHING 1544816.33 AND EASTING 768783.06 IN FEET AND NORTHING 470860.964 AND 234325.548 IN METERS.
3. THE ELEVATIONS DEPICTED HEREON ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) AND ARE BASED ON UNITED STATES COAST AND GEODETIC MONUMENT "WRIGHT", HAVING AN ELEVATION OF 7.45 FEET.
4. DATA TABLES AND/OR TEXT FILES SHOWN HEREON ARE IN THE NASA (GIS) GEOGRAPHIC INFORMATION SYSTEMS PREFERRED CONFIGURATION, THE HORIZONTAL LOCATIONS WILL BE DISPLAYED IN NAD83 (METERS) AND THE VERTICAL LOCATIONS WILL BE DISPLAYED IN NAVD88 (FEET).

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ABBREVIATIONS:

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

## **APPENDIX M**

### **MOBIL VERTICAL DELINEATION DOCUMENTS**

CGO-DPT0002			
11/17/2005	(9.25-10.75)	(24.25-25.75)	(34.25-35.75)
Benzene	ND	ND	ND
Toluene	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Xylenes	1.0 U	1.0 U	1.0 U
MTBE	0.5 U	0.5 U	0.5 U
Naphthalene	0.25 U	0.25 U	0.25 U

CGO-DPT0001			
11/16/2005	(9.25-10.75)	(24.25-25.75)	(34.25-35.75)
Benzene	ND	ND	ND
Toluene	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Xylenes	1.0 U	1.0 U	1.0 U
MTBE	0.5 U	0.5 U	0.5 U
Naphthalene	0.25 U	0.25 U	0.25 U

CGO-DPT0003			
11/22/2005	(9.25-10.75)	(24.25-25.75)	(34.25-35.75)
Benzene	ND	ND	ND
Toluene	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Xylenes	1.0 U	1.0 U	1.0 U
MTBE	0.5 U	0.5 U	0.5 U
Naphthalene	0.25 U	0.38 I	0.25 U

CGO-DPT0004			
11/28/2005	(9.25-10.75)	(24.25-25.75)	(34.25-35.75)
Benzene	ND	ND	ND
Toluene	0.5 U	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U	0.5 U
Xylenes	1.0 U	1.0 U	1.0 U
MTBE	0.5 U	0.99 I	0.5 U
Naphthalene	0.25 U	0.25 U	0.25 U

CGO-DPT0005		
11/22/2005	(9.25-10.75)	(24.25-25.75)
Benzene	ND	ND
Toluene	0.5 U	0.5 U
Ethylbenzene	0.5 U	0.5 U
Xylenes	1.0 U	1.0 U
MTBE	0.5 U	0.5 U
Naphthalene	NA	NA

CGO-DPT0013			
7/7/2006	8-12	23-27	33-37
Benzene	1.0 U	1.0 U	<b>10.4 G</b>
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	<b>56 G</b>
Xylenes	2.0 U	2.0 U	<b>55.2 G</b>
MTBE	5.0 U	5.0 U	5.0 U
Naphthalene	NA	NA	NA

CGO-DPT0011			
7/6/2006	8-12	23-27	33-37
Benzene	1.0 U	Unable	1.0
Toluene	1.0 U	to	1.0 U
Ethylbenzene	1.2	Collect	1.0 U
Xylenes	7.7	Sample	2.0 U
MTBE	5.0 U		9.7
Naphthalene	NA		NA

CGO-DPT0015			
7/7/2006	8-12	23-27	33-37
Benzene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Xylenes	2.0 U	2.0 U	2.0 U
MTBE	5.0 U	5.0 U	5.0 U
Naphthalene	NA	NA	NA

CGO-DPT0010	
7/6/2006	4-8
Benzene	1.0 U
Toluene	1.0 U
Ethylbenzene	1.0 U
Xylenes	2.0 U
MTBE	5.0 U
Naphthalene	NA

CGO-DPT0009			
7/6/2006	4-8	23-27	33-37
Benzene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Xylenes	2.0 U	2.0 U	2.0 U
MTBE	5.0 U	5.0 U	5.0 U
Naphthalene	NA	NA	NA

CGO-DPT0006		
11/30/2005	(9.25-10.75)	(24.25-25.75)
Benzene	ND	ND
Toluene	0.85 I	0.5 U
Ethylbenzene	22.7	0.63 I
Xylenes	<b>99.5 G</b>	2.1 I
MTBE	<b>260 GN</b>	7.6
Naphthalene	NA	NA

CGO-DPT0014			
7/7/2006	8-12	23-27	33-37
Benzene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	10.5	1.0 U	1.0 U
Xylenes	<b>55.9 G</b>	2.0 U	2.0 U
MTBE	<b>160 G</b>	6.2	18.2
Naphthalene	NA	NA	NA

CGO-DPT0012			
7/7/2006	8-12	23-27	33-37
Benzene	1.0 U	<b>5.5 G</b>	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	14.8	1.0 U	1.0 U
Xylenes	<b>62.3 G</b>	2.0 U	2.0 U
MTBE	<b>87 G</b>	<b>200 G</b>	<b>28 G</b>
Naphthalene	NA	NA	NA

CGO-DPT0008			
7/6/2006	4-8	23-27	33-37
Benzene	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	1.0 U	1.0 U
Xylenes	2.0 U	4.5	2.0 U
MTBE	5.0 U	<b>48.6 G</b>	7.9
Naphthalene	NA	NA	NA

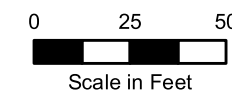


Highest concentrations at 33-37 foot interval

Approximate Extent of Impacted Groundwater

Notes:  
Concentrations in micrograms per liter (µg/l).  
Depths are in feet below land surface (ft bls).  
Bold font indicates concentration exceeds screening criteria.  
CGO - Citgo  
CSR - Confirmatory Sampling Report  
DPT - Direct Push Technology  
ft bls - feet below land surface  
G - Exceeds GCTL  
GCTL - Groundwater Cleanup Target Level  
I - Analyte detected between PQL and MDL  
MDL - Method Detection Limit  
MTBE - Methyl tert-Butyl Ether  
N - Exceeds NADC  
NA - not analyzed  
NADC - Natural Attenuation Default Concentration  
NASA - National Aeronautics and Space Administration  
PQL - Practical Quantitation Limit  
U - Analyte not detected; MDL shown

- Legend**
- Area of Investigation
  - Confirmatory Sampling DPT Sample
  - Delineation Sampling DPT Sample



**Groundwater Sampling Results and Approximate Extent of Petroleum-Affected Groundwater at 35 ft bls**  
Citgo - Confirmatory Sampling Report Addendum  
NASA Kennedy Space Center, Florida



Notes:  
Results in micrograms per liter (µg/l).  
¹ - equals the sum of m,p-xylene and o-xylene or the highest detection limit for non-detects.  
ANL - Annual LTM Report  
AST - aboveground storage tank  
CGO - CITGO Service Station  
ft bls - feet below land surface  
(G) - exceeds GCTL  
(GN) - exceeds GCTL and NADC  
GCTL - Groundwater Cleanup Target Level  
I - concentration is between the laboratory MDL and PQL  
LTM - long-term monitoring  
MDL - method detection limit  
MTBE - methyl tert-butyl ether  
NADC - Natural Attenuation Default Concentration  
NASA - National Aeronautics and Space Administration  
PAHs - polynuclear aromatic hydrocarbons  
PQL - practical quantitation limit  
U - detected below MDL, shown  
UST - underground storage tank  
VOCs - volatile organic compounds

Screening Criteria (µg/l)		
Analyte	GCTL	NADC
<b>VOCs</b>		
Benzene	1	100
Xylenes ¹	20	200
MTBE	20	200
<b>PAHs</b>		
1-Methylnaphthalene	28	280
2-Methylnaphthalene	28	280
Naphthalene	14	140

MW0013 (43.5-47.5)	5/31/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	0.088 U	0.2 U	0.21 U	0.21 U
Xylenes ¹	0.273 U	0.72 U	1.24 U	0.55 U
MTBE	1.3 U	0.16 U	0.14 U	0.14 U

MW0009 (32.5-37.5)	5/31/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	4.5 (G)	0.2 U	0.21 U	0.21 U
Xylenes ¹	1.47 I	0.72 U	1.24 U	0.55 U
MTBE	1.3 U	1.2 I	0.95 I	9.28

MW0012 (32.5-37.5)	5/31/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	0.36 I	2 (G)	0.21 U	0.21 U
Xylenes ¹	0.273 U	0.72 U	1.24 U	0.55 U
MTBE	1.7 I	2.7	0.84 I	0.14 U

MW0007 (22.5-27.5)	5/31/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	140 (GN)	280 (GN)	410 (GN)	251 (GN)
Xylenes ¹	0.273 U	1.9	50.8 (G)	127.5 (G)
MTBE	80 (G)	75 (G)	14	6.9

MW0020 (22.5-27.5)	8/13/08	4/30/09	7/24/09	5/18/10	11/15/10
<b>VOCs</b>					
Benzene	2.6 U	1.6 (G)	2.9 (G)	0.21 U	0.21 U
Xylenes ¹	1.60 U	0.32 U	0.41 I	1.24 U	0.55 U
MTBE	150 (G)	100 (G)	190 (G)	23 (G)	4.44

UST Farm with one 22,000-gallon compartmentalized UST containing gasoline and diesel fuel.

MW0013 non-detect at DPT0013 location

5,000-Gallon Ethanol AST

Ethanol Dispenser

MW0006 (22.5-27.5)	5/30/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	0.64 I	0.2 U	0.38 I	0.32 I
Xylenes ¹	3.44 I	2.8	1.63	1.76 I
MTBE	1.3 U	0.16 U	0.14 U	0.14 U
<b>PAHs</b>				
1-Methylnaphthalene	10	11	12	11
2-Methylnaphthalene	16	19	26	23
Naphthalene	16 (G)	15 (G)	18 (G)	19 (G)

MW0010 (32.5-37.5)	5/30/07	5/22/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	0.47 I	0.2 U	0.21 U	0.21 U
Xylenes ¹	94 (G)	35 (G)	3.5	0.55 I
MTBE	1.3 U	1.0 I	0.65 I	0.14 U

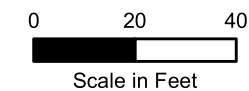
MW0018 (22.5-27.5)	8/13/08	4/30/09	7/24/09	5/18/10	11/15/10
<b>VOCs</b>					
Benzene	6.8 (G)	6.3 (G)	4 (G)	1.5 (G)	0.21 U
Xylenes ¹	6.4	2.7	0.31 I	1.24 U	0.32 I
MTBE	280 (GN)	160 (G)	300 D (GN)	130 (G)	125 (G)

MW0001 (2-12)	5/30/07	5/21/08	4/30/09	7/24/09	5/18/10	11/15/10
<b>VOCs</b>						
Benzene	0.088 U	0.2 U	0.52 U	0.52 U	0.21 U	0.21 U
Xylenes ¹	13.2	9.9	0.4 I	0.69 I	1.24 U	0.55 U
MTBE	36 (G)	40 (G)	25 (G)	12	3.8	0.14 U

MW0008 (22.5-27.5)	5/30/07	5/21/08	5/18/10	11/15/10
<b>VOCs</b>				
Benzene	0.088 U	0.2 U	0.21 U	0.21 U
Xylenes ¹	3.9 I	6.4	15.6	19.8
MTBE	62 (G)	110 (G)	38 (G)	24.7 (G)

Legend

- AST
- UST
- Monitoring Well (screened 2-12 ft bls)
- Monitoring Well (screened 22.5-27.5 ft bls)
- Monitoring Well (screened 32.5-37.5 ft bls)
- Monitoring Well (Screened from 42.5-47.5 ft bls)



Groundwater Monitoring Results  
Annual Long-Term Monitoring Report

CITGO Service Station  
NASA Kennedy Space Center, Florida

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## **APPENDIX N**

### **GSSP DOWNGRADIENT DELINEATION DOCUMENTS**

Downgradient  
DPT location

Appendix L - Analytical Results Groundwater  
GSA Seized Property RFI

Phase	Sample ID	Location	Sample Date	Screened Interval	Analyte	Concentration	Qualifier	Units	FDEP GCTL (Screening Value) <sup>(1)</sup>	Exceeds GCTL Screening Criteria
RFI3	GSSP-DPT0054-040.0	GSSP-DPT0054	7/10/2007	38 to 42	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0054-040.0	GSSP-DPT0054	7/10/2007	38 to 42	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0054-040.0	GSSP-DPT0054	7/10/2007	38 to 42	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0054-050.0	GSSP-DPT0054	7/10/2007	48 to 52	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0054-050.0	GSSP-DPT0054	7/10/2007	48 to 52	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0054-050.0	GSSP-DPT0054	7/10/2007	48 to 52	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0054-050.0	GSSP-DPT0054	7/10/2007	48 to 52	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0054-050.0	GSSP-DPT0054	7/10/2007	48 to 52	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0055-020.0	GSSP-DPT0055	7/10/2007	18 to 22	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-020.0	GSSP-DPT0055	7/10/2007	18 to 22	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-020.0	GSSP-DPT0055	7/10/2007	18 to 22	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0055-020.0	GSSP-DPT0055	7/10/2007	18 to 22	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0055-020.0	GSSP-DPT0055	7/10/2007	18 to 22	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0055-030.0	GSSP-DPT0055	7/10/2007	28 to 32	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-030.0	GSSP-DPT0055	7/10/2007	28 to 32	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-030.0	GSSP-DPT0055	7/10/2007	28 to 32	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0055-030.0	GSSP-DPT0055	7/10/2007	28 to 32	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0055-030.0	GSSP-DPT0055	7/10/2007	28 to 32	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0055-040.0	GSSP-DPT0055	7/10/2007	38 to 42	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-040.0	GSSP-DPT0055	7/10/2007	38 to 42	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-040.0	GSSP-DPT0055	7/10/2007	38 to 42	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0055-040.0	GSSP-DPT0055	7/10/2007	38 to 42	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0055-040.0	GSSP-DPT0055	7/10/2007	38 to 42	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0055-050.0	GSSP-DPT0055	7/10/2007	48 to 52	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-050.0	GSSP-DPT0055	7/10/2007	48 to 52	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0055-050.0	GSSP-DPT0055	7/10/2007	48 to 52	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0055-050.0	GSSP-DPT0055	7/10/2007	48 to 52	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0055-050.0	GSSP-DPT0055	7/10/2007	48 to 52	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0056-010.0	GSSP-DPT0056	7/11/2007	8 to 12	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0056-010.0	GSSP-DPT0056	7/11/2007	8 to 12	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0056-010.0	GSSP-DPT0056	7/11/2007	8 to 12	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0056-010.0	GSSP-DPT0056	7/11/2007	8 to 12	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No
RFI3	GSSP-DPT0056-010.0	GSSP-DPT0056	7/11/2007	8 to 12	Vinyl chloride	1.0	U	µg/L	1	No
RFI3	GSSP-DPT0056-020.0	GSSP-DPT0056	7/11/2007	18 to 22	Tetrachloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0056-020.0	GSSP-DPT0056	7/11/2007	18 to 22	Trichloroethene	1.0	U	µg/L	3	No
RFI3	GSSP-DPT0056-020.0	GSSP-DPT0056	7/11/2007	18 to 22	<i>cis</i> -1,2-Dichloroethene	1.0	U	µg/L	70	No
RFI3	GSSP-DPT0056-020.0	GSSP-DPT0056	7/11/2007	18 to 22	<i>trans</i> -1,2-Dichloroethene	1.0	U	µg/L	100	No



# KB LABS, INC.

Final Data Report

Project Number : 07-142

NASA GSA III

KSC, FL

Prepared for: Geosyntec Consultants

Downgradient surface water sample location

Sample ID	Analysis Date	Matrix	Dilution Factor	Vinyl chloride	1,1-Dichloroethene	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene	Tetrachloroethene
GSSP-DPT0052-020.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0052-030.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0052-040.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0053-010.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0053-020.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0053-030.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0053-040.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0053-050.0-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-SW0001-000.1-20070709	7/9/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0054-010.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0054-020.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0054-030.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0054-040.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0054-050.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0055-020.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-DPT0055-030.0-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
GSSP-SW0002-000.1-20070710	7/10/07	Water	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0



Figure 3-15  
 Summary of Groundwater and Surface Water Results  
 3-71/3-72

## **APPENDIX O**

### **FSA1 VERTICAL DELINEATION DOCUMENTS**

**FSA1 Vertical Delineation**  
**Fuel Storage Area #1 Underground Storage Tank - Long Term Monitoring (LTM)**  
**Summary of DPT Groundwater Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-DPT0006	5/23/2007	5 - 9	20.1	19.0	39.2	NA	0.50 U	1.1	NA	3770
	5/23/2007	18 - 22	6.4	7.5	5.0	NA	0.50 U	0.52 I	NA	10100
	1/16/2008	18 - 22	2.3	2.7	2.1	NA	0.26 I	0.59 I	NA	1210
FSA1-DPT0007	5/23/2007	5 - 9	12.6	6.7	22.0	NA	0.50 U	0.50 U	NA	3240
	5/23/2007	18 - 22	0.59 I	0.56 I	0.43 I	NA	0.50 U	0.50 U	NA	488
FSA1-DPT0008	5/23/2007	5 - 9	0.24 U	0.24 U	0.24 U	NA	0.50 U	0.50 U	NA	170 U
	5/23/2007	18 - 22	0.25 U	0.25 U	0.25 U	NA	0.50 U	0.50 U	NA	170 U
FSA1-DPT0009	5/23/2007	5 - 9	8.4	3.9 I	23.6	NA	0.50 U	0.50 U	NA	12100
	5/23/2007	18 - 22	0.24 U	0.24 U	0.24 U	NA	0.50 U	0.50 U	NA	237 I
FSA1-DPT0014	5/23/2007	5 - 9	0.24 U	0.24 U	0.24 U	NA	0.50 U	0.50 U	NA	170 U
	5/23/2007	18 - 22	0.25 U	0.25 U	0.25 U	NA	0.50 U	0.50 U	NA	170 U
FSA1-DPT0021	5/23/2007	5 - 9	0.25 U	0.25 U	0.25 U	NA	0.50 U	0.50 U	NA	999
	5/23/2007	18 - 22	0.29 I	0.32 I	0.24 U	NA	0.50 U	0.50 U	NA	189 I
FSA1-DPT0022	1/16/2008	5 - 9	0.24 U	0.24 U	0.41 I	NA	0.63 I	0.97 I	NA	21300
FSA1-DPT1001	10/16/2014	2 - 6	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	7700
	10/16/2014	6 - 10	48.0	61.0	150	100	1.8 U	1.7 U	10.0	18000
	10/16/2014	10 - 14	1.5	1.1	2.3	2.0	0.71 U	0.69 U	1.6	5600
	10/16/2014	14 - 18	2.6	2.0	2.6	2.6	0.71 U	0.69 U	0.93 I	1600
	10/16/2014	18 - 22	1.6	2.1	1.7	3.0	0.71 U	0.69 U	0.67 U	1300
FSA1-DPT1002	10/16/2014	2 - 6	120	130	530	420	7.1 U	28.0	24.0	61000
	10/16/2014	6 - 10	120	130	340	200	3.6 U	3.4 U	16.0	30000
	10/16/2014	10 - 14	27.0	32.0	46.0	29.0	0.71 U	0.69 U	6.2	6300
	10/16/2014	14 - 18	26.0	28.0	24.0	26.0	0.71 U	0.69 U	3.2	6600
	10/16/2014	18 - 22	34.0	38.0	35.0	24.0	0.71 U	0.69 U	2.0	7700
	1/19/2016	10 - 14	22.0	18.0	34.0	NA	0.71 U	0.69 U	NA	31000
	1/19/2016	14 - 18	1.2	1.4	1.6	NA	0.71 U	0.69 U	NA	2100
FSA1-DPT1003	10/16/2014	2 - 6	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/16/2014	6 - 10	0.047 U	0.044 U	0.04 I	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/16/2014	10 - 14	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	280
	10/16/2014	14 - 18	0.13	0.11	0.14	0.82 U	0.71 U	0.69 U	0.67 U	280
	10/16/2014	18 - 22	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U



**FSA1 Vertical Delineation**  
**Fuel Storage Area #1 Underground Storage Tank - Long Term Monitoring (LTM)**  
**Summary of DPT Groundwater Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-DPT1004	10/17/2014	2 - 6	18.0	10.0	62.0	51.0	3.6 U	3.4 U	3.4 U	51000
	10/17/2014	6 - 10	2.0	1.9	6.1	6.0	0.71 U	0.69 U	2.6	5900
	10/17/2014	10 - 14	2.1	0.97	1.7	1.1	0.71 U	0.69 U	2.1	100 U
	10/17/2014	14 - 18	6.2	1.1	7.8	6.2	0.71 U	0.69 U	9.2	1600
	10/17/2014	18 - 22	0.99	1.1	1.6	2.0	0.71 U	0.69 U	2.6	2200
FSA1-DPT1006	10/17/2014	2 - 6	0.047 U	0.044 U	0.063 I	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	6 - 10	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	350
	10/17/2014	10 - 14	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	14 - 18	0.21	0.044 U	0.26	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	18 - 22	5.4	0.52	1.9	0.83 I	0.71 U	0.69 U	5.6	3000
FSA1-DPT1007	10/17/2014	2 - 6	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	6 - 10	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	10 - 14	2.0	0.23	2.3	2.2	0.71 U	0.69 U	0.67 U	230
	10/17/2014	14 - 18	1.9	0.25	2.4	2.2	0.71 U	0.69 U	0.67 U	230
	10/17/2014	18 - 22	12.0	3.1	26.0	28.0	0.71 U	0.69 U	7.4	7100
FSA1-DPT1008	10/17/2014	2 - 6	0.047 U	0.044 U	0.051 I	0.82 U	0.71 U	0.69 U	0.67 U	120 I
	10/17/2014	6 - 10	20.0	23.0	18.0	14.0	0.71 U	0.69 U	3.9	2500
	10/17/2014	10 - 14	1.2	0.89	0.93	1.2	0.71 U	0.69 U	7.4	520
	10/17/2014	14 - 18	0.069 I	0.046 I	0.15	0.98 I	0.71 U	0.69 U	0.67 U	100 U
	10/17/2014	18 - 22	0.047 U	0.044 U	0.035 U	0.82 U	0.71 U	0.69 U	0.67 U	100 U
FSA1-DPT1008A	1/19/2016	2 - 6	0.047 U	0.044 U	0.086 I	NA	0.71 U	0.69 U	NA	3300
	1/19/2016	6 - 10	5.2	5.8	13.0	NA	0.71 U	0.69 U	NA	7900
	1/19/2016	10 - 14	0.64	0.56	2.1	NA	0.71 U	0.69 U	NA	9500
	1/19/2016	14 - 18	0.047 U	0.044 U	0.051 I	NA	0.71 U	0.69 U	NA	4100
FSA1-DPT1009	1/19/2016	2 - 6	6.9	0.044 U	49.0	NA	0.71 U	0.69 U	NA	26000
	1/19/2016	6 - 10	69.0	90.0	180	NA	0.71 U	0.69 U	NA	13000
	1/19/2016	10 - 14	1.0	1.6	1.2	NA	0.71 U	0.69 U	NA	3200
	1/19/2016	14 - 18	3.5	2.1	2.3	NA	0.71 U	0.69 U	NA	4100
FSA1-DPT1010	1/19/2016	6 - 10	0.19	0.19	0.15	NA	0.71 U	0.69 U	NA	140 U
	1/19/2016	10 - 14	0.047 U	0.044 U	0.31	NA	0.71 U	0.69 U	NA	140 U
	1/19/2016	14 - 18	0.73	0.24	0.35	NA	0.71 U	0.69 U	NA	250
FSA1-DPT1011	1/19/2016	2 - 6	0.047 U	0.044 U	0.035 U	NA	0.71 U	0.69 U	NA	140 U
	1/21/2016	6 - 10	0.22	0.26	0.15	NA	0.71 U	0.69 U	NA	140 U
	1/21/2016	10 - 14	0.047 U	0.044 U	0.035 U	NA	0.71 U	0.69 U	NA	480
FSA1-DPT1012	1/21/2016	4 - 8	100	120	120	NA	0.71 U	0.69 U	NA	16000
	1/21/2016	8 - 12	0.61	0.70	0.69	NA	0.71 U	0.69 U	NA	140 U

**FSA1 Vertical Delineation**  
**Fuel Storage Area #1 Underground Storage Tank - Long Term Monitoring (LTM)**  
**Summary of DPT Groundwater Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260				FLO PRO
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-DPT3001	2/2/2017	2 - 6	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/2/2017	6 - 10	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>1100</b>
	2/2/2017	18 - 22	<b>1.6</b>	<b>1.7</b>	<b>1.3</b>	<b>2.6</b>	0.16 U	0.24 U	<b>2.5</b>	<b>6700</b>
	2/2/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.54 U	0.32 U	0.48 U,J4	0.28 U	600 U
FSA1-DPT3002	2/2/2017	2 - 6	<b>0.62</b>	<b>0.68</b>	<b>0.61</b>	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/2/2017	6 - 10	<b>0.43</b>	<b>0.47</b>	<b>0.38</b>	0.27 U	0.16 U	0.24 U	0.14 U	<b>1100</b>
	2/2/2017	18 - 22	0.20 U	0.20 U	<b>0.25</b>	0.27 U	0.16 U	0.24 U	<b>2.3</b>	<b>3600</b>
	2/2/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.54 U	0.32 U	0.48 U	0.28 U	600 U
FSA1-DPT3003	2/1/2017	2 - 6	<b>0.44</b>	<b>0.46</b>	<b>0.44</b>	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/1/2017	6 - 10	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/1/2017	18 - 22	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	<b>3.2</b>	<b>2600</b>
	2/1/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.54 U	0.32 U	0.48 U	0.28 U	<b>910</b>
FSA1-DPT3004	2/1/2017	2 - 6	<b>0.91</b>	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>1400</b>
	2/1/2017	6 - 10	<b>0.99</b>	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>2200</b>
	2/1/2017	18 - 22	<b>0.39</b>	<b>0.32</b>	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>710</b>
	2/1/2017	26 - 30	<b>0.41</b>	<b>0.34</b>	<b>0.42</b>	0.27 U	0.16 U	0.24 U	0.14 U	<b>780</b>
FSA1-DPT3005	2/1/2017	2 - 6	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/1/2017	6 - 10	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>830</b>
	2/1/2017	18 - 22	0.20 U	0.20 U	<b>0.22</b>	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/1/2017	26 - 30	0.20 U	0.20 U	<b>0.29</b>	0.27 U	0.16 U	0.24 U	0.14 U	600 U
FSA1-DPT3006	2/2/2017	2 - 6	<b>0.28</b>	<b>0.26</b>	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/2/2017	6 - 10	<b>0.27</b>	0.20 U	<b>0.20</b>	0.27 U	0.16 U	0.24 U	<b>2.3</b>	600 U
	2/2/2017	18 - 22	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/2/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
FSA1-DPT3007	2/2/2017	2 - 6	0.20 U	0.20 U	0.19 U	0.54 U	0.32 U	0.48 U	0.28 U	<b>800</b>
	2/2/2017	6 - 10	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	<b>68.0</b>	<b>1100</b>
	2/2/2017	18 - 22	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	<b>830</b>
	2/2/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.54 U	0.32 U	0.48 U	0.28 U	600 U
FSA1-DPT3008	2/1/2017	2 - 6	<b>82.0</b>	<b>90.0</b>	<b>200</b>	<b>250</b>	0.16 U	0.24 U	0.14 U	<b>16000</b>
	2/1/2017	6 - 10	<b>66.0</b>	<b>68.0</b>	<b>120</b>	<b>120</b>	0.32 U	0.48 U	<b>5.3</b>	<b>27000</b>
	2/1/2017	18 - 22	<b>1.9</b>	<b>2.1</b>	<b>2.0</b>	<b>5.4</b>	0.16 U	0.24 U	0.14 U	<b>1000</b>
	2/1/2017	26 - 30	<b>1.5</b>	<b>1.5</b>	<b>1.9</b>	<b>4.2 I</b>	0.16 U	0.24 U	0.14 U	<b>650 I</b>
FSA1-DPT3009	2/2/2017	2 - 6	0.20 U	0.20 U	0.19 U	<b>1.1 I</b>	0.16 U	0.24 U	0.14 U	<b>600 I</b>
	2/2/2017	6 - 10	0.20 U	0.20 U	0.19 U	<b>5.6 I</b>	0.32 U	0.48 U	0.28 U	600 U
	2/2/2017	18 - 22	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U
	2/2/2017	26 - 30	0.20 U	0.20 U	0.19 U	0.27 U	0.16 U	0.24 U	0.14 U	600 U

**FSA1 Vertical Delineation**  
**Fuel Storage Area #1 Underground Storage Tank - Long Term Monitoring (LTM)**  
**Summary of DPT Groundwater Analytical Results**

Category			Polynuclear Aromatic Hydrocarbons (PAH) by Method SW8270 SIM			Volatile Organic Compounds (VOC) by Method 8260			FLO PRO	
Analyte			1-METHYL NAPHTHALENE	2-METHYL NAPHTHALENE	NAPHTHALENE	NAPHTHALENE	BENZENE	ETHYLBENZENE	ISOPROPYL BENZENE	TPH (C08-C40)
FDEP GCTLs (µg/L)			28	28	14	14	1	30	0.8	5000
FDEP NADCs (µg/L)			280	280	140	140	100	300	8	
Location ID	Sample Date	Screened Interval (ft bls)								
FSA1-DPT3010	8/19/2020	5 - 9	<b>29.4</b>	<b>17.3</b>	<b>116</b>	NA	0.31 U	0.36 U	<b>10.2</b>	<b>4520 VQ</b>
FSA1-DPT3011	8/19/2020	5 - 9	<b>2.3</b>	<b>1.3</b>	<b>1.2</b>	NA	0.31 U	0.36 U	0.22 U	<b>795 VQ</b>
FSA1-DPT3012	8/19/2020	5 - 9	<b>19.1</b>	<b>19.2</b>	<b>56.2</b>	NA	0.31 U	0.36 U	<b>11.9</b>	<b>5400 VQ</b>
FSA1-DPT3013	8/19/2020	5 - 9	<b>0.77 I</b>	<b>2.2</b>	<b>4.7</b>	NA	<b>0.35 I</b>	<b>0.81 I</b>	<b>3.0</b>	<b>4920 V</b>
FSA1-DPT3014	8/19/2020	5 - 9	<b>18.4</b>	<b>27.3</b>	<b>12.5</b>	NA	0.31 U	0.36 U	<b>7.2</b>	<b>1680 V</b>
FSA1-DPT3015	8/19/2020	5 - 9	<b>1.4</b>	0.32 U	<b>0.47 I</b>	NA	0.31 U	0.36 U	<b>17.9</b>	<b>2390 V</b>
FSA1-DPT3016	8/19/2020	5 - 9	<b>13.9</b>	<b>15.4</b>	<b>36.5</b>	NA	0.31 U	0.36 U	<b>18.7</b>	<b>13500 V</b>

Notes:

Results and screening criteria presented in µg/L (micrograms per liter)

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

**Red** font indicates an exceedance of FDEP GCTLs

Highlighted cell indicates an exceedance of FDEP NADCs

U = Analyte not detected

I = Analyte greater than or equal to the method detection limit, but less than the practical quantitation limit

J4 = Surrogates and MS/MSD outside of criteria

Q = Sample was analyzed beyond hold time

V = Analyte found in associated method blank

The numeric value presented for non-detects is the sample-specific reporting detection limit

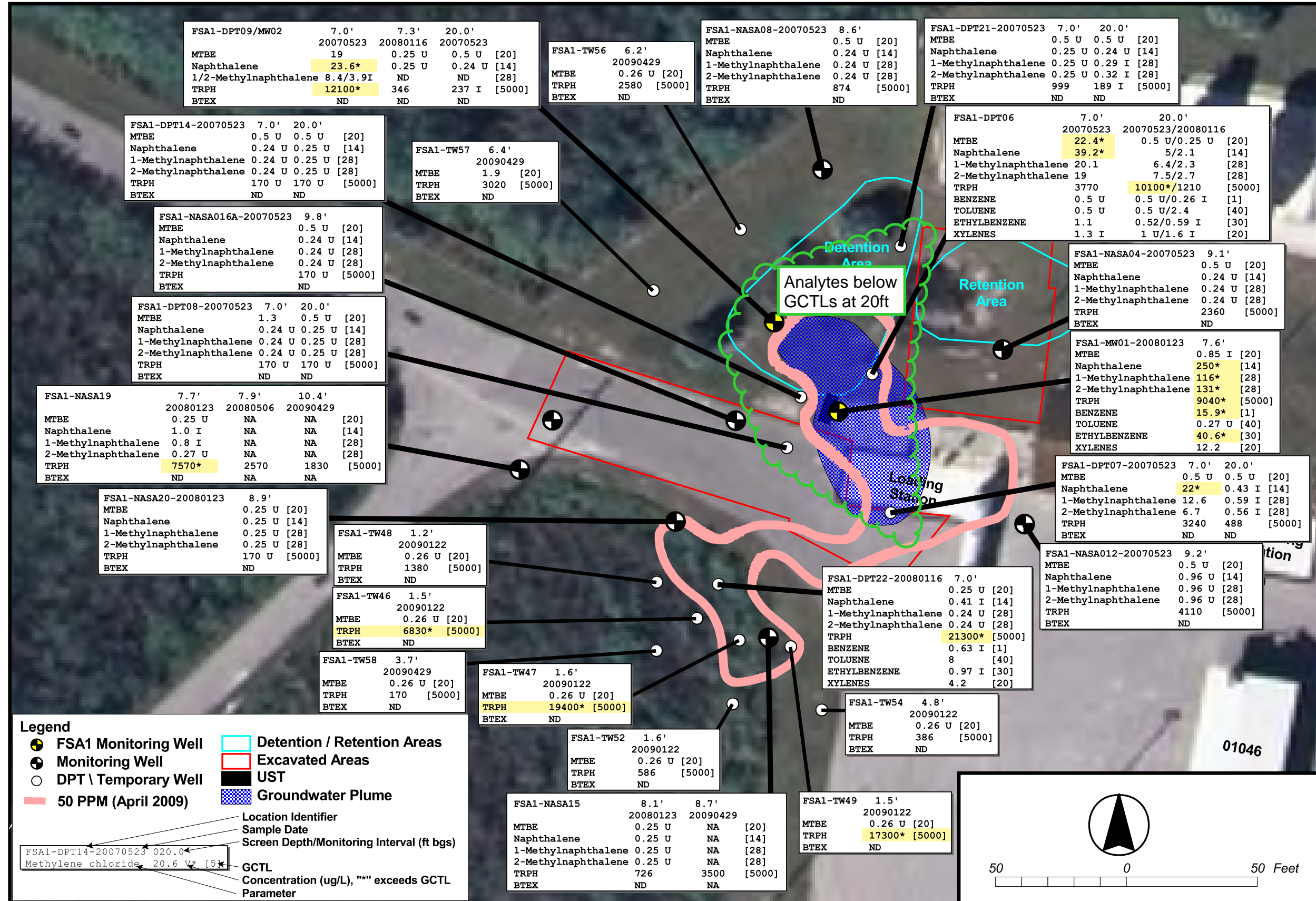
FDEP GCTLs = Florida Department of Environmental Protection Groundwater Cleanup Target Levels, Chapter 62-777 Florida Administrative Code, Table 1 (2005)

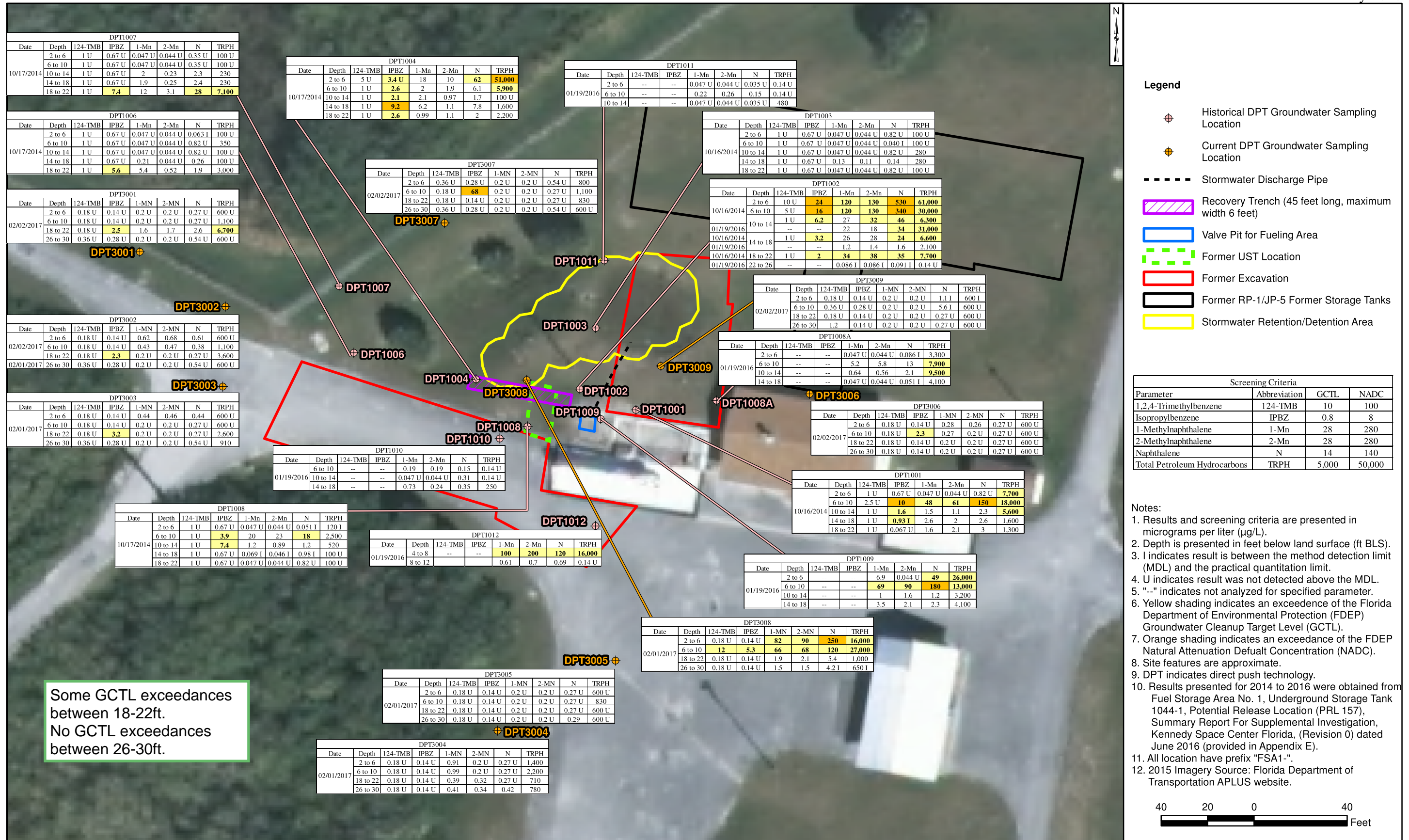
FDEP NADCs = Natural Attenuation Default Concentration, Chapter 62-777 Florida Administrative Code, Table V (2005)

NA = Not Analyzed

ft bls = feet below land surface

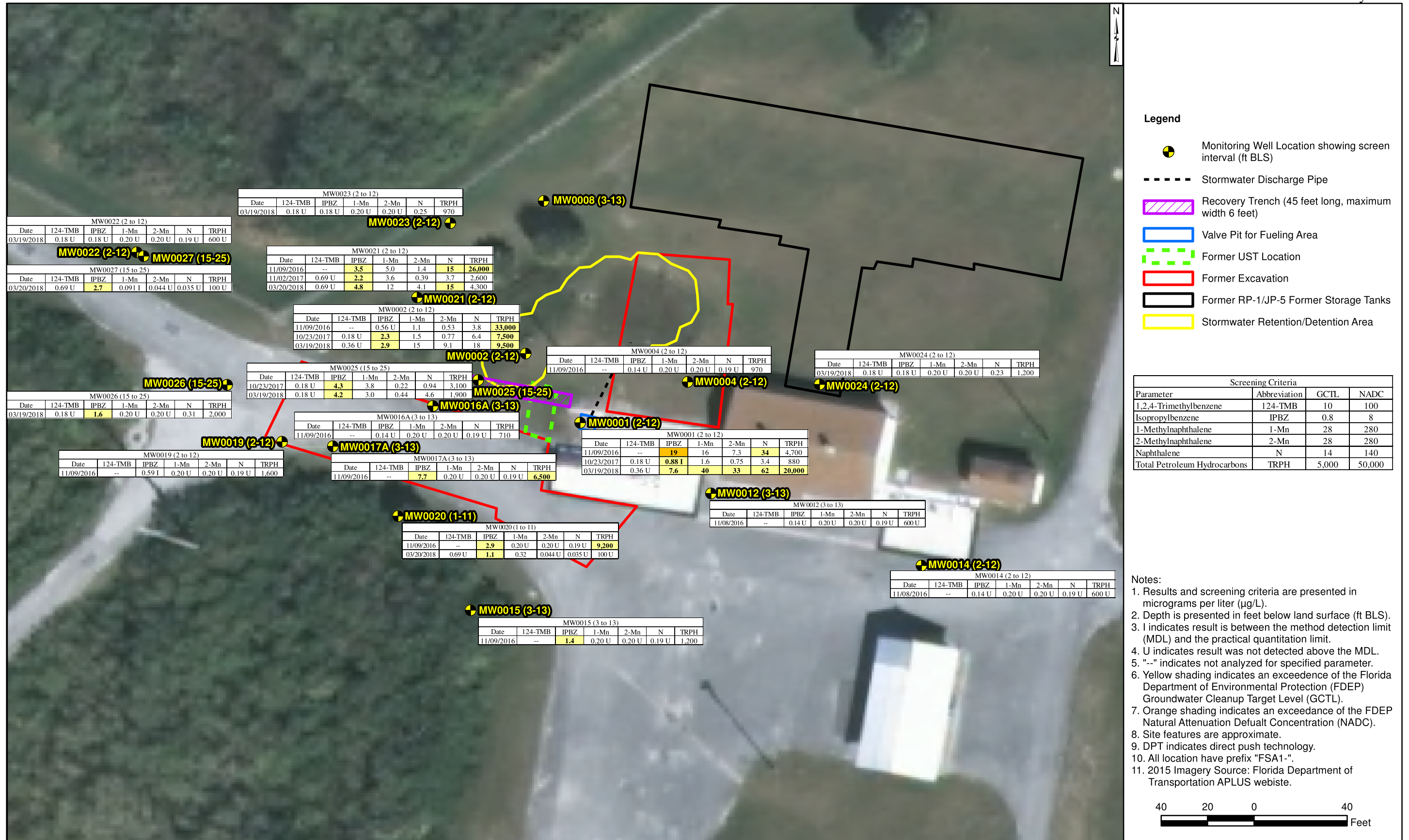
**FIGURE 4-7 GROUNDWATER RESULTS**  
**FUEL STORAGE AREA #1, KENNEDY SPACE CENTER, FLORIDA**





Path: (Titusville-01\DATA) T:\GIS\FR2894\_FSA\_1\MXDs\201805\_PM\_RPT\GW\_DPT\_results\_APR2018.mxd 11 May 2018 MAH

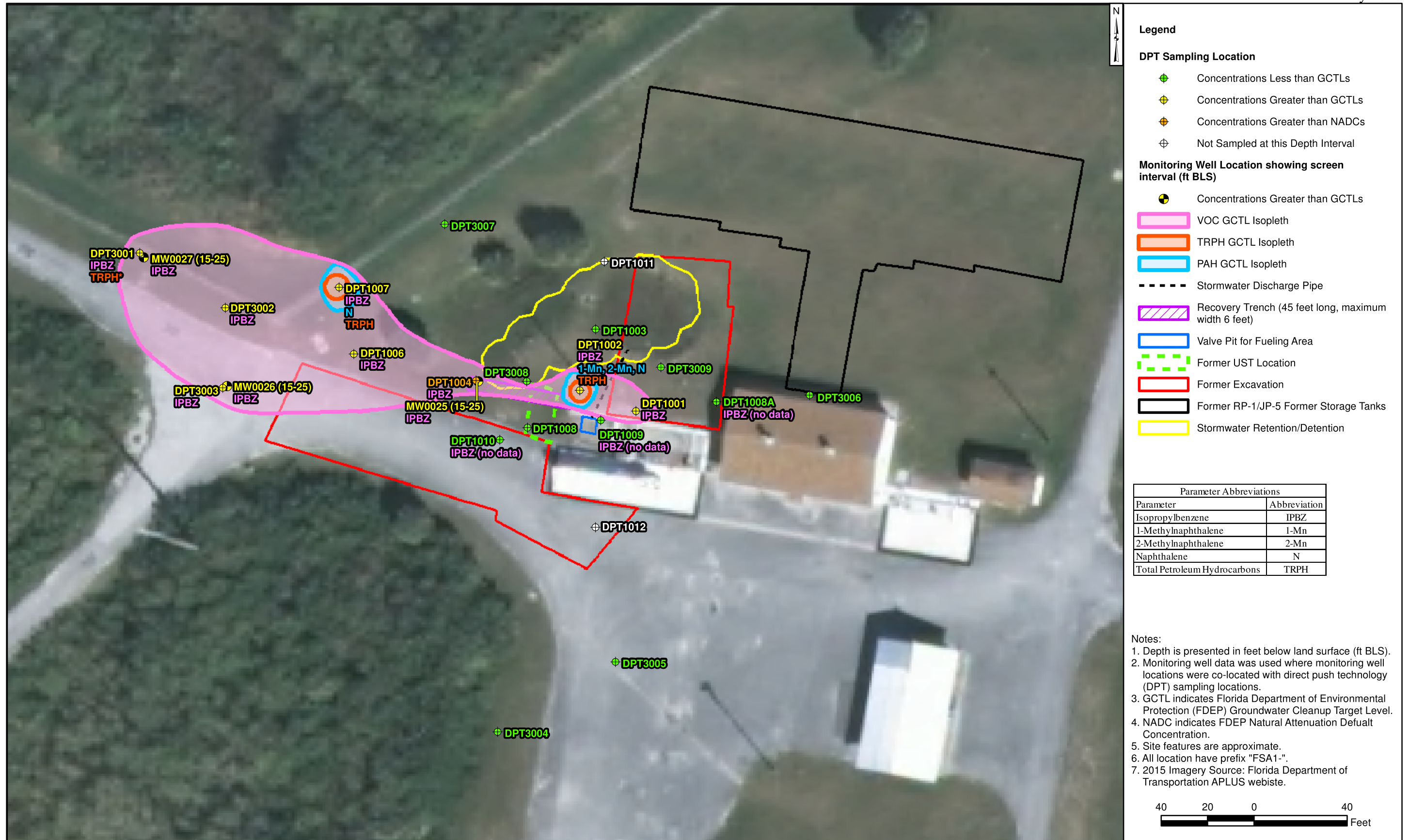
Figure 4-3  
 DPT Groundwater Sampling Results (2014 to 2017)  
 Fuel Storage Area #1 Underground Storage Tank (Building 1044) (PRL 157)  
 4-15/4-16



Path: (Titusville-01\DATA) T:\GIS\IFR2894\_FSA\_1\MXD\201805\_PM\_RPT\GW\_MW\_results\_APR2018.mxd 14 May 2018 MAH

Figure 4-4

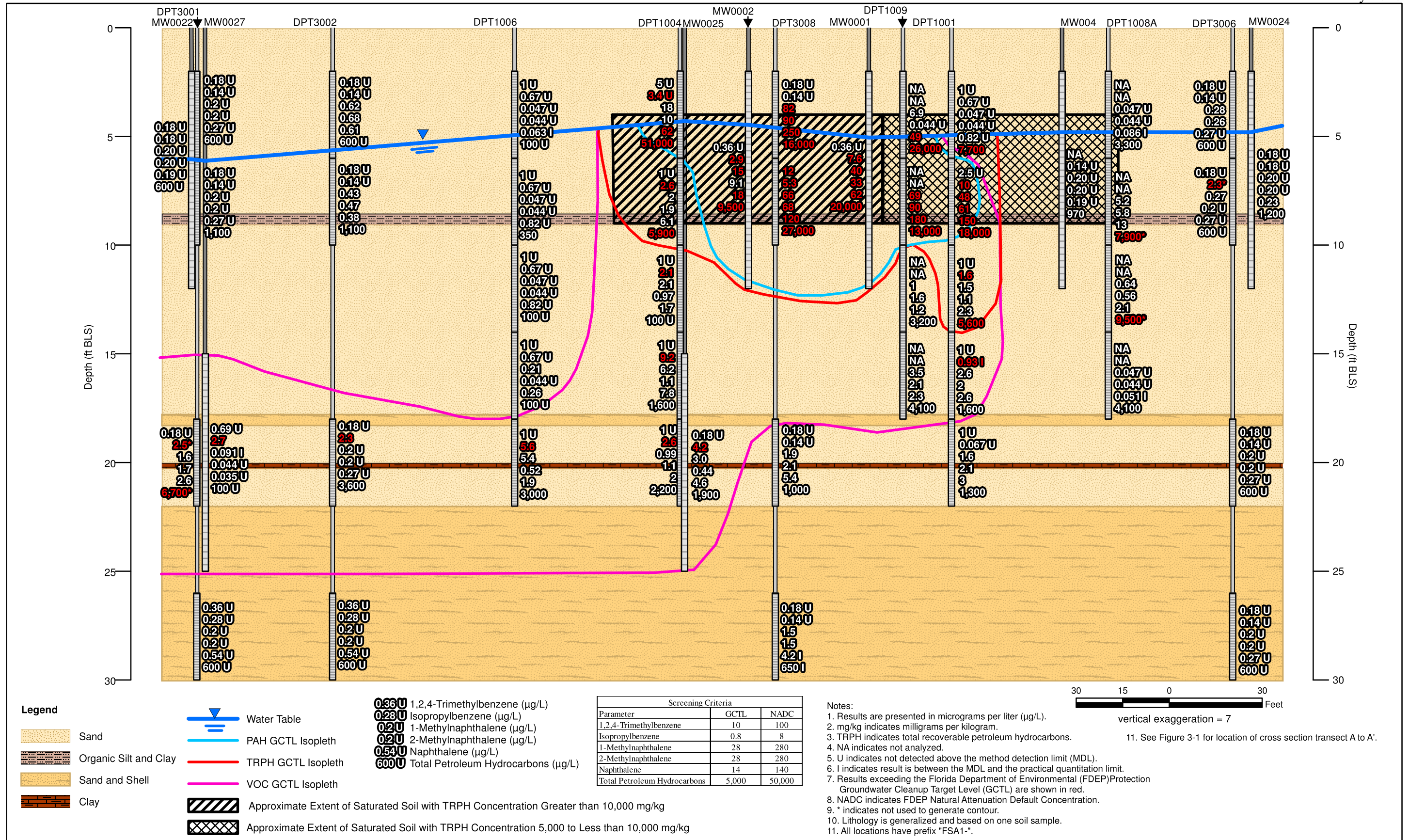
Monitoring Well Sampling Results (2016 to 2018)  
 Fuel Storage Area #1 Underground Storage Tank (Building 1044) (PRL 157)



Path: (Titusville-01\DATA) T:\0GIS\FR2894\_FSA\_1\MXDs\201805\_PM\_RPT\OverallExtent\MW\_DPT\_VOCs\_PAHs\_TRPH\_Greater\_15ftBLS.mxd 11 May 2018 MAH

Figure 4-8

Summary of Exceedances in Groundwater Greater than 15 ft BLS Based on DPT and Monitoring Well Results Fuel Storage Area #1 Underground Storage Tank (Building 1044) (PRL 157)



(Titusville-01)T:\0GIS\FR2894\_FSA\_1\MXD\201805\_PM\_RPT\CrossSection\_A\_A.mxd 5/11/2018 1:49:27 PM MAH

Figure 4-10

Cross Section Showing Summary of Exceedances in Groundwater Based on DPT and Monitoring Well Results Fuel Storage Area #1 Underground Storage Tank (Building 1044) (PRL 157)